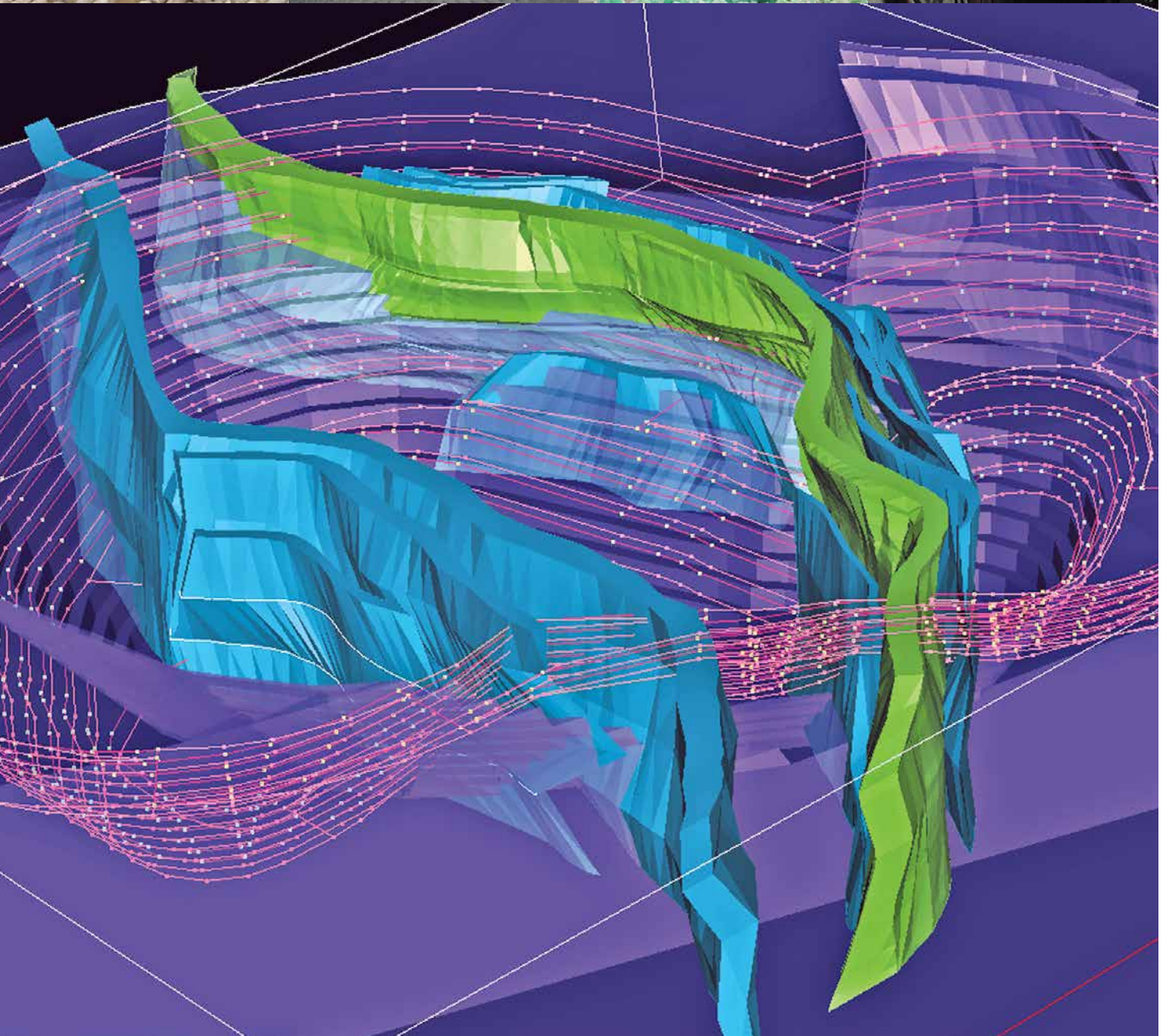




COLLABORATIVE GEOLOGY AND MINE PLANNING SUPPORTING CROSS-FUNCTIONAL TEAMS



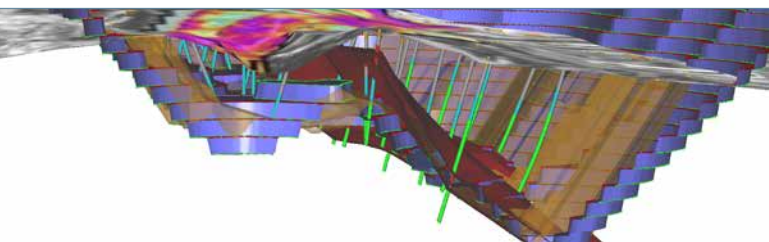
COLLABORATIVE GEOLOGY AND MINE PLANNING SOLUTION

BENEFITS

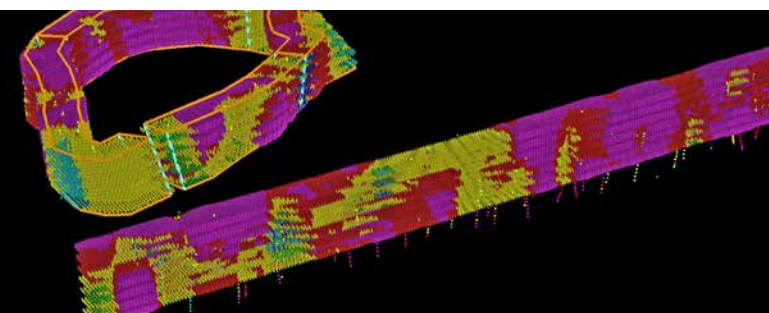
- Central database manages data, enabling data security and auditability, while eliminating data redundancy and increasing data integrity and accuracy.
- Streamlined data flows, central data access and increased compatibility improve collaboration, providing information when needed to speed decision-making.
- System ease-of-use – dialog boxes guide users through robust workflows.
- Industry-standard Microsoft technologies integrate with existing IT infrastructure and ensure system scalability.
- PlotMaker feature allows users to annotate plots with text blocks, images, Excel spreadsheets, Word documents and other objects.

GEOVIA GEMS™ is the leader in collaborative geology and mine planning solutions. GEMS has been providing the right capabilities for open pit and underground mining professionals in exploration, modeling, mine design, long-term planning and production scheduling.

With GEMS' unique central database, geologists and engineers gain immediate access to organized, up-to-date geological and mine planning data, GEMS' data security and auditing provides the capabilities to improve compliance with industry regulations like JORC, SAMREC and NI 43-101.



Sectional view of a surface showing draped mineralized zones, with 3D shear structure and coloured drillhole traces within an open pit design.



Unfold complex geology for better geostatistical analysis.

EXPLORATION AND RESOURCE MODELLING

Whether you work in the field or at the office, GEMS offers you the right capabilities for your tasks. With GEMS, you can design and manage drillhole data, create plots, maps, model surfaces and solids, and employ sophisticated geostatistics to quantify, visualize and analyze mineral deposits.

- Protect and share exploration data.
- Employ a variety of methods from simple polygons to highly sophisticated 3D solids modeling to create accurate geological models.
- Model grade values choosing from block or grid models for the solution that best suits your deposit type.
- Leverage a complete set of grade estimation techniques.
- Amalgamate data from many different sources with expanded file compatibility and block model conversion abilities.
- Take full control over the interpolation process to account for anisotropy, geological domains and anomalous grade values.

FAST, DATA-DRIVEN ISOSURFACE GENERATION – DYNAMIC SHELLS

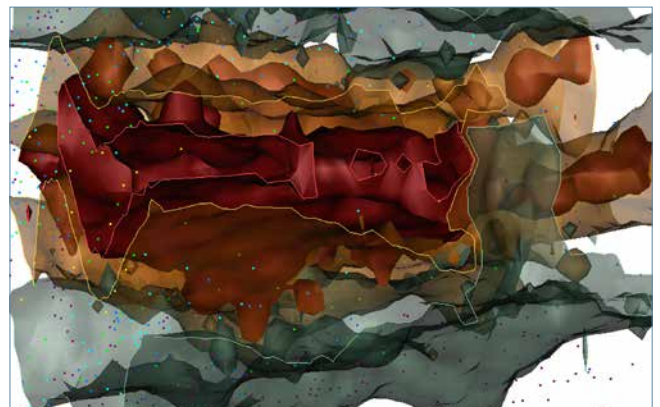
Implicit Modeling allows users to automatically generate surfaces or solids from drillhole and point sample information. This tool is designed to save time when initially evaluating deposits and can assist in generating surfaces and solids in moments as opposed to hours.

NEEDLING – A UNIQUE VOLUMETRICS ADVANTAGE

GEMS' volumetric process, known as "needling," gives your project an immediate advantage. Needling differentiates the proportion of each solid in the block model, providing you with weighted tonnage and grade values for each rock type.

OVERCOME THE CHALLENGES OF FOLDED AND FAULTED DEPOSITS

GEMS' Unwrinkle/Unfold capabilities enable you to overcome the challenges posed by complex folding and faulting. It places data points into a transformed space in which the correct spatial relationship is maintained for analysis and interpolation purposes. It then transforms the estimates back into their original space.



Multiple grade shapes generated using Dynamic Shells.

“GEMS plays an important part at Nordkalk – from ore exploration to drillhole planning to product delivery. GEMS is so integrated into our entire mining structure that we could not successfully handle quality control or do mine planning without it.”

– Gerhard Hakkarainen, Geologist, Nordkalk Corporation

MINE PLANNING

The mine planning and design features available in GEMS support both open pit and underground operations. With key processes linked together through the GEMS database, mine plans can be kept up-to-date more accurately based on ever-changing information.

- Design mine plans to meet your volumetric and grade objectives.
- Use long-term planning tools to set mining targets and test scenarios to determine the best way to mine over multiple working periods.
- Reconcile performance by comparing planned mining activities to actual performance and progress.
- Control daily production with always up-to-date survey and grade control data.
- Use GEMS Go Simulator to ensure that your plan is practical to mine by simulating mining with equipment fleets.
- Run volumetrics to determine and report reserve depletion.
- Depend on the Drillhole Excavation Warning System to help you identify potential hazards.

Open Pit Tools

- Interface seamlessly with GEOVIA Whittle™ to optimize pit designs and pushbacks.
- Specify blast pattern layouts and control drilling depth by setting pre-defined surfaces, then place hole collars onto existing surfaces for elevation control.

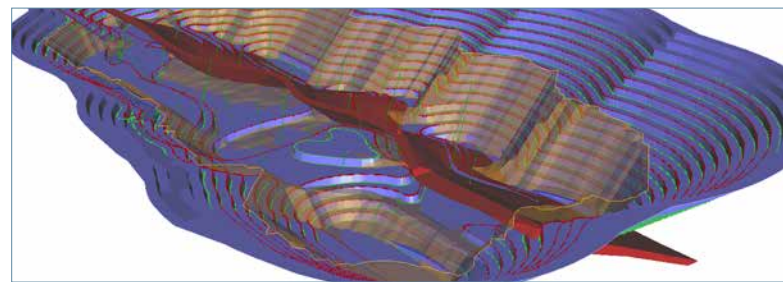
Underground Tools

- Automate the tunnel design process by turning centre lines you define into complete tunnels with safety bays and filleted intersections.
- Create comprehensive stope designs and determine volumes, dilution and mineable reserves.
- Ensure your designs are accurate and up-to-date by using a blast ring design tool integrated with stope design and 3D solids modeling.

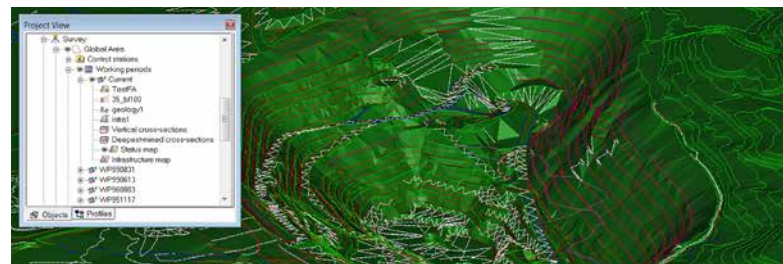
MINE PRODUCTION

Whether you operate an underground or open pit mine, GEMS lets you control essential mining processes. With all data stored in a central database, all decisions are made using the most up-to-date information, which is available on-demand where and when it is needed.

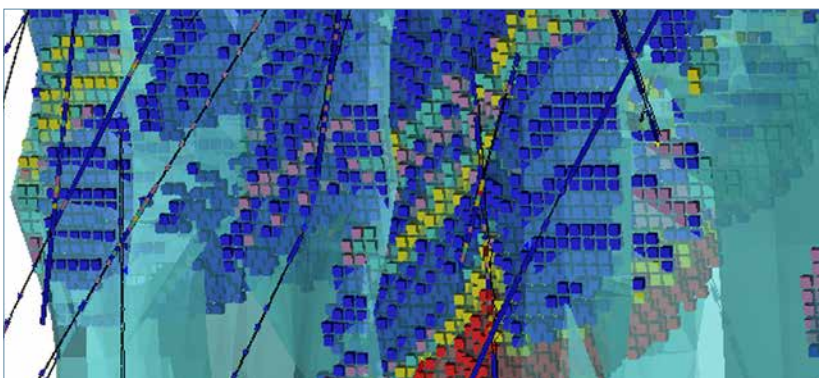
- Add production scheduling capabilities to produce Gantt charts and schedules.
- Download measurements directly from total stations and GPS recorders, then merge pickup data, update excavation status, report volumetric progress, and lay out dig limits and blast patterns.
- Improve ore control by enabling grade control engineers to use assay data and polygons to manage the daily operational grade control requirements.



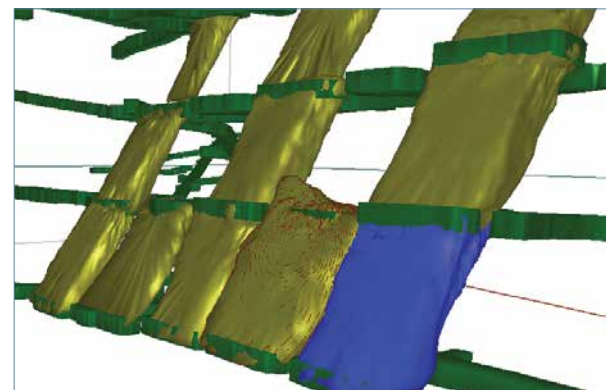
Open pit design.



Survey Application in GEMS.



GEMS showing complex geological solid and block modelling based on drillhole and topographic mapping.



Triangulated modules of underground workings (from survey data and CMS laser survey systems).

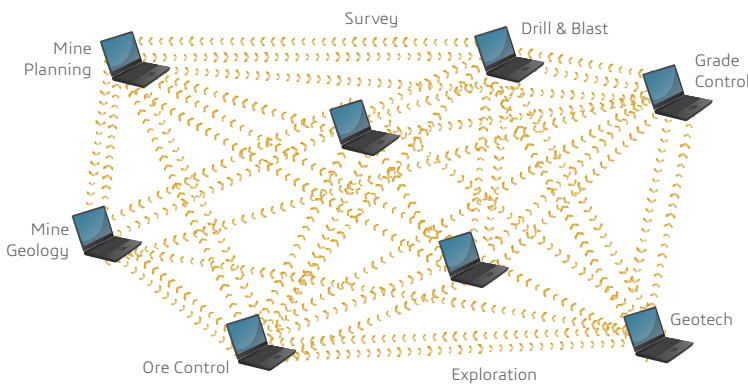
GEMS COLLABORATIVE SOLUTION

With a GEMS collaborative solution running on Microsoft SQL Server, workflows are optimised and mining professionals freed from managing data, allowing more time to be spent on running the operation.

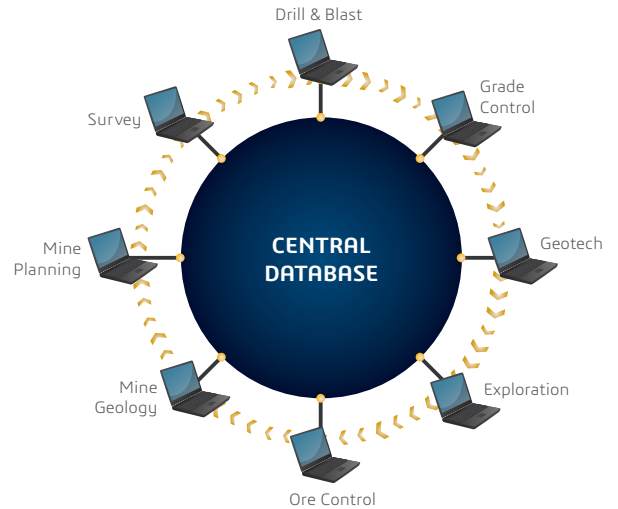
BENEFITS

- Business process improvement approach to implementation.
- Optimized workflows enable faster and better decision making.
- Role-based access to data.
- The right data is always available.
- Data is secured and managed.
- Redundancy of data is eliminated.
- Auditable information trails.

The Problem
Multiple Sources of Questionable Information



The GEMS Solution
A Single Source of Trusted Information



For more information email GEOVIA.GEMS@3ds.com or visit www.3ds.com/GEOVIA/GEMS

Our **3DEXPERIENCE®** platform powers our brand applications, serving 12 industries, and provides a rich portfolio of industry solution experiences.

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