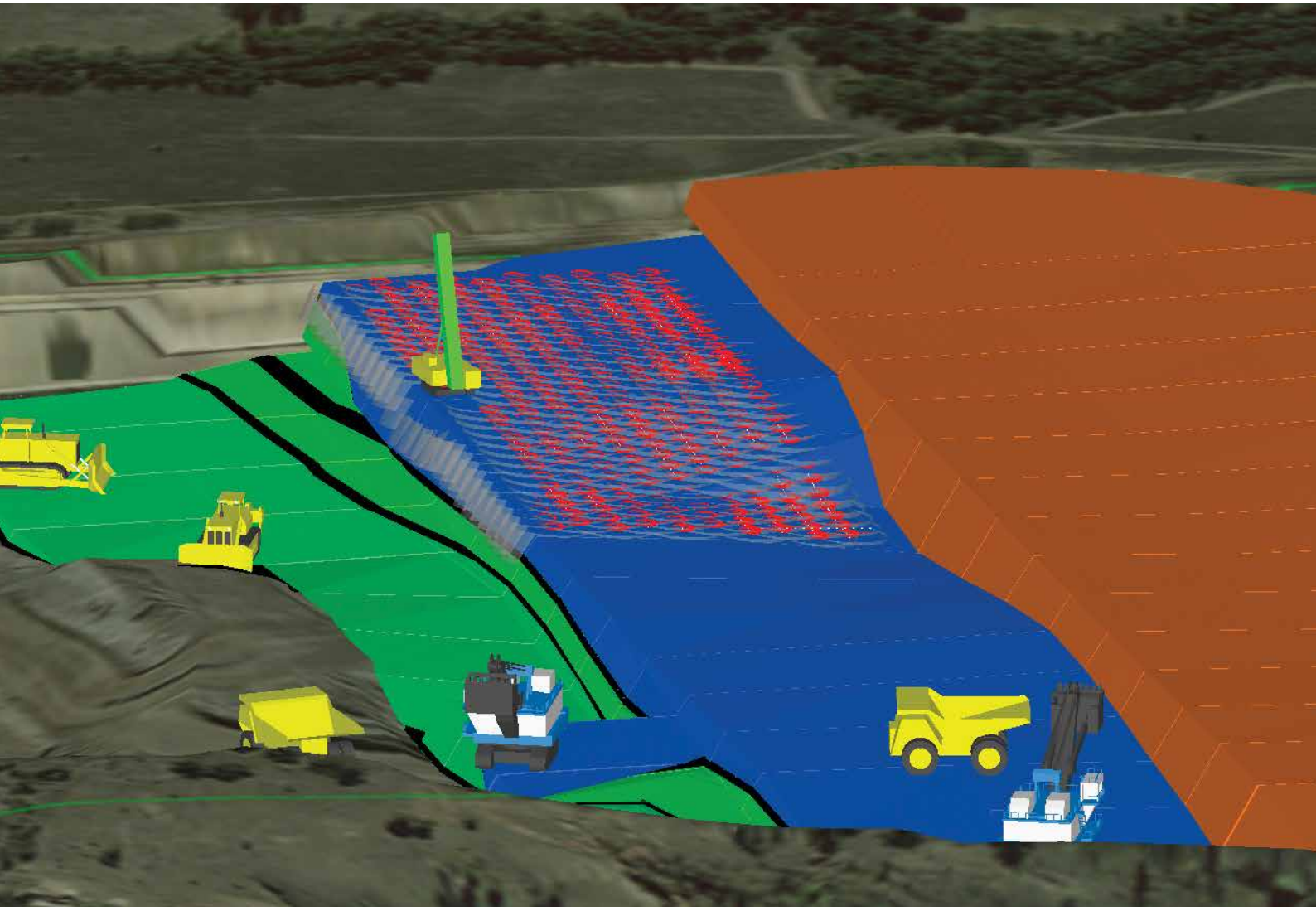
DASSAULT SYSTEMES

GEOVIA

GEOVIA MINEX
EDITIONS



Mining operations include a series of linked activities – from drill hole data entry in exploration, through mine design and planning, to mine operations and production management. Dassault Systèmes is committed to helping customers maximize value from their operations by providing the right tools and services to carefully manage activities over the mine's life cycle.

With our Subscription Model, we are pleased to provide a new way to access the GEOVIA application portfolio. Each Edition provides a unique combination of tools designed for typical users, and their standard tasks and activities. Customers "subscribe" to the Edition that best suits their needs, on a one-year renewable term.

Each Edition has been carefully selected to offer the broadest range of features to address a user's core requirements

Mining and Exploration activities require an extensive investment in both time and money. The core of all GEOVIA Minex™ Editions is designed to help you make the most of that investment by providing secure and effective data management, display, plotting, surface modeling, CAD tools and analysis.

Minex is built around open industry standard databases that support both client-server and single-use modes. The database infrastructure supports easy importing and exporting of the data, and seamless connectivity to many corporate databases – such as SQL, Oracle, acQuire, Access, and Excel. Minex easily fits into every computing environment, interacting with your existing applications for unprecedented levels of integration and information sharing, and supports a wide variety of common mining activities that best meet your specific operation.

Common to all Minex Editions is the ability for both geologists and engineers to import, create and work with point and line data; create, preview, annotate and print plan and section plots from grids, triangles and boreholes; as well as to create triangles, grids and calculate volumes. This broad range of functionality, based on the database-hosted data, coupled with CAD tools, offers full use of all exploration, geological and engineering data.

Minex users can work with previously created survey data (up-to-date surface or underground pickups, infrastructure maps and interpolated sections) and can view and access mine designs for display, plotting and reporting.

All Editions include the full use of the Minex 3D graphics environment, surface modeling, CAD tools, and supports editing, sectioning and plotting of all data types mentioned above.

GEOVIA MINEX EDITIONS

- **Minex Geology**
- **Minex Mine Design**
- **Minex Mine Design and Scheduling**
- **Minex Survey**
- **Minex Premium**

GEOVIA MINEX GEOLOGY EDITION

Whether carrying out exploration, modeling complex faulted structures, or preparing resource statements for regulatory authorities, the geologist needs tools to complete the job accurately and efficiently.

These tools can be found in the GEOVIA Minex™ Geology Edition, which loads and validates borehole data (lithology, quality, geophysics) from a variety of sources—the important first steps in the geological modeling process. As holes cannot be drilled everywhere, this Edition also includes a module that predicts where seams will be encountered if a hole was drilled in a particular location. This feature saves the exploration geologist both time and money, and helps create a more complete model.

The geologist displays multiple cross-sections and correlates seams on-screen with ease, eliminating the need to create paper plots. Information alongside each borehole can be displayed to assist in the seam correlation process, including histograms of geophysical data, downhole depth and quality values, and lithologies.

BENEFITS OF A SOFTWARE SUBSCRIPTION MODEL

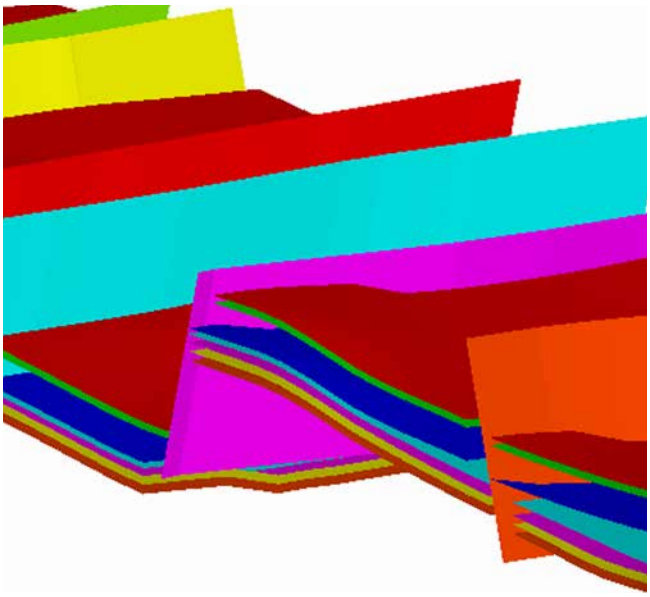
- Reduced initial investment
- Ability to utilize Opex versus Capex budget
- Pre-packaged Editions designed to meet the needs of typical user profiles from Exploration to Production
- Ideal for shorter term projects
- Includes all updates and technical support, network licensing and much more...

Severely faulted deposits require modeling techniques that pay close attention to the time sequence in which the strata were laid down. The geologic modeler unravels the history of the depositional sequence, makes necessary adjustments to account for splitting or missing seams, and reconstructs the model as it appears today. This can be completed for just a few seams or for dozens of seams, faults, and quality variables, in a relatively short period of time.

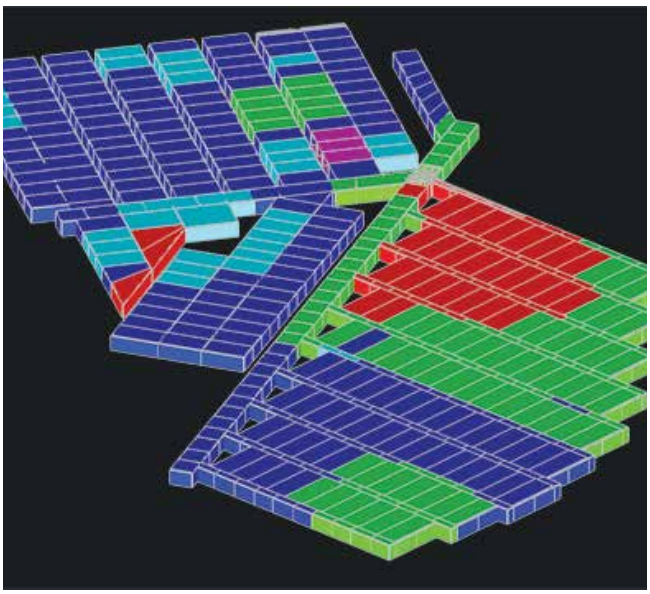
Geologists whose work involves washability and ROM beneficiation procedures will find features that address these issues.

By using the tools in the Minex Geology Edition, geologists can produce an accurate resource statement that conforms to the guidelines in use in the industry today (e.g., JORC, SAMREC, etc.).

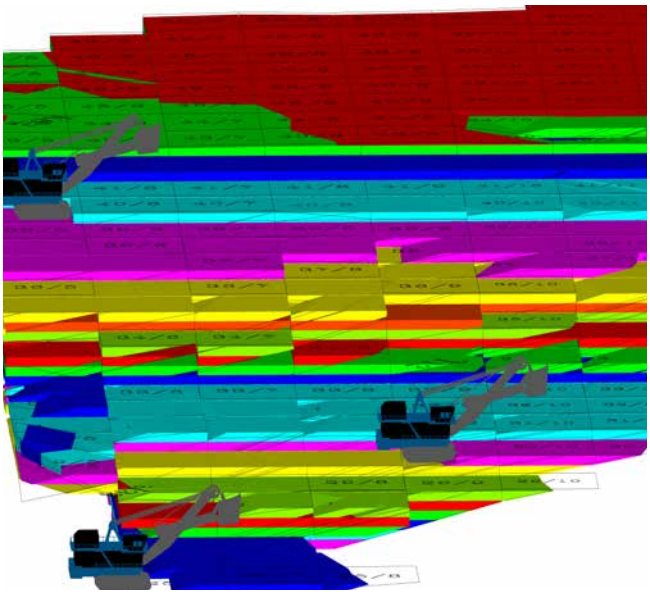
Other basic functions such as creating strings, gridding single surfaces and producing reports are all included as standard features in this Edition. In addition, workflows are



Minex Geology Edition: Faulted model.



Minex Mine Design Edition: Underground mine layout colour-coded by ash content.



Minex Mine Design and Scheduling Edition: Scheduling of a multi-bench, steeply-dipping surface mine using multiple excavators.

automated to reduce the chance of the introduction of errors during the modeling process.

GEOVIA MINEX MINE DESIGN EDITION

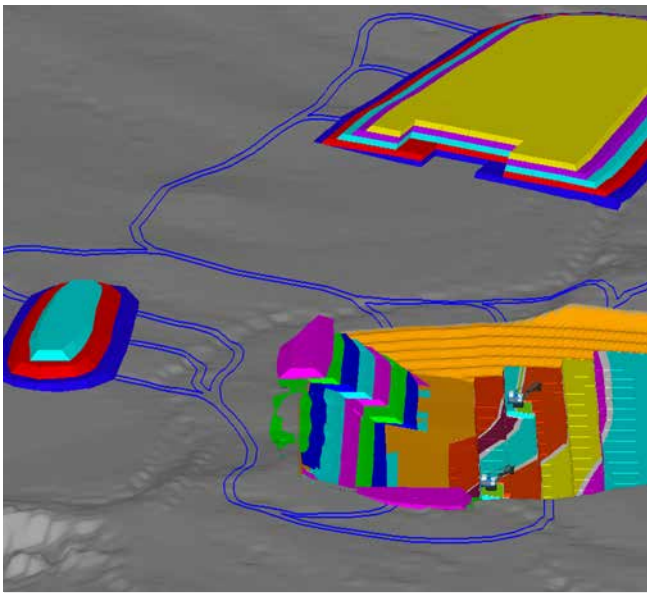
With an accurate geologic model, mine planners can design surface mines where various types of equipment are used to extract material, including shovels/loaders and trucks, bucket-wheel excavators or draglines. The benches of a pit design can be referenced to a constant elevation or allowed to follow a nominated surface. All other aspects of the operation are taken into account, including the setting out of drill patterns for blasting, the creation of roads and ramps, and the construction of waste dumps. Pre- and post-mining surfaces are modeled using data collected by survey instruments and end-of-month volume reconciliation is carried out with ease.

Overlaying this design on the previously-created geologic model produces a mine reserves database, which is updated with multiple quality parameters (e.g., chemical quality or economic data). This database can later be modified to reflect actual mining conditions, such as the wasting of thin seams, the merging of inseparable partings, the loss of material from the top/bottom of seams, and the inclusion of out-of-seam dilution.

For surface mining engineers who need additional tools to assist them in determining pit limits, the GEOVIA Minex™ Mine Design Edition includes a module that uses the industry-standard Lerchs-Grossman pit optimization algorithm. Nested shells reflecting varying extraction costs and/or sale prices allow a full range of sensitivity analyses to be carried out.

Rehabilitation activities such as the regrading of spoil peaks to meet regulatory standards after mining activities cease are provided for in this Edition.

Engineers engaged in planning underground mines can take advantage of intuitive tools which provide immediate feedback for any changes made to the size or shape of workings. Longwall and room-and-pillar designs are laid out using any aspect of the geologic or quality model as a guide, and appropriate attributes (such as rock strength) are included in the calculation of the reserves.



Minex Premium Edition: Multi-bench detailed scheduling with in-pit and out-of-pit dumping.

The routines to construct the geologic model and to carry out all basic functions such as creating strings, gridding surfaces, creating plans and cross-sections, and producing reports are all included in this Edition. In addition, the engineer can export selected data in different formats for further processing.

GEOVIA MINEX MINE DESIGN AND SCHEDULING EDITION

The GEOVIA Minex™ Mine Design and Scheduling Edition is designed for engineers whose jobs focus on either tactical mining activities on the order of weeks and months, or more strategic, longer-term issues. Each group picks and chooses the level of detail necessary to accomplish the planning goals.

One engineer may simply need to ascertain how long the mine can sustain a certain production profile (for example, steadily increasing tonnage initially, maintaining a constant

output for a certain period of time, and then decreasing levels until the end of its life). Another engineer may be concerned with the interaction of numerous excavators on multiple benches while scheduling the extraction of material from different faces.

The ability to visualize the depletion of the reserves is an important aspect of the mine scheduling process. Not only does Minex accommodate this visualization, but it also shows the engineer how the overall quality or strip ratio changes as every block of material is excavated. Corrective action can immediately be taken instead of waiting until the end of the planning period.

With this Edition, all of the different types of scheduling are possible without requiring any changes to the underlying data. The tools to construct the geologic model and carry out all basic function such as creating strings, gridding surfaces, creating plans and cross-sections, and producing reports are all included.

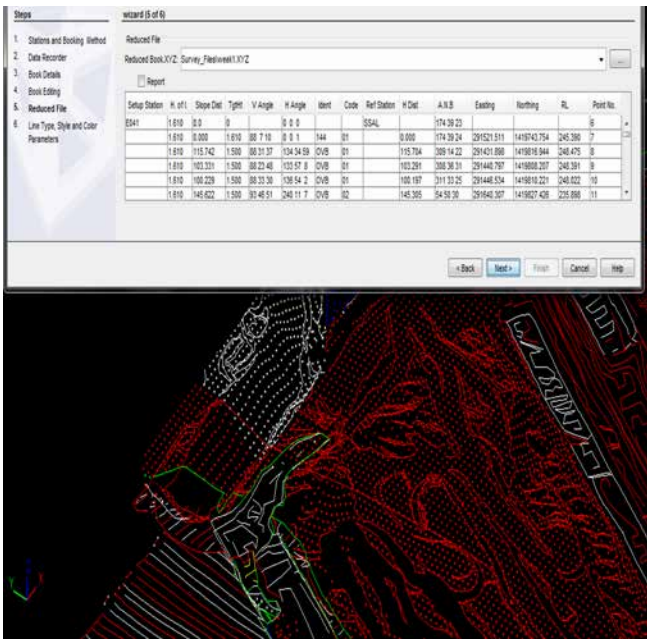
Following on from mine scheduling is the movement of the waste material to in-pit or out-of-pit dumps. The Mine Design and Scheduling Edition provides the engineer with integrated dump scheduling and haulage planning modules to ensure these important elements of the operation are taken into account. They address complex issues such as the movement of waste from washeries, the selective placement of material in the dumps, and the availability of particular haul roads at various times of the year. In addition, they help the engineer choose the best routes from pit(s) to dump(s), given all possibilities, based on criteria such as cost, distance or time.

Engineers working in underground mines can schedule in much the same way as their surface counterparts. The movement of each machine is either strictly controlled during the schedule, or the software freely chooses the best alternative using the Critical Path method of allocating machines to various tasks as they become available.

GEOVIA MINEX SURVEY EDITION

As part of their ongoing job and in preparation for end-of-month volume reconciliation, surveyors need tools to help properly manage the thousands of measurements they take with both ease and confidence.

The GEOVIA Minex™ Survey Edition contains all of the routines necessary to reduce survey data recorded in the field to X-Y-Z data. It supports a wide variety of instrument types and booking methods, and catalogs them and data from other sources (such as GPS systems) into a map database.



Minex Survey Edition: Reduced survey data shown in both tabular and graphical forms.

On-screen visualization using standard codes to represent important features (e.g., the tops/bottoms of seams or the locations of faults) allows the data to be validated.

Triangulation of the survey data produces very detailed surface representations showing the exact status of the mine at the time of the survey. From these, accurate volumetrics between surfaces can be calculated. In addition, these triangulated surfaces can be converted for use by the geologist as another source of reliable data, thereby improving the integrity of the geologic model.

The routines to carry out all basic function such as creating strings, gridding surfaces, creating plans and cross-sections, and producing reports are all included in this Edition.

GEOVIA MINEX PREMIUM EDITION

For users with the most comprehensive needs, the GEOVIA Minex™ Premium Edition combines the capabilities of all the other Editions to support geological modelling and mine planning for all types of stratified deposits and mining methods.

DASSAULT SYSTEMES | The **3D**EXPERIENCE® Company

Europe/Middle East/Africa
Dassault Systèmes
10, rue Marcel Dassault
CS 40501
78946 Vélizy-Villacoublay Cedex
France

Americas
Dassault Systèmes
Canada Software Inc.
1066 W Hastings Street
Vancouver, BC V6E 3X1
Canada

Australia
Dassault Systèmes
GEOVIA Australia PTY Ltd.
Level 8, 190 St Georges Ter
PO Box 7495, Cloisters Square
Perth WA Australia 6000