ROUNDTABLE: Future opens up for new technology leader

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The leaders of Hexagon AB's new 'mining vertical', Hexagon Mining, gathered in Las Vegas, Nevada, last week for the group's major annual product display and customer event.

For Hexagon Mining president Guilherme Bastos, and division heads Haydn Roberts, John Davies and Urs Rothacher, a large part of the week was spent behind closed doors, mapping out a strategy aligned to mining's expanded appetite for technology, and demand for new solutions to long-term operating issues. They joined *Mining Journal* editor Richard Roberts for a round-table discussion about the future.

Mining Journal: Mining Journal has published a report on a survey conducted during the first half of this year, 10 technologies that will rock the mining world (to 2025). Interviews with, and responses from more than 70 mining companies, contractors, consulting firms and leading suppliers, indicated Big Data analytics, connectivity, mobility, and automation technologies head the list of technologies the industry sees as potentially game-changing. How do you see things in this regard?

John Davies: It's probably an amalgam for us. You talk about big data, supply chain optimisation, the digital mine; those are crossing the spectrum of some of the things we've got in our business plan. As a starting point for us, closing the loop between mine planning and actuals is a focus. When we talk to people in the industry they all say, yeah, that's exactly what we need.

Guilherme Bastos: We are in discussions right now about how we progress that. They [miners] need more integration; they need to eliminate the gaps between the key areas in the mining business. That's our DNA here – safety, fleet management, high-precision surveying, mine planning – no-one else can do that better than us I think.

JD: Certainly for us coming from the planning side this intersection with operations and breaking the discontinuity [in planning/operation information cycles] we see as vital. If we can achieve that we've kicked a huge goal, we think. And that's attainable for us in the short term.

MJ: It's not just about these new technologies either is it? We heard this morning about current technologies such as machine guidance and control, where [the mining industry speaker] said he thought the industry was using only 10-15% of the capability of the technology. That it was miles away from realising its full potential. So there would appear to be huge upside there for you guys and the industry generally?

Haydn Roberts: I think the poor use of machine guidance is due to the fact that the plans have not gone out into the field, and people in the office – the dispatchers – can't actually visually see the plans [against] what the machines in the field are doing. That's why I think the embedding of GeoMedia [Hexagon open GIS database software] into fleet management – this concept of putting terrain into the optimisation process along with time, tonnes and grade – is going to set machine guidance on fire. People are going to use it much more.

JD: There is the connection with surveying as well, because with GeoMedia and other Hexagon technologies we can connect the photogrammetry, lidar, and the scanners, and we can drop that into our planning/actual feedback loop. We can provide the total package.

HR: In the past if you wanted to send out the switchback design for a ramp design it could go out on a piece of paper, and you'd look at in the foreman's office, and someone would go out with pegs and peg it out. What you want to do though is send it out to that machine – the dozer or the front end loader – and see in a visually rich way the 3D nature of what the operator is doing and see how the work is progressing in relation to the plan, in real-time, whether that's back in the office or in the foreman's vehicle. That's been missing from machine guidance where you couldn't get really good designs to the machine and then also monitor it.

MJ: What about the training deficit and knowledge retention deficit in the industry which has been highlighted as being an issue not just for mining companies but for you guys as well, in the sense that if the people aren't there to really make the technology work as effectively as it can then there is only so much you can do to drive this forward. How much of a brake is that for you, potentially?

HR: I think you can do a certain amount of integration with the various platforms to make the workflow easier and more automated. That's one step that we want to take. The other I think is around big data analytics where you want to get, as we say, actionable information out of it in a succinct way. So smart dashboards that can actually indicate where you've got a problem in the mine, and identify for instance a shovel operator who is in the lower performance quartile. Help people identify continuous improvement opportunities, and utilise that in an application where you don't have to rely on your A-player foreman to do it, because I think that's a problem the industry has. If you get a good group of people together and they're really motivated in a mine, you'll sit down, work out how you're to do things and put a process in place. But it's ad-hoc and manual. When those guys leave or move on, it's gone; the process evaporates. If we can institutionalise that learning in the software solutions we offer and allow people to identify weak spots and opportunities, I think we can assist the industry with its knowledge retention and training issues. And we can also automate the workflows.

JD: There is a lot more to the convergence side of this too. Today we have operators sitting with lots of panels in front of them in a truck trying to figure out what's going on with each panel. Bringing together the technology into one platform and one display, you've solved a lot of training issues because now they're training on one platform rather than 10. And it's the same with software. We've seen [here] the great platforms being used in the construction and EPCM areas; they're using standard platforms, and we look at these and go wow, if we can standardise on some of these

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platforms in our software processes. Not right away, but in the future. Then we'll have a set of rich tools that everybody on the site – engineers, geologists, construction people – can all be using, with a standard interface, and that takes away training issues as well.

HR: The more we go to standard technologies off the shelf, the better.

JD: You guys [operations] talk a lot about that and I agree with that now that I see it in action.

GB: In terms of workflow automation I think we can compare with the use of Excel. When you have a very well designed spreadsheet and you lose the guy [who created it], you can forget about that Excel because only that guy uses it like that. So you are going to start from scratch in terms of the use of that spreadsheet in that environment. And that can be an input for our technology as well. Nowadays there a lot of companies that, between the plan and the operation, they have some very [customised] spreadsheets and if they lose this guy our system will be affected because we are waiting for that information in order to operate. This is the type of gap that, if we can eliminate it or improve the process then the new guy will have a better chance.

MJ: Morgan Stanley investment bank has said that "smart is the new big" in mining, in reference to yesterday's so-called technology, bigger equipment, being superseded by ICT and automation, etc, technology, as the new focus for mining's efficiency and productivity drive. Are they right about this or is the new technology still a nice-to-have rather than a must-have in the industry? Most mining companies still seem to be making so little headway with it.

HR: I think if you look at the top 10 mining companies' annual reports, every one of them is talking about moving to autonomous or smarter systems. They've all identified it I think at a strategic level that this is an important part of how they're going to operate in the new landscape, and what strikes me I think is how heavily automation gets mentioned – pretty much in all those reports. So I think smart is definitely an important part of pretty much every mining company's move forward. Interestingly, 15 years ago, you tried getting a contractor to buy a fleet management system and they just said, don't care, we've got great foremen, they go out and do it, why would I want a FMS? In fact they saw it as competition for their skill-set in terms of doing the mining. Today those contractors have all got a different approach. They all want a technology partner, like a Hexagon Mining, because they see that as an important part of how they're going to do business and compete against, let's face it, Komatsu and Caterpillar, because those guys are going to get into autonomous mining and they'll run the mine.

MJ: A lot of views of the mining industry still seem outdated, in the sense that people don't see miners as sophisticated users of technology. Do you think Hexagon AB investors have, or will they get, an appreciation of the value of this move into mining – the speed and possibly the scale of technology uptake in the industry – or will they discount it because of perceptions the industry is just slow to participate in the technology race, or in many cases isn't a participant?

GB: For me a smart mine is a way to optimise in a more global way. This is the message that I think we can help Hexagon to transmit. We are working with the industry to optimise from a … higher level, where we can align the thinking across safety, operations, etc. For sure the optimisation will change a little bit of the perception in one area, but the overall result will be significant improvement in performance.

HR: I agree and would say that it's that ability to act on real-time information and improve productivity and safety, and that in essence is the vision that we have in terms of what we want to provide as a Hexagon Mining division. We want to improve productivity and safety in real-time, and the problem in the past was that real-time data wasn't easily accessible to people, it was hard to get to. It was in a silo somewhere; it was in a surveyor's backpack, in a pick-up truck, waiting for a week to get into the office. Getting access to information in real-time, to improve productivity and safety, to me that's the essence of smart mining. And I think investors in Hexagon must understand [that] we've lost 10 CEOs of the top mining companies … and if they read their reports and see what they're saying now, they're saying we need more technology to improve what we do in the mine, to reduce capex, to reduce opex, and I think they can make the link to what we're doing and why Hexagon Mining has been formed. There might be a business for us there to go in and improve that productivity and performance.

JD: I think there's been a recognition in the past five years or so that technology is a solution to some of the efficiency problems, and there is a lot of technology out there – a lot of point solutions out there – but who's bringing it all together? The individual vendors, our [MineSight] size, are not able to. We can only handle our stuff. Everybody is waiting for someone to give them that technology spread and Hexagon has now done that.

MJ: Where do you see the US$500-to-1000 million a year 'mining' technology corporations of the next decade and beyond being focused – what is their business?

HR: I think to be in that space you need to be offering configurable solutions – probably a mix of hardware, sensors and software. Perhaps over time as devices become smarter and we move towards Android, and move towards more common technologies perhaps the hardware side might fall off into a commodity, and what replaces it for that $500 million company is that configurable solution that goes across the value chain. And then closely coupled with that is this life-of-mine type relationship that supports it … that also then extends into consulting services and change management. It's the same large organisation that's going to offer change management and consulting services to improve the use of those configurable solutions.

MJ: Who will your competition be?

JD: I think Guilherme identified it – it's got to be a technology player; someone who understands technology. Hexagon gets technology, that's their bread and butter. I don't think it's an equipment OEM group. The names that pop up all the time are the ABB-Ventyx, Schneider, GE. But there are a lot of groups out there talking, Hexagon has actually done it.

GB: We believe the mobile [mining] environment requires a specific focus. It really does create a lot of challenges. You don't know, for example, if you can really trust the wireless network all the time. So you have to design a system to take that into account. There are other mining technology verticals out there but we are focused on being number one in this [mobile mining] area.

MJ: *The Economist* ran a report last week referring to the 'Internet of nothings', questioning the real rate of growth in the consumer-focused IoT. However, it did highlight what it saw as one area of genuine IoT advancement: industrial heavy equipment, where it saw growth and positive outcomes. Mining might not be a big part of that yet, but do you see areas where mining could be a leader in technology development and application in future?

Urs Rothacher: Mining offers a unique environment in that it has a closed ecosystem. The vehicle-to-vehicle communication that we use for our collision avoidance system is something that will get into cars. Last Fall the National Transport Safety Board in the US recommended to put vehicle-to-vehicle into every highway truck

because they had a highway truck run into a school bus or something. Radar, or those types of sensors, wouldn't help in those situations. Similarly, again with the closed environment, the whole autonomous story is something that will arrive in mines before it's really on the roads.

HR: I think in mining in a way we actually do lead in some areas. You think about dispatching, which was done in mining in the early 80s: when was the first time it was done in a taxi in terms of it coming out as a marketable solution? So I think you're right, Urs, because we've got a captive market and customers who are willing to invest a bit in this area we do get to do some things like health monitoring in vehicles in real-time, interfacing into the vehicle information management system, and displaying it on a dashboard. You're getting it now in cars. Mining started down the autonomous road in the late 90s. I think we just didn't know it was going to get sexy and trendy and we didn't market it as such. This idea of activity based costing, too … we were all doing that when we were monitoring truck cycle times [in the 1980s].

GB: The sorts of consumer items people are talking about being connected via the Internet of things are really not providing the return on investment. But in a mine you are in front of a truck, or a crusher, a pump, and you have the same capacity to access the data and the necessity to access data and act. That's why it makes a lot of sense [in that heavy industry environment]. In mining, in this closed ecosystem like Urs said, this type of new technology is very welcome in this environment.

UR: There's a whole range of technologies that will be used in mines. For instance, UAVs … you can fly a UAV over a mine and no one will care; fly it over a city and you're in trouble.

HR: If you go back to 2001 and Modular [Mining Systems] introduced the first wireless system into a mine, a distributed wide area network. Nobody had thought about doing it. We moved off UHF and went to Wi-Fi and thought, everything is going to be enabled. And one of the things that Jon Olson did was to decide that, you know what, everything has got to have an IP address now; everything has got to be addressable in the mine, because we've got this connectivity. So we moved to an IP-based system and then it went one step further. There are sensors on a vehicle, so now the equipment manufacturers are actually putting IP addresses onto their sensors around the vehicle, again for connectivity and to be able to network. Because connectivity is not always there and sometimes the Wi-Fi drops off, the next thing was to develop database architecture to capture the information in real-time, time-stamp it, store it on board, and when it comes back into connectivity it uploads it.

So I think there's a lot of examples of where we're [mining] leading the way in a lot of things, and I think the Internet of things is another example where they've come out with a name for something that we've actually been doing for some time. We just don't realise it. We're not good at marketing.

MJ: Mining equipment manufacturing is growing in parts of Europe (Scandinavia), the US, China and India. Where do you see centres of mining technology development/ excellence emerging in future?

UR: They might go where the technology is, not so much where the mining is.

JD: We talk about it sometimes in terms of technology groups … clustering … but technology itself enables us to be anywhere.

UR: Strangely, we started a mining [technology] business in Switzerland, and it went quite well. And one of the reasons was probably that there was no domestic market, so from day one we knew we had to build something that works everywhere and treat everybody the same.

HR: I think globally the problem is that it's difficult to get good people – developers, and knowledge workers. You think in a place like America we're going to get loads of them. But it's actually very difficult to get good developers. One of the things that may happen over time is we may have to think about how we connect people globally, and have distributed development centres.

JD: It's not much different to the mine itself moving their staff out to remote operating centres. It's the same thing for us. We want to go where people are comfortable and happy and cheerful working. Vancouver is a great place to hire developers for us because there is a big gaming industry, electronic arts is there, and Disney just moved there. But it's a high cost centre, which negates some of that. We just go where we can get the talent basically. And I think, to your point, it's usually predicated on a few really smart, innovative guys. You always need the staff, but you need the critical thinkers, the champions, and we'll take them wherever they are. If they're living in Timbuktu, we'll grab them.

MJ: There has been a bit said and written of late about a return to 'in-sourcing' in mining, and returning the major 'cost-outs' of the past decade or so – from engineering and contract mining, to mineral assaying, etc – back into mining houses. One of the big three miners has already embarked on in-house development of what it sees as a differentiating technology division, but is this a trend that could encroach on, for example, some of that aftermarket/service business we alluded to earlier?

HR: I think the only thing that touches on with us is when they decide to do their own maintenance on their vehicles and so forth, which includes the software. We do have revenue from putting people on site doing things for them; changing out parts, looking after the software, maybe even doing the dispatching. So there may be some impact there. But then what takes over from that is they then want remote support. So it's not going to have a huge impact on us I believe.