

## KnowledgeScape

at a glance

### Software

English-like Syntax  
Fuzzy Logic  
Process Models  
Optimizers  
Integrated Historian  
Trends  
Custom Views

### Strategies

SAG Mill  
Ball Mill  
Hydrocyclone  
Flotation  
Crush & Convey  
Thickener  
Custom

### Operating System

Windows 2003 Server  
and up

Windows 7 and up

### Communication

Integrated OPC Client  
and Server  
Call out to external  
programs  
Http API

### Hardware

Physical Hardware  
Virtual Machines

# KnowledgeScape

## Advanced Optimization and Expert System

KnowledgeScape is a **complete solution for process optimization in mineral processing plants**. It is easy to install and easy to integrate into new or existing control systems.

### Software

The KnowledgeScape software **runs as a Windows service** in the background and can be used in a server environment with no need for a person to start and stop it. It monitors itself, and can detect and respond to communication failures and software crashes. **A graphical user interface can be attached to monitor and configure the system**, and to display real-time updates to operators and metallurgists.

### Strategies

We have developed world class strategies for optimization of mineral processing plants. They have been proven to reduce upsets, increase throughput, increase efficiency and decrease reagent consumption.

#### SAG Mill

Our SAG mill strategies automatically adjust feed rate, mill speed and water addition to **reduce upsets, eliminate grind-outs and increase tonnage**. We maintain desired operating conditions by constantly monitoring bearing pressure, mill power, recycle pebbles, mill density and mill acoustics.

#### Ball Mill and Hydrocyclone

Our ball mill strategies automatically adjust sump water and mill water addition, mill speed where available and can open and close cyclones when appropriate. The strategy **smooths disturbances and provides optimal particle** size in cyclone overflow to flotation.

#### Flotation

Our flotation strategies monitor recovery, grade and downstream constraints like regrind capacity and sump levels and pumping constraints. They integrate seamlessly with image analysis software to **maximize recovery** at the desired final concentrate grade.

## Crush and Convey, Thickener and Custom

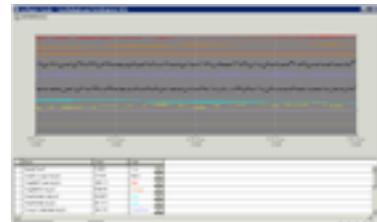
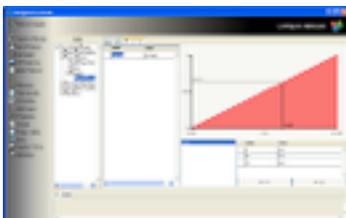
We have strategies to control primary and secondary crushers to maintain bowl level for choke feed conditions, optimize product size, start and stop feeders and signal haul trucks. Thickener strategies optimize underflow density, monitor and control rake torque and minimize flocculant addition. We can create **custom strategies to optimize any process.**

## Installation and Communication

KnowledgeScape runs on modern versions of Windows. Our preferred targets are **Windows 7 and Windows 2008 Server R2** because these have received the most thorough testing. It will run on 2003 Server, as well as on 2012 Server and Windows 8.

KnowledgeScape can be installed on **physical hardware** dedicated to the task, or it can be installed on **virtual machines**. Many of our clients are moving to a managed computing infrastructure with VM's and we can easily accommodate this shift.

KnowledgeScape can act as **both** an **OPC server** and **OPC client**. This allows for easy integration with any DCS, PLC or SCADA systems like DeltaV, ABB, Modicon, Wonderware or Citect. We can connect with virtually any control system on the market.



### Powerful Fuzzy Logic

Fuzzy-logic enables the system to understand and use descriptive concepts of non-binary value ranges, such as "warm", "a little bit", "fast", "slow", etc. Fuzzy logic membership sets are easily configured for any attribute using a graphical interface. The fuzzy browser provides an intuitive way to define terms such as "Hot, Warm or Cold, Fast or Slow," etc. This further extends the understandability of the rule syntax as states can be defined in linguistic terms.

### Rule Script Schematics

Within KnowledgeScape all rule scripts, crisp and fuzzy, can be viewed in a logic tree form. All operations are displayed in real-time and allow the user to see the results of the logic as the process values change.

### Accountability

KnowledgeScape is accountable for the benefits it provides users. Charting, database, and histogram functions are integrated throughout the system to inform users and managers alike, of process constraints or control opportunities. In addition, the integrated report generator can e-mail pre-configured production or maintenance reports to personnel based on a predetermined schedule, or when some particular event occurs.