Tim Horsley, Mining Manager at global specialist consultancy Coffey Mining, says he stops work when he can’t save a client a substantial amount of money in an hour of mine optimisation analysis. He told IM that mine optimisation doesn’t need to take a lot of time or be an expensive exercise, but has very real potential to add significant value, sometimes in the order of hundreds of millions of dollars over the life of an operation. However, he warns that such gains can only be made by looking at the big picture of the entire operational process.

“Mine optimisation should be approached from a broad perspective, as it is rarely the case that parts of the process can be optimised in isolation,” he said. “If you specifically focus on one part of the value chain there is a risk of transferring costs or reducing revenue elsewhere.”

Horsley believes in a balanced approach to mine planning, emphasising that it is vital to work with understanding of the synergies that exist between different areas within a mine project. “Synergies between the processes can add or destroy value and so it is vital that the project process is assessed from the in-situ resource through to cash revenue generation. There is a significant amount of value to be realised by being able to model and understand these synergies, particularly with respect to the definition of ore locally within a mine and how this impacts on productivities, costs and the downstream processes,” he said.

“This is particularly important in an underground mine where the orebody geometry can have a significant impact on the mine layout and production efficiency. For example, having a more flexible approach to cut-off grade can allow for more stable stopes that are easier to drill and blast, resulting in higher production capacity and lower costs.”

Horsley said that by looking at both the mining method and the equipment used from a broader perspective, losses in the chain can be more clearly identified and potential improvements made from there.

Although the resources downturn meant that many mine operators are looking to make savings wherever they can, Horsley believes that mine optimisation is such an important process that it should be prioritised by organisations throughout the price cycle.

“The key to a mine’s longer term viability is to maintain a continuous focus on optimisation in good times as well as bad,” he said. “A thorough study can provide compelling ways of streamlining a mine’s current operations and would provide a life-of-mine optimisation model which can be periodically updated, and optimisations re-run with minimal effort. Keeping such a model current provides a valuable tool for scenario analysis planning and allows a mine operator to react very quickly to changing circumstances.”

According to Norman Lock, Coffey Mining’s Regional Manager - Canada, it is the cashed up companies that often neglect to pay attention to optimising value and keeping costs as low as possible in good times. “The first things to go in a downturn are exploration and drilling, and so it is the organisations that have planned for the cyclical nature of the industry who will survive and see the cycle out in relatively good shape.

“Just as no battlefield general would go into a fight without a backup plan, planning for a downturn and optimising your operations so you are running to peak efficiency in good times as well as bad is the most prudent management strategy.”

Donald Polly, Senior Mining Engineer at Skelly and Loy, notes “the benefits of a well-designed mine are extraordinary, ranging from operational advantages, such as shorter haul distances and less waste handling, to economic gains for the operator. Without proper planning, reserves may be sterilised unnecessarily and it may be difficult to meet certain product grade requirements.” A block model is one of the tools used by Skelly and Loy in mine planning when site geology and product grade are variable. “Within the context of a mining operation, a block model refers to a three-dimensional graphical representation of the physical and chemical properties of the mineral resource,” Polly explains.

“Depending on the site-specific needs of the operation, the block model can be as detailed or as generalised as so desired by the operator. The process for creating a block model begins with a...
drilling and sampling program and is followed by data analysis, and then input into appropriate computer software that generates the 3D block model.

“Carlson 2009 (CAD-based software) is the most widely used design and mapping software in the mining industry. In the summer of 2008, Skelly and Loy worked closely with Carlson representatives to revamp the software’s block modelling capabilities to meet or exceed current mining industry standards.”

The detailed block model discussion can be found at http://www.skellyloy.com/Pressroom/MiningPortal/mp/Volume VII, Issue 3 Portal.pdf

Maximising NPV
Datamine has been taking a fresh look at mine optimisation. “Three years ago we asked our customers what concerns them most about mine planning,” explains CEO Nick Beaton. “And almost every time it boiled down to the same issues - orebody knowledge, optimised mine design and integrated production scheduling. So we’ve been making radical changes to our products and consulting services to address these basic needs.”

Datamine started by rethinking the block model. “Most mines use models comprised of two components: geological structure and metal grades, but today’s thought leaders are using much more sophisticated models that include geotechnical and geometallurgical parameters as well,” adds Technical Director, Andy Lapworth. “So we have worked with those leaders to develop tools for what we call multi-parametric models.”

Datamine has been collaborating with Anglo Platinum in South Africa and The WH Bryan Mining and Geology Research Centre (University of Queensland) to develop techniques and software for 3D modelling of geotechnical parameters. It has wrapped the technology and the techniques into an integrated service offering and working with the Bryan Centre has now taken the technology to mines all around the world.

With a detailed model of the main geotechnical parameters like RMR rock mass rating, UCS uniaxial compressive strength, FF fracture frequency and rock quality domain, engineers can achieve a whole new level of mine optimisation; slope design can be altered dynamically depending on the position, orientation and depth of the proposed pit, saving millions of dollars in waste extraction over mine life. Datamine has made changes to Datamine Studio block modelling, and to NPV Scheduler, its strategic open-pit planning system, to generate pits and pushbacks using dynamic slope designs that are optimised to the modelled geotechnical parameters.

The geotechnical models can also be used to derive short-term improvements by optimising fragmentation profiles to operational activities. Datamine has reworked its blast design software Geotech Modeller so that individual blasts use a Blastability Index to adjust the spacing, charging and detonation according to the demands of the local geotechnical model. It claims customers have seen the optimised fragmentation profiles improve the loading rates of shovels at the face as well as improve throughput times for ore in the SAG mills.

It sounds simple but the approach is quite sophisticated. The first stage is to collect all the geotechnical data in the mine into one database and then determine the location of (and controls on) the geotechnical domains within the orebody.
Once those have been established, sophisticated geostatistical techniques are used to model rock properties within the domains and add them to the multi-parametric model.

Each project is reviewed by experts from the Bryan Centre to ensure the model is calibrated and workable. They also work with Datamine to assess whether the data coverage is patchy or out of date in order to establish a “sustainable geotechnical model” for the customer.

As part of this initiative Datamine has also formed an alliance with the CSIRO in Australia to integrate the Sirovision product into its data capture line up. Sirovision is a new technology for automated remote mapping and capture of rock mass properties and it is one of the tools to ensure the geotechnical model is “kept alive” with new data.

Collaborating with the top research bodies around the world is a deeply seated philosophy within Datamine. For the last three years it has also been a sponsor of AMIRA’s P843 project for Geometallurgical Mapping and Mine Planning (GEM III). This project (and the follow on P843a project) is doing for geometallurgy what has already been done in the geotechnical arena – enabling detailed 3D models of multiple parameters – all a part of modern mine optimisation. Datamine has developed case studies with the research team and is already actively working on bringing geometallurgical modelling tools to the market.

It has also been sponsoring AMIRA’s P884 PRIMO (Planning & Rapid Integrated Mine Optimisation) project that aims to bring the types of optimisation tools available in open pit to the world of underground mining. The first products resulting from that research are emerging now, with Mineable Stope Optimiser (MSO) currently being released around the world. This automates the detailed task of finalising the design of underground stopes within an identified ore zone.

“This is a great product,” says Datamine’s General Manager in Australia, Brad Barker. “It is the perfect follow on for our very popular Mineable Reserves Optimiser and takes the back-breaking work out of stope design.”

“No one has a monopoly on innovation,” says Lapworth. “So we look for areas of expertise around the world. We have always had a knack for commercialising the work of development partners such as GijimaAst and Century Systems. Our next product to be released shortly was developed by the Canadian research institute MIRARCO, so finding leading research, collaborating with the developers on the software and commercialising it around the world is a core skill for Datamine.” In all cases the software is reviewed very carefully with the original developers and then amended so that it integrates seamlessly with the other products in Datamine’s “solution footprint”.

James Newland, Operations Manager in Datamine’s R&D centre in England brings another perspective to this. “We recently released our Interactive Short Term Scheduler (ISTS) which is a great product. It’s for short term open pit scheduling and can schedule right down to a shift-by-shift basis driven by the engineer coordinating production targets, the available shovels, the maximum truck hours and of course what blast blocks are available in the next few days or weeks. It gives the planner complete visual control of every aspect of the schedule, while at the same time giving them automated tools for blending and optimisation.”

Newland elaborates further, “Most of the mining technical products on the market are single user, ‘practitioner’ software systems. There are a lot of sophisticated software tools available from Datamine and our competitors, and they may be targeted at geologists or the mine planners, but they are used by individual users, not groups of users working as a team.”

Newland is correct, these products aren’t really enterprise systems the way ERP systems are. They may be used by the resource management team or the short term planning team, but in the end they are single user systems and co-ordination is up to the team. It is a bit like everyone trying to use the same Microsoft Excel file at the same time to complete the company budget.

This where Datamine’s new MineTrust product comes in. “This is a real breakthrough,” says MineTrust Project Manager Mike Lafferty. “MineTrust is the glue that holds all of these systems together; whether they have been developed by Datamine, by our partners or even by our competitors. Every mine has lots of products developed by Datamine and our competitors, and they are a lot of sophisticated software tools available from different vendors. MineTrust is the framework for data management and process workflow management for all of them. It can convert any product in mining into a multi-user system, and do that over a LAN, a WAN or a global corporate network. Our customers will fire up Datamine Studio and see it as the product they are familiar with, but within a fully managed multi-user environment.”

MineTrust should become a major tool for mine optimisation. It will allow teams to collaborate and follow the same process workflows regardless of their level of skill with the individual products. The system is strong on visualisation and allows users to search for, and then visualise, the data and files of many of the industry’s well known products. It also allows the user to define workflows for how processes such as generating block models, creating blast design and performing scheduling tasks. “This is the way of the future,” says Newland.
Underground design package
International engineering and project management company, AMEC has chosen to increase its use of Maptek™ Vulcan software for mine planning and mine design applications.
AMEC supplies high-value consultancy, engineering and project management services and considers Vulcan to be a proven 3D geological modelling and mine planning package which remains at the forefront of innovation in mining technology solutions.

Newmont Mining has selected the Maptek MineSuite production management information system for its Leeville and Midas underground gold operations in Nevada, USA. It is intended that MineSuite will fulfil requirements for increased productivity and performance by providing shift managers with real-time information on production as well as the status of equipment, delays and assignments. Decreased maintenance downtime is another key benefit of the system. This results from accurate reporting and the ability to receive real-time maintenance information in the underground environment during the current shift.

Stratified specialists
Gemcom Software International has released Gemcom Minex™ 6.0, which it says is “the only integrated end-to-end mining software specifically designed for coal and other stratified deposits such as lignite, phosphate, bauxite, iron ore, and platinum. Minex fully integrates all aspects of mining from exploration through rehabilitation, ensuring that resources are evaluated accurately and mined efficiently, improving productivity and profitability throughout the mining lifecycle.”

“Minex provides us with an integrated system for surveying, modelling, planning, and blast design so we can manipulate data and interchange information freely. Any kind of manual re-entry always opens up room for error; the same holds true if you’re exchanging data electronically between systems with incompatible formats. Minex helps us avoid these risks,” said Steven Sides, Vice President of Technical Services, Carbones del Cerrejón. “Minex helps Cerrejón develop effective mine plans that can be utilised to make prudent business decisions. It gives us an important edge as we compete with other producers around the
The visualisation achievable through Ventsim is gathering many plaudits from those using it world. We are only as good as the vendors that serve us, and Cerrejón is very fortunate to partner with a company like Gemcom."

Effective mine scheduling is a critical part of any mining operation, especially in today’s economy. Minex 6.0 incorporates new, feature-rich capabilities in this area. The software provides mine planners with more scheduling options with the addition of detailed interactive scheduling capabilities to the system. Using this approach allows the creation of schedules by interacting with 3D graphic displays generated directly from seam models, pit designs and reserves. Users also have the option of scheduling to meet volume or tonnage requirements in a given period.

“Smart scheduling of layered deposits, using tools specifically designed for the task, can be the difference between an operation being viable, and one being marginal or losing money. Minex provides numerous scheduling tools to help our clients get the most from their mines, while efficiently planning the costly extraction of waste material,” said Mark Godresse, Technical Product Manager Stratified Deposits, Gemcom. “With the depth of scheduling capabilities inside of Minex, mine planners have the industry’s most robust range of decision making and communication tools available to them. For example, they can run multiple what-if scenarios to find the best scheduling options and then watch and share animations that accurately represent what the customers are looking at, allowing the identification of potentially costly problems.”

Additional benefits of Minex 6.0 include:

- Developed specifically for coal and other stratified deposits, providing a decision-making environment that reflects the reality of these kinds of operations and the needs of geologists, engineers, surveyors and others who drive them.
- Rapid modelling of all stratified deposit types, including large, deep and complex data-intensive coal projects. Minex’s high-speed and efficient modelling technology offers significant time and cost savings over other mining packages.
- Lower total cost of ownership through the integration of geology, optimisation, design, planning, scheduling, survey, rehabilitation and other functions.
- Visual confirmation of each stage of the modelling and design process to ensure full confidence in the final model, resources and reserves.
- Reduction of data duplication by easily connecting to corporate databases and common file and data storage formats, including GIS, CAD and other mine planning data.

See it as it is

Visualisation is one criterion that is setting competing systems apart these days. Ventsim Visual has accumulated many plaudits from those using it and seeing it. It features a fully 3D graphics interface with scaled airway solids or wireframes. It offers super fast and smooth rotation and scaling regardless of network complexity. It allows the colouring of airways by flow, pressure, elevation, cost, heat and dozens of other data types for easy visual analysis and interpretation. It is fully editable in 3D with a natural easy to learn 3D interface and has many new features such as full thermodynamic heat simulation, economic airway size predictor, recirculation predictor, and variable speed fans that can be switched on or off. It remains fully compatible with all Version 3 network models and can import VnetPC files and DXF graphics files.

Beck Arndt Engineering (BAE) is also generating great interest for its visualisation developments. In a step change beyond traditional processes, Abaqus finite element analysis (FEA) software from SIMULIA (the Dassault Systèmes’ brand for realistic simulation) is being used to enhance mine design and engineering simulation in North and South America, Africa and Australia to evaluate safety and improve design planning, implementation, and operations. BAE is a pioneer in this area. The consultancy has worked closely with engineers at SIMULIA Australia to expand the use of Abaqus FEA simulation software for mining applications.

BHP Billiton is among the early users of mine-ready FEA technology. With BAE’s help, BHP has already applied this technology to evaluate mines in Canada and Australia. At the BHP Billiton Nickel West Perseverance Deeps project in Western Australia, Abaqus FEA software is now being used to help engineer the safety and productivity of planned deep-mining operations.

To achieve this goal in the deep-mining environment requires significant technological innovation. Using measurements of site deformation and seismicity, Abaqus FEA models have been calibrated and, in a single day, used to simulate a full, 3D, inelastic analysis of a mine’s life cycle.

In recent years, similar applications at Deobwana’s Jwaneng mine in Botswana, the Newcrest Mining Ridgeway Deeps project in New South Wales, Australia, and Rio Tinto’s Argyle diamond mine in Western Australia have also established Abaqus FEA analysis as a leading technology for multi scale, simulation-aided mining engineering.

Another one popular for its visualisation attributes is GijmaAST’s mineORBIT, which has received much praise for its visual tools. GijmaAST Global Mining Solutions aspires to be No.1 in the world in the mining technical systems market, according to HighGrade (September 21-27). It is closely linked with Britain’s Datamine.

Dynamic mine planning

Runge has received two patent rights (No 2006279250 and No 200800449) related to the methodology of the overall framework called ‘method and system of integrated mine planning’ of its enterprise solution, Mining Dynamics. The process has been pioneered by Runge for over four years and has proven to improve predictability of mining operations which have a high degree of dynamic variability. The methodology couples business process execution with comprehensive access to information. Any information from geology through to mine engineering/planning/scheduling, operations and reconciliation can
be easily visualised, interrogated and reported to the executive, operations and systems management teams.

Glen Kuntz, Runge’s VP Enterprise Mining Solution says: “The overall methodology and system patent can be summed up as the three Cs of simplicity - communication, co-ordination and collaboration to deliver the right information to the right people at the right time. This methodology provides the ability to quickly collaborate in order to harmonise new ideas, win support and deliver ground breaking initiatives. These in turn generate short and long-term growth while significantly driving a competitive advantage.”

Mine planning is non-linear and dynamic and the use of Enterprise Resource Planning (ERP) systems is widespread. Whilst predictable supply inputs have been successful in the use of ERP systems, mining operations are different and have inherently unique characteristics. The planning components of ERP systems, designed for other industries and deployed within a mining operation, are not suitable without the direct coupling and integration of spatial mining information with transactional financial information. In order to achieve this level of integration Runge has formed business and technology partnerships with ERP companies, such as SAP.

Kuntz continues: “Successful mining operations depend on the availability and reliability of information in order to make critical every day decisions. Because of the complexity of mining data and the spatial characteristics associated with it, rapid universal access to trusted and accurate information has traditionally been difficult. Basing decisions on data that is misplaced, not universally accessible, out-dated, or incomplete can at best become a bottleneck in the decision making process and at worst be operationally and financially devastating. Mining Dynamics reliably co-ordinates and manages both the common and unique data types associated with any mining operation and enables the integration, visualisation, and comprehensive management of the wide variety of mining data, regardless of its origin or software platform”.

When it comes to mine development, the SimMine Development Package is easy-to-use and powerful software to plan, simulate and evaluate the development process underground. SimMine says that by using the software “as the method of verification of plans, you will get more accurate results than from commonly used spreadsheet based schedulers.”

It allows users to test long- and short-term schedules ahead of time to see if development targets can be met, and also to compare different scenarios to yield an improved development schedule. It also provides for:
- Analysis of multiple infrastructure scenarios
- Identifying critical paths and critical start date in development projects
- Evaluating best shift schedules to meet development rate demands
- Testing what priorities will best achieve your development goals
- Simulating drift development with both single and multiple headings for long access drives
- Finding the most cost effective way to develop a mine and finding the optimal fleet size, number of operators and best shift schedule
- Reducing bottlenecks and equipment conflicts
- Determining the effectiveness of changing fleet size, either by acquisition or removal of equipment

No programming skills are needed, nor use of outside consultant’s expertise. The first step is to import your existing mine layout, design the simulation model and set your parameters. Then create your development plan according to time limits, predecessor and priority. Step 3 is to simulate your development plan and
evaluate the results and then, find the best solution by using the SimStat function or by performing repeated tests. You can watch ongoing operations (e.g. daily operations, development progress and equipment movement) animated on the screen to validate equipment assignments and section priorities. This allows analysis of machine interactions and development delays for better understanding of the statistical results generated by the model itself. You can analyse development delays due to equipment downtime and the effects of maintenance improvements. Animation allows management to view proposed changes and provides a means for greater buy-in by the management team. It also provides an educational tool for teaching operators and supervisors how the system will operate. Management, scheduling, maintenance, and operational strategies can be explored with increased understanding of the complex interactions that exist in the development process.

Currently SimMine is only available for underground development, but the company is developing modules for production and a open pit module will also be developed during 2010.

Upgrades
Mintec’s flagship software, MineSight, is a comprehensive suite of powerful analytical, planning and design tools that enable mining and geology professionals to manage the entire lifecycle of a mining enterprise. During the recent economic downturn Mintec significantly ramped up production of new features and applications. The vision was simple: “to ensure our clients had the tools needed to work even more efficiently during difficult times.” The company now offers many improvements and new features in its current software packages.

The most recent addition to the already powerful suite is MineSight Drillhole (MSDH). Conceptualised as a repository for life-of-mine drillhole and blasthole data, Mintec says “MSDH has set the bar far higher by providing on-the-fly editing and query, browse, and filtered search capability. MSDH has rigorous data integrity and validation, plus extensive auditing and data security functionality.”

MineSight Schedule Optimizer (MSSO) generates medium to short term schedules that satisfy all project quality and quantity constraints, destination capacities, equipment resources, and economic parameters. In addition to its ability to determine cut mining sequence, which achieves the highest project profitability, MSSO also includes the capability to work with multiple ore cases, multiple material cases, and variable bench height models.

Another exciting addition is the introduction of MineSight Axis (MSAxes). Available in four separate modules, MSAxes unites various MineSight tools to provide true business
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intelligence to the professionals in the different, and highly specialised, parts of the mine process. MSAxis Drill & Blast and MSAxis Grade Control are already in use worldwide and Mintec expects the release of the final two modules, MSAxis Production Management and MSAxis Reconciliation, in the near future.

MSAxis Drill & Blast unites the tools of the blast engineer, providing quick attribution and reporting of blasthole data. The ability to rapidly view and edit blast area-of-effects offers more efficient planning, thus saving operational costs.

MSAxis Grade Control simplifies the process of acquiring information, cut planning, and daily reporting, freeing grade control engineers to spend more of their time making the important decisions.

MSAxis Production Management is being designed to help operations with material tracking and other in-mine processes. Being able to follow material destinations on a truck-by-truck basis enables detailed stockpile reclamation on a level previously unattainable and helps prevent misrouting which can critically diminish profitability.

MSAxis Reconciliation will allow for great flexibility in reporting. Drill and model reconciliation, resource leak, and model inconsistency reports can be produced in a few short steps.

MineMap recently completed an upgrade of its Mine Design Software 'MineMap'. The company notes that "as one of the earliest developers of mining software we are critically aware of the importance of maintaining a clear understanding of what clients want - an easy to use, reliable, competence and cost effective mining design package that can be used for all commodities and phases of an operation from green fields exploration through mine design to rehabilitation for both open-pit and underground mines.

Gemcom has released Gemcom Whittle™ 4.3, the latest version of its strategic mine planning software for open pits. Whittle is very popular with exploration and mining companies because it enables them to determine their investment strategy and to deliver robust mine plans that maximise profitability by taking into account real mining constraints.

"The development of robust mine plans that withstand the volatility of prices, costs and demand is more important than ever and the re-evaluation of mine plans in today’s market is a necessity," said Cindy Tonkin, Technical Product Manager - Scheduling and Optimisation at Gemcom. "For sound decision-making, you need straightforward tools that allow you to analyse different alternatives and which produce trusted results. This means that all physical and economic information must be available for easy review and that users must have the ability to ask questions about their input sensitivities and carry out what-if or scenario analyses. Whittle allows such analyses to be run easily and quickly, which helps save costs and drive mine value through the selection of a good planning strategy."

Samuel Takyi, Senior Mine Planning Engineer, Etruscan Resources comments on the benefits Whittle has delivered to Youga mine in Burkina Faso. "Whittle helped us extend our bench across our orebody and come up with new cash flows. We have increased reserves by more than 1.2 Mt in six months, and we expect extra years of production from the mine. In addition, merging actual numbers and operational parameters from our block models into Whittle pit optimisations onsite has mitigated the need to hire additional consultants. Creating one or two pit shapes and the associated reports would otherwise cost about $30,000 in consulting fees."

Whittle has been designed for mine optimisation, which enables significant increases in project value over and above pit optimisation. The software incorporates the strategic mine planning capabilities needed to achieve mine optimisation: strategic scheduling; detailed cost, price and recovery modelling; stockpiles; multiple mines; blending, and cutoff optimisation.

New for Whittle 4.3 is the NPV Practical Push Backs module which provides a single-step process for creating push backs that address both maximum NPV...
and minimum mining width requirements. For all deposits where minimum mining width needs to be maintained, or the creation of push backs is an option, this module is recommended to add value to the decision making process by providing a more accurate NPV for each project. It provides new methods for fast, effective push back creation that enable practical schedules to become a standard part of the mine planning decision-making process, allowing the full potential value of the deposit to be realised.

Intergraph® has introduced the newest solution of its SmartPlant® Enterprise engineering software suite, SmartPlant 3D Materials Handling Edition, to automate the design and modelling of bulk materials handling systems. This automates the design of conveyor systems and transfer chutes to the rapid and easy creation or expansion of facilities.

New tools and streamlined menu options in Maptek Vulcan™ 8 help mine planners work smarter and faster, the company says. "Vulcan 8 includes improvements to display options, file size output, auto-population of fields, floating panels for design and modelling, menu wizards and customisable settings," said Eric Gonzalez, Maptek Product Manager for Vulcan. "We've revisited drillhole compositing, grade control, block model estimation and coalescing. There's a new survey field format, and new CAD and viewing options like 'smart snap' and 'draw by hand'."

**Model project**

Hatch Associates won a 2008 Be Award of Excellence in the Innovation in Metals and Mining category for Barrick Gold’s Pueblo Viejo mining project in the Dominican Republic. The primary goal of this complex undertaking was to design and build facilities for the extraction and processing of gold from a refractory sulphide ore body at a throughput rate of 24,000 t/d. The use of Bentley’s PlantSpace and other Bentley 3D modelling tools enabled Hatch to save design time and reduce the risk of rework in the field.

Hatch’s task was to create the first process step in the recovery of gold. To successfully complete the project, the Hatch team needed to design four large pressure oxidation vessels (autoclaves) as information became available without continuously redesigning the plant. In addition, it had to overcome the site’s space constraints by creating the most compact layout possible while maintaining access and safe operation.

The use of PlantSpace and other Bentley products allowed all disciplines to work simultaneously while sharing design information on a real-time basis. Hatch implemented a user-friendly 3D environment that allowed the team to develop a compact layout, general arrangements, and isometric drawings by extraction; import terrain maps and structural steel and concrete models; and produce integrated models for design reviews, presentations, and clash detection. It also deployed Bentley software to create a central storage system that allowed fast information transfer across all design disciplines.

Commenting on the project, Murray Pearson, Lead Mechanical Engineer for the Pressure Oxidation Facility, said, “The use of PlantSpace and other Bentley 3D products has greatly enhanced our ability to make the most efficient use of available space in plant layout, produce cost-effective designs, visually demonstrate operational and maintenance concepts to the client, and to convey the construction methodology and sequence to the project team. It has saved the project thousands of hours in checking, design revisions, and drawing production.”

Glenn Sakaki, Managing Director of Project Execution at Hatch, said, “Without the assistance of Bentley software, this project, which is very important to the Dominican economy, would have taken much longer to execute and would have required more staff for coordination, checking, and supervision. Moreover, through our collaboration with other companies and our emphasis on quality, we were able to optimise this technology and effectively deliver and supervise the construction and operation of the facility.”

As part of Intergraph’s SmartPlant Enterprise suite of products, SmartPlant 3D Materials Handling provides the capabilities needed to design a bulk handling system and keep it as-built throughout its life cycle. It offers piping, HVAC, electrical raceway, structural, plate work and mechanical equipment modelling tasks, as well as a specification and catalogue manager and a project administration environment.
The use of PlantSpace and other Bentley products on Barrick Gold’s Pueblo Viejo project, allowed all disciplines – civil, structural, mechanical, piping, electrical, and controls – to work simultaneously while sharing design information on a real-time basis. The design team included more than 55 engineers, designers, and specialists; five CAD systems and IT support personnel; and up to 50 members in management, project controls, procurement, and construction supervision. Central data storage enabled fast, accurate, and up-to-date information transfer between disciplines.

Database management
After extensive analysis of vendors Kinross Gold selected Century Systems Technologies, with its head office in Sudbury, Canada, as its global supplier of geo data management and collection solutions. The analysis was carried out by members of the Kinross team including the Database Manager, Exploration Group and IT team to ensure the correct solution was chosen. Century Systems develops solutions for mining and exploration companies around the globe and currently has its solutions deployed in over 43 countries.

Built on the premise of accuracy and efficiency, the Century Systems suite of solutions includes applications for the collection and management of all upstream geo data. From collecting drillhole and surface sample data with DHLogger and Sample Station respectively to mapping the geological, geochemical and geotechnical features of open-pit and underground mines in 3D with MineMapper 3D, Century Systems data collection tools are easy to use. Regardless of the module being used, all data entered into the system is validated at the point of entry so at the end of the day, the data can be relied on for modelling, reporting, GIS, planning, and auditing purposes.

Costing and reporting
Molycorp Minerals, a U.S.-based rare earth producer and technology company, has successfully implemented, through Mincom Accelerator, Mincom’s core enterprise asset management solution in approximately half the time and half the cost of an average EAM implementation. Mincom Accelerator is a pre-configured version of Mincom’s core EAM solution that includes finance, maintenance and materials management. The Accelerator is based on Mincom’s 30 years of experience in asset-intensive industries and its expertise in best-in-class business processes for those industries.

Molycorp selected the EAM solution as well as MineMarket, the only solution specifically designed to address the supply chain challenges faced by the mining industry, due to Mincom’s proven success with referenceable US-based clients and its rapid and lower cost deployment through Mincom Accelerator. “Mincom’s reputation as well as its deep expertise in mining guided our selection of Mincom’s EAM solution,” said Jim Camacci, Information and Business Systems Manager, Molycorp. “We are pleased with our decision as the implementation was deployed in half the time at half the cost of other large enterprise-wide software implementations, due to the technology as well as Mincom’s professional and knowledgeable consultants who invoked good mining business processes.”

“In today’s economic climate, businesses can’t afford to waste time and money on long, drawn-out software implementations,” said John Benders, Vice President, Solutions for Asset Intensive Industries, Mincom. “This successful Go-Live underscores our commitment to developing, maintaining and supporting best-in-class solutions for asset intensive businesses so that our clients remain competitive and agile in a challenging economic environment.”

Nevsun Resources (gold and base metal resources) has completed its deployment of Skire Unifier™ for use in its $250 million Bisha project in Eritrea. Unifier will provide comprehensive cost, document and schedule management capabilities, as well as advanced reporting, for project teams based in North America and Africa.

The Bisha mine and processing plant is located west of Asmara, Eritrea’s capital, and is expected to be a long-lived, high-grade mine for gold, copper and zinc production. The initial ore production is forecast to yield high percentages of gold and silver, which will deliver accelerated return on investment. Production is expected to begin in 2010. Project managers at Nevsun’s Vancouver, BC headquarters use Unifier to collaborate with project teams at the company’s Eritrea subsidiary, the Bisha Mining Share Co. Other project stakeholders include the Eritrean National Mining Corp, a shareholder of Bisha Mining Share Co., and Senet, the South African engineering company that is providing EPCM services for the mine. Unifier enables all team members to securely access up-to-the-minute project information over the Internet for managing cost accounting and reporting.

“Skire Unifier and its hosting option enable us to provide comprehensive project management capabilities to users in a location with limited IT options,” said Peter Hardie, Nevsun’s CFO. “Its flexibility and ease of use are indispensable features in helping us successfully bridge operations across Vancouver, Eritrea and South Africa. Unifier gives us highly efficient forward-looking project management.”

Nevsun uses the Unifier Cost Manager to establish project cost controls for internal accounting and reporting for the Bisha project. The Document Manager allows everyone to share documents and have access to current information and project status. Vendor bidding and selection is supported through the automation of an enquiry and adjudication process. Budget management, order placements, change orders, invoicing and other business processes are deployed in Unifier. Nevsun also loaded existing project data into Unifier, giving managers visibility into project progress and enabling them to co-ordinate efforts more effectively than had been previously possible.

John Leet, Director of Marketing for Skire explained: “As the mine project moves forward, Unifier will provide the company with robust cost controls and a new level of management efficiency.”