



# Business Simulator for Executive Decision Support

 **MOSIMTEC**™

# OVERVIEW

MOSIMTEC and Global Mining Company (“GMC”), a mining strategy consulting firm, partnered to create executive decision-support platform for a Canadian mining conglomerate.

MOSIMTEC assists clients in making better decisions through the application of advanced decision support tools. MOSIMTEC leverages modern advancements in modeling and simulation science and technology to solve complex issues for clients across various industries.

GMC evolved from management consultancy that uniquely combined management consulting with technical consulting to developing first-to-market Executive Decision Support Software - INSIGHTIZE™ which reduces reliance on consultants to identify potential business and productivity improvements.



**The client was the largest gold mining company in the world with multiple underground and open-pit mines around the world. The project addressed key challenges at their US-based mining complex:**

- ✓ Assess the impact of new mine plans that are updated every quarter on the financial performance of the company.
- ✓ Allow management to make trade-offs between initiatives with reference to the value of the options to the business.
- ✓ Conduct ‘what-if’ analysis on different performance improvement initiatives across various business units within mining complex.
- ✓ Incorporate external and internal impacts on the business, for example, gold prices, occurrence of hot stopes, ore body failures.

## THE CHALLENGE



The mining complex comprises of six open pits and two underground mines, three ore processing plants and multiple heap-leach pads to extract gold. The unique metallurgy of the ore from different sources governs where and how they get processed. The mining value chain starts from ore extraction, to transportation, to storage, to ore blending, and processing.

Each of these activities involve many steps with hundreds of stochastic variables that drive the monthly and annual variability in gold ounces produced. **Their challenge was to understand:**

- ✓ Trade-offs between business value and number of headings / equipment in an underground zone.
- ✓ The impact of blending ore from different sources to stabilize the feed to the Roaster to reduce operational variability and rate of gold recovery.
- ✓ Production trends of transitioning from one mining method to another in the underground operations.
- ✓ How to run the Autoclaves under all-Acidic, or all-Alkaline or combination of ore types and develop a plan for executing on that transition as the ore body changes over time.

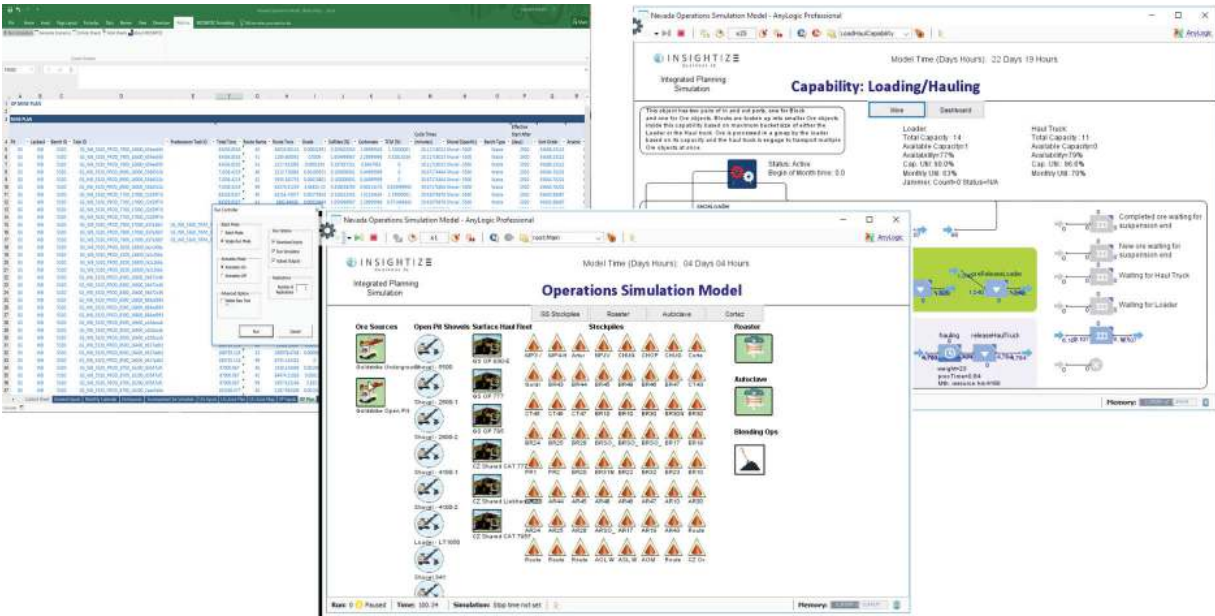
# THE SOLUTION

Simulation models are the best tools to incorporate many inter-dependent stochastic variables in a mathematical relationship to represent a complete business operation. By combining a business simulator with stochastic simulation models under the covers with Organization Blueprint and a Data Analytics Engine, MOSIMTEC and GMC have created a leave-behind executive decision-support platform called Insightize. The Organization Blueprint provides details on how people, equipment, and processes are organized within the company. The Data Analytics Engine provides scenario management, scenario execution and capability to analyze results across scenarios



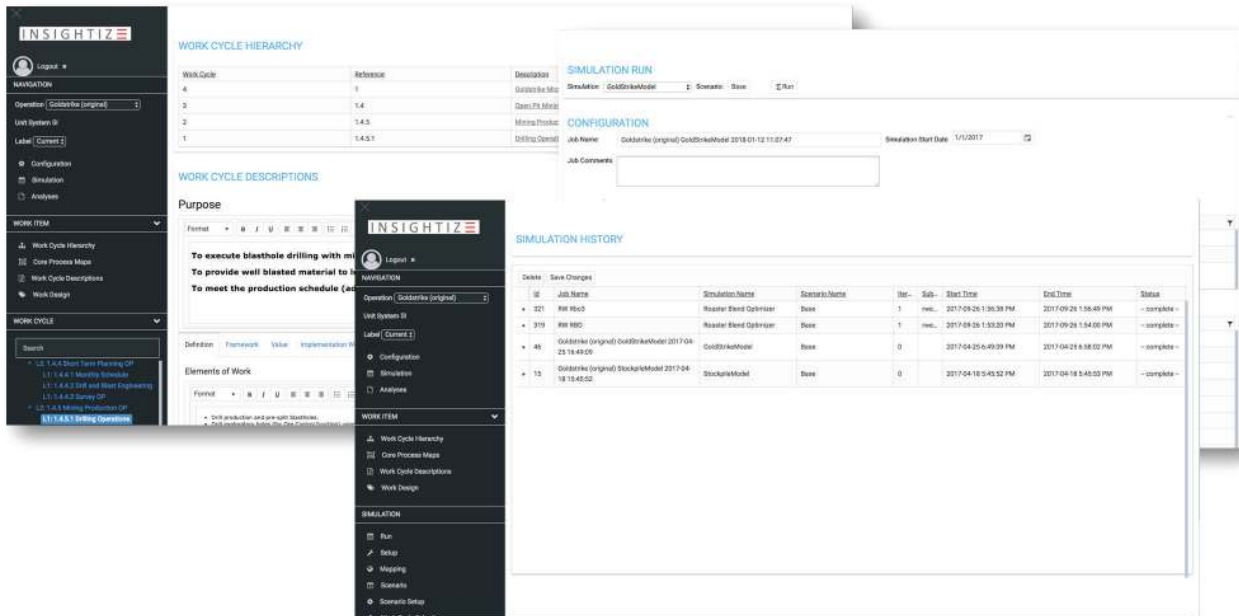
Insightize: An Executive Decision Support Solution

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## Insightize Business Simulator

The Business Simulator mirrors the client's current operation including their logic, data, constraints, operating philosophies and key performance indicators. The simulator captures all sorts of variability by evaluating different versions of reality.



## Insightize Organizational Blueprint and Data Analytics Engine

# THE OUTCOME

The client was able to use Insightize to simulate different business scenarios over short (1-2 years), medium (2-5 years) and long (5-30 years) term to identify the options that provided the best return on investment.



## Below are a few examples of opportunities identified to improve the business:

- ✓ Plant Maintenance: Identify the sweet spot in how often to perform preventative maintenance on the crushers and mills at the Autoclave to maximize gold production.
- ✓ Degree of impact in gold recovered at the Roaster by reduction in haul truck fleet: When reducing the number of haul trucks available to transport ore from the open pits to the Roaster plant, the gold recovery is not impacted for the first two years. But beyond two years, recovery drops by a certain percentage for every reduction in size of the haul fleet.
- ✓ Ore Blending at the roasting plant: The business simulator integrates a 'Blend Optimization Engine' that computes the best blend that maximizes margins given 50+ stockpiles to select from. Identified \$150 million worth of additional gold by improving the feed blend to the Roaster.
- ✓ Identify the best Cut-over Grade and routing of ore to best metallurgical process: Used Insightize to test different mine plans with different cut-off grades and routing ore (based on different cut-over grades) to different processing plants (roasting, milling + cyanidization, heap leaching, or pressure-oxidation) for highest gold recovery. End result was a cut-over schedule for the next 30 years based on current life of mine plans.
- ✓ New underground truck purchases: Tested for improvements in underground production throughput by replacing aging fleet of DUX haul trucks with higher capacity CAT AD30 trucks. The model predicted no statistical improvement in daily ore production with the newer fleet given the zone plan. The lower expected maintenance cost related to a new fleet was used as a justification for the upgrade.

Example  
outcomes for  
business scenarios

