The mining software market continues to evolve rapidly, with more functionality and capability from packages than ever before, reports Paul Moore

There has been significant consolidation to the mining software industry, most notably with the buyout of Gecoma by Dassault Systemes to become GEOVIA; but also CAE’s takeover of Datamine and a number of others. There is no question that these moves will help drive greater modelling, simulation and functionality capability at some of these groups; with mining software taking advantage of features already applied in other industries, from defence to aerospace; and automotive to oil/gas. Particularly with regard to 3D modelling, virtual mines and interactivity; the world of mining software is rapidly changing. And the more global the larger groups become, the more comprehensive the solutions offered to large mining groups with multiple operations are becoming.

Back in June 2012, Rick Moignard, the new GEOVIA CEO told IM: “Only in the past few years have we been seeing a genuinely global approach from some of the mining houses. However, we have now deepened our relationship with several key mining companies on a global basis. But more effective and more real time simulation, whether in surface or underground mining, will allow for faster decision making for global miners. They may even include virtual mines that are updated with the latest geological, equipment, production and development data in real time and could even be hosted on mining companies’ intranet systems. New systems will also be able to deal with the largest operations and the largest amounts of data; making environmental impacts of decisions more clear across the whole operation.”

The line between companies that offer respectively software for machine health monitoring; fleet management/ dispatch; enterprise resource planning (ERP); orebody modelling; and mine design/mine scheduling are also becoming more blurred. This is partly as some packages that combine previously distinct modules are now catering to a wider range of functions, but has also developed due to the level of data sharing that occurs in the industry anyway, as different software packages are hosted on the same networks and platforms. The evolution of 3D simulations of “virtual mines” is also driving this; as it allows the user to view and access much more data intuitively than before.

The links between different software areas are also arising through tie-ups such as CAE’s recent agreement to distribute Devex software; as well as Modular Mining’s joint project with Mintec – both these developments are reviewed in this article.

Despite consolidation and globalisation of the industry; the roots of mining software were in the entrepreneurial spirit and IT expertise of a handful of mining engineers and other professionals – something that is alive and well, and which some would argue has the ability to still produce innovations that drive progress in the sector. One manager at a smaller group told IM: “As some players have been engulfed by large industrials, hedge funds or the quarterly reporting cycle, the focus of the industry has changed, not necessarily for the better in all areas. In some cases, mining consulting divisions with software experts have been jettisoned as non-core businesses. These are established companies with global capability, but the number of mining experts they can bring to bear is reducing, and with it their pool of people who understand what the next innovations should be.”

The point has also been made in the industry that the recent consolidation has placed a significant proportion of the mine planning software market into large companies with potential access to budgets in the tens or hundreds of millions, as well as global marketing arms. It might have been expected that this would be the beginning of the end for the smaller players in the market. The reality, however, is that the market for smaller players remains quite healthy.

Not having the baggage of systems originally developed using older code is one significant reason, argue some newer players in the industry. Neil Tyson, Business Development Manager at Deswik comments: “Most if not all of the big names in the industry were coded in the 1990’s or earlier, using old but now obsolete languages and techniques. Large swathes of this code still sit beneath updated GUI’s, and this is what those large companies bought, and bought for very large multiples of earnings. By contrast, Deswik Suite has been written entirely using the latest techniques, and was architected from the beginning to facilitate developing new functionality. The result is that we can and do develop more functionality faster and for a much lower cost than any company still using legacy code. The implications are brutal – ourselves and other new generation companies will continue on a very steep development trajectory. Others will be faced with stark choices – invest large amounts in development and improvements based on the old code base, or start from scratch and renew their code base entirely.”

Complementary software
Already mentioned are the tie-ups between software groups that are allowing complementary packages to be offered to the mining industry – especially between mine fleet management and mine planning systems. CAE Mining and Devex recently announced a strategic partnership whereby CAE Mining will become a distributor of Devex’s leading mining operations management and optimisation solutions. The agreement grants CAE Mining exclusive rights to distribute Devex’s mining solutions in Canada, India, Russia, Azerbaijan, Armenia, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Tajikistan, Turkmenistan, Uzbekistan and Ukraine. The companies will
The Devex stand at MINExpo 2012 – the company has since announced a strategic partnership with CAE Mining

The companies stated: “Customers will benefit from the alliance as the combined offering of both companies covers the full spectrum from optimising strategic mine plans through to operational execution. They also give the capability to rapidly analyse and respond to changing conditions.”

“We have observed the trend of mining clients seeking to apply our sophisticated planning and optimisation technology on shorter and shorter timeframes, using them as decision support tools in constantly changing environments,” said CAE Mining President Damian McKay. “As a result, we have developed cloud-based versions of our strategic optimization products. This allows thousands of scenarios to be investigated very rapidly, a perfect complement to the Devex suite of operational management tools.” With CAE’s core expertise as a systems integrator, customers can benefit from these solutions together in an Integrated Operations Centre (IOC).

Likewise, Mintec’s MineSight Axis software and Modular Mining Systems’ ProVision 3 high-precision machine guidance software are being brought together in a joint company collaboration “for more precision in plans and work.” This integrated solution exploits Mintec’s modelling and mine planning tools and Modular’s high-precision machine guidance software for shovels, dozers, and drills. “Previously, mine personnel had to manually upload and download data between the mine planning and machine guidance applications,” explained Mintec Product Manager, Larry Berry. “Mines will save a huge amount of time with the automated data transfer.” The new integration will support automated, bidirectional communication between MineSight Axis and the ProVision 3 system, allowing supervisors to monitor and evaluate plan execution, and issue corrective actions to operators in real-time. “With our new, centralized approach, the mine plan updates the work plan, and the work plan updates the mine plan,” said William Nassauer, Product Manager, Machine Guidance at Modular. Mintec and Modular customers will be able to add the new functionality to their existing MineSight Axis and ProVision 3 tools via a remote software upgrade. For new installations, the integrated solution will come as an optional add-on to MineSight Axis and Provision 3 core products.

Modular Mining Systems has announced its attainment of Microsoft Gold-Level status in the Microsoft Partner Network program. The achievement demonstrates Modular’s “best in class” capability within a specific Microsoft solution area. To achieve this goal, select Modular employees had to prove proficiency through rigorous exams, application tests, customer references, and customer satisfaction surveys. A number of Modular employees also became Microsoft-certified in their individual areas of expertise.

Montreal-based Flairbase recently announced it has come to strategic partnership agreement with Autodesk. Flairbase’s flagship Amine mining solution is integrated with AutoCAD. As an Autodesk Partner, Flairbase will work closely with Autodesk on product integration opportunities in order to enhance the ability of mining engineers and geologists to bring and analyse data within the CAD environment, as well as joint marketing and consulting opportunities in the world wide mining market. “Users of AutoCAD in the mining industry will benefit immensely from having access to powerful tools for planning, design and analysis at all stages of a mine’s life cycle. We are very excited to be working more closely with Autodesk on a number of levels,” said Gaetan Leonard, President and Co-Founder of Flairbase. “Mining is an important and growing business segment for Autodesk,” said Paul Donnelly, Business Line Manager for Natural Resources at Autodesk. “The interoperability and integration of Amine with AutoCAD make Flairbase an important partner for us. Autodesk offers a broad portfolio of solutions to help consultants and owners build and manage their mining infrastructure, including the Autodesk Infrastructure Design Suite, which has AutoCAD as a key component. The integration of Flairbase’s mining suite enhances these offerings and adds important capabilities in the areas of mine planning, design, engineering and geology.”

“The ability to utilise the powerful AutoCAD engine has allowed Flairbase to develop products uniquely suited for the mining market,” said Shawn Romkey, Product Manager for Flairbase. “Closer integration and cooperation will allow us to improve that experience for the benefit of our customers.”

Amine is a suite of modules running on the AutoCAD engine to allow mining engineers and geologists to streamline their work and increase their productivity. The main modules are: the Drawing Manager, Geology and Block Model evaluation, Section Cutting, Mine Layout, Surveying, Drilling and Blasting, Stope Dilution Modeling, Graphical Document Management, Mine Grid and Plotting, 3D Visualisation Tools, and Ventilation. Corelog for AutoCAD allows exploration geologists to plot, visualise and analyse data within the AutoCAD environment.

GEOVIA advances GEMS further

GEOVIA continues to make improvements and enhancements across its range of software solutions, arguably the broadest and most comprehensive in the industry. Available in the first quarter of 2013, GEMS 6.5 will provide many new features designed to save time and improve productivity, including a new drillhole planning feature will save geologists and engineers a significant amount of time in designing drillholes for exploration, mine planning and design. The new version also has a quicker, more robust solids repair functionality reduces manual solids validation time from days to minutes. As with Surpac, this version will deliver the new integrated Dynamic Shells tool for significant time savings when initially evaluating deposits, while implicit modelling allows users to interactively create grade shells from drillholes and sample information. New and integrated with both GEMS and Gemcom Surpac, the Dynamic Shells tool is designed to save time when initially evaluating deposits and
can assist in generating surfaces and solids in moments as opposed to hours.

Using implicit modelling, Dynamic Shells allows geologists to interactively create 3D grade shells from geologic data. It overcomes the previously mentioned challenges by providing quick results with a clean dynamic interface. Dynamic Shells does not replace solids and block modelling, but is available as an additional tool that will provide a better, quicker and more flexible resource analysis capability to the mining industry.

The company states: “Most mine planning software is based on the idea that solid models are built manually using a geologic understanding of an ore deposit – a traditional solid model. These traditional models are still required as they take into account an understanding of geology, geotechnical data, faulting, depositional mechanisms and local trends. Block modelling is currently the way to model and visualise grades in 3D, but to achieve a result requires experience and significant analysis. Traditional methods are time consuming and do not allow visualisation of pure data, and this is where Dynamic Shells can help.”

As opposed to “explicit modelling”, a laborious process in which the geologist explicitly digitises grade boundaries on section, and turns them into grade shells, implicit modelling requires minimal input from the user. It estimates sample data into a 3D lattice, and creates contours or isosurface shells from the estimated data; allowing for a very fast interpretation of the nature of the deposit. As stated, the company describes it not as a replacement but providing “geometric guidance” to traditional solid/polygon modelling. Direct integration with GEMS prevents the need to reformat and perform import and export between different software packages. In addition, a new solids repair panel makes it easier to visualise problem areas with a solid

For the mining and exploration industry, The software captures, validates, stores and manages data from a variety of sources. MICROMINE has also recently received two sets of software accreditations from Microsoft. For the second year in a row, MICROMINE has been awarded Microsoft Gold Partner Certification as an Independent Software Vendor. In order to achieve this, the company’s flagship geological exploration and mine design solution, Micromine, has been certified Windows 8 Compatible. In achieving this certification as an Independent Software Vendor, MICROMINE was required to demonstrate excellence in technical expertise and outstanding experience in the field of information technology. “By achieving a gold competency, partners have demonstrated the highest, most consistent capability and commitment to the latest Microsoft technology,” said Jon Roskill, Corporate Vice President, Worldwide Partner Group at Microsoft Corp.

“These partners have a deep expertise that puts them in the top 1% of our partner ecosystem, and their proficiency will help customers drive innovative solutions on the latest Microsoft technology.”

Following on from being certified Windows 7 Compatible, the company’s Micromine solution has been tested to meet all of the technical requirements to receive compatibility certification, and then become certified Windows 8 Compatible. Scott Pleiter, Software Development Manager, Micromine says: “Since the first versions of Microsoft Windows operating systems, we have strived to ensure our product has been at the forefront of compatibility. Now that Micromine 2011 is Windows 8 Compatible, and appears in the Windows Compatibility Centre, our customers can upgrade with the confidence that our software will not require any compatibility configuration to work correctly on Windows 8.”

In the wider organisation, MICROMINE has opened a new office in Gävle, Sweden, which it
Maptek, has released Vulcan 8.2 to its global license base of more than 6,000 users. The new tools, updates and features in Vulcan 8.2 “provide the increased speed, efficiency and usability that modern mining demands”, says the company. An improved software experience complemented by a walk-through document, release notes and tutorials has been rolled out. A customer request for generating strategic pit and dump designs prompted development of the new Rapid Pit Design tool, which has been released in Vulcan 8.2. Mine planning engineers can quickly create mid-bench based designs, and generate phases and reserve reports. With this tool users can evaluate multiple designs in the same amount of time they would traditionally create a single design.

“Vulcan 8.2 allows users to evaluate multiple designs in the same amount of time they would traditionally create a single design great user experience,” commented Uecker. ‘We increased test assets by 53% for this release and feedback from our beta testers has been very positive overall.’

Efficient pit optimisation development

ThreeDify has launched ThreeDify FlowPit v5, which features a new pushback designer and NPV scheduler for enhanced strategic options analysis and can be deployed as an add-in to Microsoft Excel. The company states: “This major milestone release adds a slew of new functionality and flexibility, making FlowPit an ideal tool for strategic options analysis as well as Life Of Mine schedule optimisations. Other notable additions include an integrated 3D visualiser, the ability to allow the user to vary pit slopes by both azimuth and level, and the ability to publish the resulting phase-pits and scheduled periods as interactive 3D models to Microsoft Word, Excel and PowerPoint. Another enhancement in v5 is the ability to vary pit slopes not only by azimuth, but also by level or depth using the new Slope Geometry module.

ThreeDify Excel CoreBlock v3, a 3D drill hole data visualiser and simplified ore reserve estimator deployed as an add-in for Microsoft Excel. ThreeDify Excel CoreBlock (CoreBlock), previously known as Excel CoreViz, is a member of the ThreeDify GeoOffice Suite. The company states that CoreBlock is not only created for geologists, but also for other stakeholders, such as investors, fund managers, and property owners. To view their properties, they can freely share CoreBlock-powered Excel worksheets or animation videos exported by CoreBlock without resorting to other expensive geological modelling packages.

A new round of MineQuest seminars

Mintec is continuing its regular MineQuest series of seminars with the first 2013 event in Tucson, Arizona, from April 15-19. MineQuest 2013 will be the 30th anniversary of Mintec’s series of seminars, kicked off annually in Tucson before rolling out to Mintec branches around the world. New for MineQuest 2013 will be MineSight Atlas, an activity and resource-based scheduler; MineSight Implicit Modelling Utility, a mathematical tool enabling geologists to build complex shapes directly from drillholes; MineSight Performance Manager, “the newest, fully-integrated addition to MineSight’s operational product suite, featuring consolidated reporting and true mining analytics”; and MineSight Reserve, which unifies the consolidated power of MineSight’s reserve engines and features a completely integrated reserve calculation and reporting engine. Other featured modules will be
MineSight Stope, a complete toolkit for stope design, scheduling and reporting; MineSight Dump Design, which designs dumps and stockpiles, targeting on a specified volume; and MineSight Surface Resloping Tool, an "invaluable addition" to MineSight 3D's Engineering Open Pit CAD, enabling engineers to reduce a shape, such as a waste dump, to a desired final slope while balancing cut and fill. Finally, MineSight Sub-Blocking extends MineSight model files to convey detailed information along, for example, contact boundaries of geologic zones; while Model Center initialises and manages models directly from MineSight 3D.

In addition to new products, the group will show numerous improvements to some of its flagship products," said Davies. Those products include MineSight 3D, MineSight Torque, MineSight Schedule Optimiser, MineSight Strategic Planner, MineSight Haulage, MineSight Basis and MineSight Economic Planner.

All MineSight planning products integrate completely with MS3D for reserves, visualisation and design. This avoids importing geometry and reserves from a third party; and it avoids repeating the process to simply alter a mining shape's geometry. MSIP and MSHaulage enjoy interoperability with MS3D, and recent technology has given MSSO a direct link to MS3D. MineSight Atlas will integrate seamlessly with MS3D for direct design, query, display and reserve calculations. MineSight STP scheduling tools can all schedule on multiple block models.

MineSight planning products streamline use by firstly keeping all the functionality within a single product suite. This avoids unnecessary data transfer, and cultivates products focused on workflow. MSSO is an example: all available constraints are exposed to the user for intuitive definition, as opposed to detailed scripted commands.

MineSight says it continues to pursue "class-leading planning tools delivering performance and usability." MineSight Atlas is being integrated with MS3D, allowing dynamic cut design and reserve calculation across multiple block models. Resources assigned to activities can be levelled and material routed through a network of destinations. All geometry results, including destinations, can be quickly animated for the user, displayed in a Gantt view or summarised in one of the many reporting methods.

**Mine dewatering modelling**

ARANZ Geo, developer of the 3D geological modelling Leapfrog software suite, has announced an agreement with DHI-WASY, developer of fluid flow modelling software FEFLOW, to develop and market a complete hydrogeological modelling solution. The solution extends the current linkages between Leapfrog’s hydrogeological solution Leapfrog Hydro and FEFLOW to “provide significant benefits for users focusing on mine dewatering and remediation.” Shaun Maloney, CEO of ARANZ Geo, says, “The agreement brings together best-in-class geologic and groundwater modelling tools to provide a complete solution in groundwater modelling. Leapfrog’s ability to model complicated geologies combined with FEFLOW’s capability in flow modelling creates a compelling proposition.”

Users can easily build detailed geologic models in Leapfrog Hydro and seamlessly transfer them to FEFLOW to handle the most demanding groundwater simulation tasks. Both Leapfrog Hydro and FEFLOW feature state-of-the-art interactive 3D graphical capabilities. Peter Schätzl, FEFLOW Business Area Manager at DHI Group, says, “This seamlessly integrated software solution covers the entire groundwater modelling workflow. Previously a gap existed between geological modelling packages and hydraulic modelling software. By bridging that gap our users can provide better and more reliable modelling results to their clients in less time.”

The solution will have many hydrogeological and low temperature geothermal applications. Leapfrog’s ability to model complicated geologies allied with FEFLOW’s prowess in flow modelling will provide significant benefits for users focusing on mine dewatering and remediation, say the two companies. Leapfrog Hydro provides dynamic, flexible and extremely fast interactive geological modelling incorporating a multitude of data sources including well logs, sections, and GIS data. FEFLOW allows advanced subsurface-simulation combined with highly flexible meshing. FEFLOW models fluid flow and transport of dissolved contaminants and/or heat transport processes in the subsurface. Users can seamlessly work between Leapfrog Hydro and FEFLOW. Starting with FEFLOW the advanced FEFLOW 2D mesh generation options allow users to create an optimal horizontal mesh for the groundwater simulation task at hand. Leapfrog Hydro then allows users to build a 3D mesh geometry based on the geological model and the imported 2D mesh. The 3D model and lithology material properties can be exported into the FEFLOW format. Users can then complete initial and boundary conditions and build a groundwater model as complex as required for their application. The groundwater model can then be run and calibrated. Model geometry and geological data can then be compared.

**Keeping to schedule**

MineMax has done a lot of research into how mines schedule and how automated packages can best offer results. With manual scheduling, it can be difficult to ensure multiple targets are met. Furthermore, running schedules for multiple scenarios often requires more time than is available. With automated scheduling, schedules are computed quickly, giving planners...
MINING SOFTWARE

The new Scheduler 6 from MineMax greatly enhances reporting with the addition of user-defined dashboards

The company argues that there is a role for target based scheduling. Targets are similar to goals that you try to achieve or get as close to as possible. However, there are other situations where a mine will want to develop a schedule that satisfies a hard constraint. An example of this is a need to ship a product of a fixed specification, based on sales contracts. A below-spec product will either be unsaleable or will incur a significant penalty. The mine will want to know if a schedule exists that will satisfy these constraints, not just get close to them. This is where a constraint based scheduling system should be used to generate your schedules.

“Optimised scheduling can be set up to deliver a schedule that will maximize the value of your project (NPV). Once your model is set up, you can consider how changes to your constraints or equipment will impact the schedule as you optimize different scenarios. Comparing several optimised schedules can assist you to choose the one that gives the best long-term value to your operation.”

The company has now been providing mine planning and scheduling solutions and services to the mining industry for over 15 years. Its solutions cover the whole spectrum of strategic and operational mine planning, and they help mining companies achieve production requirements, maximise resource utilization, and optimise business value. Scheduler software is now used in over 35 countries by companies including Anglo American, Barrick, BHP Billiton, Freeport, Newmont, Rio Tinto, Vale and Xstrata.

The latest version of Minemax Scheduler, Version 6 features 64 bit parallel optimisation, new intuitive workflows, SQL Server database technology, a “fresh easy-to-use interface”, robust scenario management and user-defined reporting dashboards. Extensive development in consultation with industry and users has resulted in the all new Minemax Scheduler Version 6 which is even more powerful and easy to use. The architecture has been re-engineered using SQL Server database technology to store and manage schedules, resulting in simplified project and scenario management. Multiple product editions are now available to enable planners, managers, and executives to easily interact, share schedules, and make coordinated responses to schedule changes. Reporting has been greatly enhanced with the addition of user-defined dashboards, a facility for comparing multiple scenarios and a reporting framework which interfaces to Word and Excel. A free Viewer edition allows anyone to inspect a schedule and its associated reports. Scheduler’s user interface has also been completely redesigned using Microsoft’s Windows Presentation Foundation for a fresh new Windows 8 look. The intuitive workflows provide for natural progress through the scheduling process. Building upon Minemax Scheduler’s industry-proven optimisation capabilities, Version 6 now comes with 64 bit optimisation to support larger scheduling problems. Additionally, the incorporation of parallel optimisation technology helps users generate scenario schedules much faster.

Minemax Scheduler Viewer allows anyone to view schedules including reporting dashboards and 3D animations. Mines can also view all model parameters for validation purposes. Minemax Scheduler Viewer is useful for internal schedule collaboration within a mining company or for clients of consulting companies to easily review and validate results. Scheduler Viewer is free, and can be downloaded here with sample projects included:

- Scheduler 6 allows a mine to rapidly analyse multiple economic/production/infrastructure scenarios; compute high-value, practical schedules; minimize up-front waste movement; maximize recovery through consistent feed grade to plant; increase competitiveness with tight controls on product grade; determine effective intermediate stockpile management strategies; and develop a set of contingency plans for possible economic/market changes. It also allows determining of optimal truck fleet size and ramp-up schedule and optimal cut-off and cut-over decisions in the context of complex scheduling constraints.

Runge has released XACT 1.7, the latest update of its widely used short-term mine scheduling solution. The company believes that XACT 1.7’s 3D visualisation and reporting features represent major improvements on what was previously available. “Our XACT customers are used to their planners being able to collaborate with XACT, while retaining complete visibility of who has changed what,” said Sean Stewart, Innovation Program Leader – Technology, at Runge. “With the new release, we’ve improved graphics and reporting to give users an even better picture, and even more certainty.” XACT 1.7 delivers improved 3D graphics, with spatial data plots replacing standard polygon graphics. It also opens the door to faster reporting, and adapts the popular “stage plans” from Runge’s long-term scheduling mainstay, XPAC.

Chris Taylor, Senior Mining Consultant in Runge’s North American regional office, has already been using some of the new features of XACT 1.7 for projects utilising Runge consulting services. “In particular, I’ve found stage plans to be extremely useful in maintaining a strong connection between my long-term and short-term scheduling scenarios.”

XACT 1.7 allows for superior communication, whether through collaboration, or reporting to internal and external stakeholders. “We’re giving our customers more and more ways to communicate their plans,” said Stewart. “With XACT 1.7, you can see more, analyze better and deliver improved results.”

Brisbane hotspots
Brisbane-based Deswik Software no longer sees itself as a niche player, with an 80 strong team and software in use at over 100 mines and projects worldwide, supported by consulting offices in South Africa, North America, Europe and its home markets of Western Australia and East Coast Australia, along with business partners in South America.

The company believes that it now has a mine planning system that is a contender in all four main sectors of underground and open pit coal and hard rock. Neil Tyson, Business Development Manager, comments: “This is not done by trying to fit planning practices to the tool - we developed a powerful platform that can have sector specific functionality added to it, without compromise. The results are that we can compete in diverse markets, which is insulating
It directly integrates with Deswik.CAD and the Deswik Interactive Scheduler to allow simple updating of mining task information from the graphics, while reading and writing both Microsoft Project and EPS (Enhanced Production Scheduler) file formats facilitating seamless data exchange. Deswik Interactive Scheduler "provides the mine planning engineer with all the tools required to produce detailed mine reserves and schedule mining activities. Utilising 3D spatial data (mine designs, survey and geological), the software provides a simple, work flow driven user interface to guide the user through the process of creating a long, short or medium term mine plan for either an open pit or underground mine."

In other offerings, Deswik says it has addressed the shortfalls in existing dump scheduling and truck haulage techniques by working with industry to develop tools that quickly determine dump schedules and truck requirements based on a mining schedule. Utilising spatial dump and mining data, process flows and automation of repetitive processes, the Deswik Landform and Haulage Solution is capable of rapidly examining multiple dumping scenarios to determine both least cost and practical dumping strategies. Further, the truck calibration tools utilise existing trucking information to calibrate the theoretical truck requirements and provide far more accurate results from a haulage analysis.

Tyson concludes: "Deswik’s role in this business is to trigger a step change in mine planning efficiency. Our start was in identifying laborious or repetitive aspects of mine planning tasks, and improving based on the demands of our consultants and their clients, and this continues to underpin our story. For a number of years, as the industry became more frenetic in its pace and challenges, the techniques for the core business of creating a mine design, undertaking scheduling and examining scenarios stood still, which sowed the seeds for where we are today."

Also Brisbane-headquartered, Oniqua MRO Analytics, a leading provider of analytics-based MRO optimisation solutions for asset-intensive organisations, has announced the release of the Oniqua Analytics Solution (OAS) Version 6.4 – the company’s most advanced software offering to date. OAS 6.4 supports a full array of 24 value-based elements, extending OAS capabilities across six key MRO (maintenance, repair and operations) value domains, including: Equipment Performance, Maintenance Effectiveness, Inventory Optimisation, Procurement Effectiveness, Supplier Performance and Supply Chain Effectiveness.

"As a long time Oniqua customer, we've derived significant value from Oniqua's MRO inventory optimisation capabilities," stated Matthew Cain, Manager Supply and Contracts, Xstrata Copper, "and we’re excited about achieving similar results from the wider range of capabilities now available in OAS 6.4. Cost pressures are only increasing across the mining industry, and OAS 6.4 will enable our executives and plant managers alike to leverage the power of advanced analytics to better control our MRO-related costs, reduce downtime and improve service levels."

"OAS 6.4 represents a landmark release for Oniqua," stated Andy Hill, CEO and Co-Founder, Oniqua MRO Analytics. "It goes a long way in advancing our vision of providing the most value-rich, end-to-end MRO analytics software solution in the industry. It is our philosophy that the greatest value comes when high levels of visibility and cooperation exist across supply chain and maintenance teams. OAS 6.4 strongly promotes this concept, further amplifying the value and efficiencies that can be achieved across the entire MRO asset value chain."

With a newly architected user interface designed for seamless cross-domain analytics, OAS 6.4 delivers "an extensive set of new and enhanced asset performance management capabilities", including cross-domain analytics including failure analysis; identification of poor performing equipment; related parts identification "where-used" through BOM and/or issues; optimised reordering parameters; and supplier performance reviews. It also incorporates new and enhanced functionality including asset performance visibility; equipment failure analysis; maintenance performance visibility; maintenance forecasting; quick reporting with Web Intelligence; workflow and approvals; work queues by business unit; quick metrics; and streamlined MRP/Lot Size validation. A new look and feel includes interactive visual analytics; a unified User Interface with embedded business intelligence and reporting; rapid drill down and cross-domain relationship.

Small but nimble
It has already been stated that the market beyond the largest groups remains healthy and dynamic, with a number of smaller players retaining their niches due to the unique aspects of their offerings.
Denver-based Randall K Martin (RKM) and Associates is a small, independent group of engineers that have specialised in software applications in the mining industry since 1995. The company comments: “We sell excellent 3D Modelling Software products at very affordable prices. We pride ourselves in top quality service and mining software systems. MicroMODEL is a full-featured deposit modelling and mine planning software. MicroMODEL is an inexpensive mine software alternative to complicated, high-priced mine planning software packages. We urge you to compare the features of MicroMODEL to Gemcom, MineSight, DataMine, and others. Many of these high priced systems require months of training in order to use them effectively. In comparison, MicroMODEL is only a fraction of the cost and is easier to both learn and use.”

RKM’s PolyMap is ideal for open pit mining with its interactive graphical input and display programs for both geologic data and open pit mining design. It enhances the capabilities of MicroMODEL. PolyMap simplifies map digitising of complex geology. Open pit mining geology can be digitised in sections or plans, and the intercepts from one set of maps can be easily transferred to another set, for example, section to plan. PolyMap’s interactive open pit mining design program allows the user to design open pits using single or multiple benching, variable slopes by rock type, and variable road grades and widths. EZVol is a simple interactive tool which allows the user to calculate stockpile volumes based on a survey of the base perimeter plus a survey of the stockpile surface. EZVol displays the stockpile volume in cubic feet, cubic yards, or cubic metres. The user can enter a density factor for the stockpile material, and the program will display the total weight of the stockpile. Display options include survey points, TIN (Triangulated Network) surfaces, contour plot of stockpile thickness, and 3D solid mesh view. The 3D display can be viewed at various angles, and at a range of vertical exaggeration scales. Interfaces exist for Trimble POS, enCampo, Laser Atlanta, or generic XYZ data.

Henderson, Nevada-based C Tech Development Corporation’s EVS and MVS software packages “unite advanced gridding, geostatistical analysis, and fully three-dimensional visualization tools into a software system developed to address the needs of all earth science disciplines.” The graphical user interface is integrated with modular analysis and graphics routines. The more advanced versions of the software allow these modules to be customized and combined “to satisfy the analysis and visualisation needs of any application.” The software can be used to analyse all types of analytes and geophysical data in any environment. C Tech’s software is used by government agencies, universities and companies around the world. Customers include the UN, US EPA, Environment Canada, US Geological Survey, and British Geological Survey. Environmental database and data management software products such as ESRI’s ArcView, ArcInfo and ArcGIS, EarthSoft’s EQuits, ESCis, ESdat, and Microsoft Access are also supported.

Many of the newer and fastest growing providers are also located in the fastest growing mining markets. Netcad, based in Turkey has the NETPRO/Mine mining solution that according to the company “performs all stages of ore body modelling in surface and underground mining.” The system is described as a broad and experienced 3D CAD and GIS platform based on unique specifications but also being flexible and open to software development. “What of’ types of analysis are possible, enabling the user to test the accuracy of models. NETPRO/Mine is available in English, Turkish and Russian.

Modules include Digital Terrain Modelling (DTM), with the ability to construct digital terrain models from different data types and triangulation scales; as well as the ability to perform addition, rotation, clipping and copying of triangles; and drawing contour lines for terrain and writing elevations. Borehole Editor allows for easy and fast data input and access, with spatial and vectoral data types stored in a GIS database. The module is used for grouping or categorising drill hole and log information into different groups as defined by user; with query, filtering and thematic display according to any attribute. The module has a wide range of user defined symbol, lithology and texture libraries and automatically creates drill hole log reports. The Geological Solid Modelling module allows users to draw cross-sections in any direction and create surfaces using geostatistical methods, with interpolation and extrapolation according to the defined border, arithmetic computation between surfaces, and solid model generation from cross-sections to points. Faults and folds can be inserted into the solid model. Other modules cover Resource and Reserve Estimation, Surface Mining design, Underground Mining design; 3D and Stereo Visualisation; and GIS Integration.

Beijing-based 3DMine states that it is “the first mining software company to copyright in China”, describing its approach as combining international mainstream software functions with design functionality. The company’s systems also have compatible statistical links with other well-known software brands worldwide. Although based in China, 3DMine states that it has already extended its market overseas to the point of publishing an English version of the software, while also now employing foreign representatives. The company states: “Our software Mining Office is the only tool you’ll need. If you have used AutoCAD in the past, you will find it easy to adapt to our software system...3DMine software’s excellent quality and functionality provides our customers with professional local exploration guidance, technical support and consulting assistance. Consequently, we have received enthusiastic responses from customers engaged in domestic mining, exploration, and scientific research who have used our products, with favourable feedback from their professional technicians and experts.”

3DMine’s multi-purpose software product “focuses on resource and reserve management, as well as open pit and underground mining, and includes the survey functions needed by geologists, engineers, surveyors and managers. The company says it has incorporated sophisticated module units into Mining Office including CAD, geological databases, DTM, solid modelling, block modelling, opencast and underground design, open pit scheduling, and surveying and plotting.

Mine and fleet management

Released for MINExpo 2012, Carlson Software’s all-new Carlson Fleet Manager Office is designed to handle the two-way communications, data transfer, and remote monitoring of machines on a modern, connected mine-site. Carlson Fleet Manager Office is a completely updated and enhanced Command & Control monitoring and data management system that increases both safety and productivity by transmitting data from the machines to the office and from the office to the machines. “The system transmits in real-time via standard wireless and mesh networks,” says Randy Noland, VP of Carlson Machine Control. “However, static connectivity is also supported to allow data to be stored locally in each machine and copied to a thumb drive for post analysis.”

Managers can see and monitor multiple machines in multiple views. Activity, GPS status, delay/idle or down time can all be monitored and then reporting functions allow these aspects to be analysed. Additional outputs include real time cut/fill and real time elevation at one site or multiple sites all from one location, plus existing surface from all machines at a mine site.

Projects can be created for an entire fleet, saving the time necessary to do each individually, all with a dynamic change function – making a change in one aspect of the project will then be updated throughout the system.
MINING SOFTWARE

with Carlson Fleet Manager Office. This scalable remote monitoring tool facilitates productivity analysis and data management while providing avoidance zones and on-site proximity warnings. It also enhances training opportunities and allows for troubleshooting across many aspects of a mine site. The system transmits through GSM/CDMA cellular, standard wireless and mesh networks. All data is hosted and owned by the user. “This software benefits strongly from Carlson’s extensive experience with the close managing needs of mining operations,” adds Josh Weber, Carlson Machine Control Product Manager. “This program not only monitors your project site and equipment, it increases safety while saving users time and money and reducing energy use.”

Additionally, the new Carlson TruckPro 2.0, part of Carlson Machine Control’s “Complete & Open Mining Solutions” is a GPS-based assignment and tracking system for haul trucks. It helps optimise operations by enabling dispatch operators to know haul truck locations and material types during transit, even in low visibility conditions. TruckPro is designed to aid the shift foreman or engineer in calculating material types and tonnages hauled for the shift. The heavy equipment operator can get instant feedback on their performance statistics; thus giving them goals in which to better perform. Carlson TruckPro 2.0 has been completely rebuilt on the same platform as Carlson’s popular Mining Grade software, which is used in its MineRover products. This offers interoperability, which translates into ease of use and seamless workflow, as well as the same file structure between applications. In addition, TruckPro, which is scalable to accommodate varied infrastructure, adheres to Carlson’s Open Positioning Architecture (OPA) and supports data share, multi-GNSS receivers.

GE’s Proficy MaxxMine remote monitoring and diagnostic solution was part of the company’s launch at MINEEXPO 2012. The MaxxMine software solution combines process and asset optimisation in a single offering enabling mine operators to make timely and accurate decisions that balance process performance with equipment health.

The Proficy MaxxMine solution increases performance optimisation by improving operating results through better asset and process performance, utilisation, and planning. GE also states that it increases operational visibility, helping companies get the most out of their available resources and meet production targets safely. It also maximises the time that equipment is reliable to produce ROA and the solution allows for quick, planned repairs, but only when they are needed.

“The solution provides quantified productivity benefits based on proven technology that monitors more than 4,000 assets from our remote monitoring and diagnostic centre in Chicago,” said Derick Moolman, Mining Segment Leader, GE Intelligent Platforms. “Our customers report a return on investment in six to 12 months – and more than 95% renew their subscriptions each year.”

VIST Group is Russia’s leading fleet management and dispatch software system provider, led by its “Karier” (Quarry) system, used at over 30 of the largest mining projects in the country and additional mining customers in Ukraine, Mongolia, Kazakhstan and elsewhere. While the technology behind its systems are similar to offerings from other leading fleet management solution providers, VIST told IM it believes that its advantage lies in functionality – in that its system covers the whole inclusive fleet down to ancillary water trucks, graders and dozers, even mine locomotives and railcars – not just the core truck and shovel fleet. The VIST system also offers complete fleet wide fuel consumption throughout the mine, from the fuel procurement and storage through to delivery to mining equipment. IM met with VIST Director General, Dmitry Vladimirov at the recent Tehgormet conference in St Petersburg, and the interview is a High Profile article in this issue.