Although many see mining as a paleotechnic industry, nothing could be further from the truth. Today's industry is subjected to global markets and as a consequence, for a mine to remain competitive it must constantly look for new ways to increase output while keeping costs at a minimum. This results from the simple fact that in real terms metals and minerals have never been cheaper.

As in other industries, miners have turned to computer software to provide fast, accurate, cost effective and efficient tools. Every aspect of mining uses some form of software—from exploration through to production and finally mine-site rehabilitation.

Many software packages are aimed at one particular market, such as database management and surveying. Others concentrate on CAD functionality. More recently a number of software packages have been developed to carry out virtually all of the functionality required to run a mine or exploration project.

Geology and mining is essentially a three-dimensional activity and there is a strong requirement to generate visualisations and models of the ore body. Based on this information, the mining method, equipment, and scale of operation are determined before the first shaft or decline is cut. The operation of dragline, cast blasting, bulkloading, and truck and shovel operations, for example, can also be effectively simulated to develop a series of optimised range diagrams.

Mining software allows the user to bring all these areas together to provide the best planning solution for a deposit. However, as many operations progress, issues arise that may cause the operation to divert from the original planning procedure. These diversions can be costly but by implementing modern day software, they can be kept to a minimum and problems realised sooner. Common ways to plan for these events is to determine a number of possible scenarios that could potentially occur. Therefore software not only provides future planning capabilities, but also real time developmental changes.

Mining software companies are constantly under pressure to evolve products to meet these challenges and solve new problems, and the development of software is a result of both programming foresight and reaction to industry demands. Without feedback from the mining industry many of the products now available would probably not exist.

One software developer, Maptek/KRJA Systems, was first established in Australia to provide software solutions to the coal industry in the early 1980s. Its goal was to develop a true interactive graphics application for the mining industry, and by the mid 1980s its aim had been achieved in the form of Vulcan, the world’s first true 3D mining software tool. Since its first release the package has evolved to meet industry demands for a complete package with ever-increasing functionality.

User friendly
It is essential that the user is able to interact with software easily and effectively. To facilitate this, Vulcan uses a customisable graphical user interface...
Materials software and high-powered computers can perform modelling functions that allow the planning of a mine down to the smallest detail. Mark Campodonic of SRK Consulting discusses recent advances in resource estimation technology.

Mining projects that lay dormant for decades due to political instability, metal price, or lack of technology have now become attractive prospects. These projects often have a vast paper trail in the form of maps, plans and book-sized volumes of tabulated data, and accurate digitisation of this data is prerequisite to the application of mining software. Maps and plans, for example, can be scanned as high resolution Jpeg images and imported into geographic information systems software – such as MapInfo – where they are digitised and exported into Envisage, the 3D file import/export module. This data can then allow 3D geological models to be constructed and the creation of digital terrain models representing topographic data (see picture above).

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