

# Disrupting the Industry

## The innovations changing the way we mine

On September 12th 2018, Barrick Gold announced it will eliminate the executive role of Chief Innovation Officer as part of a broad decentralization push. Whilst adding that it will continue to work on innovation, this news is in line with the trend of major mining companies opting to rely on the service industry for the development and provision of new technology.

In the face of stiff competition for funding from the cannabis industry, and with commodity prices suffering, mining companies have had to look for innovative new methods to drive down costs and increase productivity. The epicenter of this wave of innovation can be found in the small mining town of Sudbury, Northern Ontario. World-renowned as the service and supply hub of Ontario mining, Sudbury is also home to a plethora of SMEs and organizations spearheading a technological revolution that is changing the way we mine.

A trip to the NORCAT Underground Centre at the Fecunis mine in Onaping, Ontario,

allows visitors a snapshot of the future, nurturing a robust innovation ecosystem that supports approximately 60 mining technology projects per year. "NORCAT is the only non-profit regional innovation center in the world that has an operating mine designed to enable start-ups, SMEs, and international companies to develop, test, and showcase new and innovative technologies in an operating mine environment," commented Don Duval, CEO of NORCAT.

One of the mining tech companies to have tested its products at the NORCAT Underground Centre is Maestro Digital Mine, who provide a complete automation network backbone and rugged IoT devices for underground mines. "Recognizing the industry's growing demand for data, and the challenges that many of our customers encountered with connecting ventilation solutions to their networks, we identified a gap in the market," said Michael Gribbons, co-founder of Maestro.

Creators of the Plexus PowerNet, the world's first powered coaxial Gigabit network,

Maestro Digital Mine have installed products in over 100 mines globally. Acknowledging that it has taken time to educate the mining community, Gribbons has noticed an acceleration in the uptake of digital connectivity solutions in the last twelve months: "Five or six years ago, companies did not put gas sensors in the mines, whereas today it is commonplace," he stated, continuing: "This momentum will continue to gain traction with the growing need for mining companies to reduce costs and become more productive."

Centric Mining Systems provides enterprise solutions software to mining companies worldwide, with offices in Sudbury and Perth, Australia. Recognizing that automated systems and technologies need to work in unison, Centric's technology unifies data streams into a single view and uses analytics and predictive analytics to interpret data. Utilizing WipWare fragmentation data, integrated with power consumption and recovery data from the mill, Centric has created an AI system then generates workable scenarios





Wray Carvelas, CEO and executive director, DRA Global.



Justin Taylor, president, Halyard.

of information. Chris Novak, CEO of Centric, explained: "We discovered that we could tune the drill and blast processes to optimize power usage in the mill and recovery, all based on fragmentation. By taking those four verticals: drill and blast, fragmentation, milling and grinding, and recovery at the processing plant, we could generate entirely new answers."

Another company investing in innovation to drive down costs is global consulting firm SRK, which recently acquired Sudbury-based mine simulation company, Labrecque Technologies. Gary Poxleitner, SRK's principal mining engineer, explained how this partnership can help customers visualize mining operations and plan accordingly: "Once a mine has been designed, Labrecque Technologies' software simulates processes that help clients accurately predict mine production and work out how best to equip their operations to maximize profitability."

### **Fortifying the foundations: The EPCM companies building the mines of the future**

The lack of new projects during the downturn forced engineering firms to reevaluate their approach, downsize, merge and innovate to enhance their capabilities and become leaner, more agile entities. However, the challenging conditions did not mean doom and gloom for all companies, as a broad spectrum of EPCM players from blue chip multi-nationals to new players in the market proved that adversity can create its own set of opportunities.

Multi-disciplinary EPCM group DRA Global has established itself as a credible and more agile alternative to the blue-chip engineering and project delivery companies, according to Wray Carvelas, DRA's CEO and executive director. Since 2016, acquisitions such as the Met-Chem business in Montreal and more recently Perth-based engineering company, Minnovo,

have strengthened DRA Global's platform in francophone Canada, francophone Africa and Australia, enhancing its open-pit mining capabilities. It has also allowed DRA to re-domicile its corporate holding company to Perth, in a strategic move to extend client-facing capabilities to ASX clients, complementing the Toronto and Montreal offices, which cater to TSX clients.

DRA offers the full life-cycle of services to its clients – from concept study through to commercial operation. Against this backdrop, it is advancing towards the digital mine: "DRA Global is investing in the transition towards predictive maintenance and prescriptive optimization of mine facilities, the backbone of which is MOMS (Mine Operations Management System), which is being used successfully across a number of our operations," explained Carvelas.

Another South African to have made a positive impact on the Ontario mining industry is Justin Taylor, president of engineering firm Halyard, who established the Toronto-based company in 2012 to focus on smaller, fast-tracked projects. Halyard has grown from one employee to a workforce of 22 people in its six years since creation, having worked for mining companies such as Harte Gold, Alamos Gold, Hudson Bay Minerals, Canada Fluorspar, LNS Greenland, Coeur Silver Tip, Dominion Diamond, Stornoway Diamonds and Agnico Eagle. Halyard won the EPCM contract for Harte Gold's Sugar Zone property, Ontario's newest gold mine, a fast-tracked project that took 15 months from beginning to completion. Since then, based on the delivery success of the initial project, Halyard has been asked to be involved in the expansion of the Sugar Zone mine. Taylor elaborated on the agility that Halyard can offer its clients: "We believe the large EPCM firms struggle to deliver smaller capital projects (below C\$60m) in a fast-track and efficient manner and this is the space we operate in."

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Cementation, recipients of the gold award in the Mining and Natural Resources category as one of Canada's Safest Employers for 2017, has developed a culture that permeates through the organization, assured Roy Slack, president of Cementation Canada. Slack recognizes that innovation is more than just a cost saving measure: "When you talk about innovation, it is not necessarily automation, but different processes that take people away from the face or away from the greatest risk. Separating people from the hazards is the next step from a safety standpoint, through remote operation and the development of processes."

Engineering giant Jacobs acquired CH2M Hill for US\$3.27 billion in December 2017, and has seen double-digit pro forma revenue and profit growth since the merger came into effect. In September 2018, it was announced that Sirius Potash will continue to move forward with their Wilton project, and Jacobs was awarded the material handling facility (MHF) construction contract, with construction due to start by Spring 2019. Jeremy Okolisan, VP of business development for the Americas for Jacobs MM&T (Mining Minerals & Technology) division, intends to leverage the experience of Jacobs Connected Enterprise (JCE) in sectors such as aerospace, to provide innovative solutions to the mining industry: "We want to adapt and bring these technologies into the mining sector, particularly in the areas of automation, control systems, monitoring and cyber security," he said.

### **OEMs making the transition from diesel power to battery electric vehicles**

In a similar vein to the automotive industry, mining equipment is rapidly making the transition from diesel-powered machinery to battery electric vehicles (BEVs). Increasing global emissions standards, the heightened awareness of the threat Nano diesel particulate matter (nDPM) poses to mine worker's health, in addition to the economic and safety benefits electrical equipment provides, are all factors contributing to an industry-wide push to electrify mining.

In February 2018, Sudbury-based RDH Mining Equipment was acquired by SMT Scharf AG from Hamm, Germany, subsequently creating RDH-Scharf. Gustavo Portulier, CEO and MD of RDH-Scharf, accredits the Canadian-German alliance for enlarging the company's global footprint and potential to take on more projects, as well as increasing its product line. RDH-Scharf is extending its regional targets by introducing battery technology with CODELCO in Chile, and Gustavo insists that the adoption of BEVs must

be a wholesale change: "There is no point in having one battery-operated machine when there are another ten working with diesel in the same project. This is a change that must happen from the start," he reflected.

Another OEM to undergo significant structural changes recently is global giant Epiroc, which listed on the Stockholm Stock Exchange as a separate entity to Atlas Copco on June 18th 2018. Epiroc collaborates with customers in more than 150 countries, had revenues of US\$3.7 billion in 2017, and employs more than 13,000 professionals globally. Epiroc has already achieved over 50,000 hours of automation and interoperability – the ability of different information technology systems and software applications to communicate, exchange data, and use the information that has been exchanged – in Canada to date. Jason Smith, general manager of Epiroc Canada, hopes to see the introduction of Epiroc's second generation of BEVs in Canada in 2019. Regarding their development timeline, Smith commented: "The first prototypes of the generation 2.0 BEVs are expected to be coming off our production lines in Q4 2018, with trials beginning in Europe together with our development mining partner."

### **The services that support the industry**

Since winning a five-year contract with Vale in 2015, Sudbury-based NATT Safety Services has focused on providing the full safety package as a turnkey operation – supplying rescue teams, developing rescue plans, performing hazard assessments and providing training. Mark Arnold, general manager of NATT Safety Service, divulged on the philosophy driving business growth: "We take care of our client's health and safety, so they can focus on their core business," he declared.

The mining industry contributes to over 30% of all business for Golder Associates, which provides consulting, design, and construction services in earth, environment, and related areas of energy. As mining companies become more aware of water management issues across the entire mine site, and energy reduction becomes an increasing priority, David Brown, principal of Golder's mine environment division, commented on Golder's intention to expand its presence in Ontario and across Canada: "We are starting to see upticks in the market and thus we are also in the process of attaining more staff to meet the industry demands," he said, continuing: "We would like to expand our integrated mine water management and treatment, and climate change and carbon emission reduction services."

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