DATASHEET

DYNSIM® Dynamic Simulation

High Fidelity Dynamic Simulation for Engineering & Operator Training Solutions

DYNSIM Dynamic Simulation is a comprehensive, dynamic process simulator that enables users to meet and beat the dynamic challenges of designing, commissioning, controlling, and operating a modern process plant safely, reliably, and profitably. By assisting in process design, controls checkout and control system design, DYNSIM Dynamic Simulation enables process yield improvement and reduction of capital investment costs. The DYNSIM Dynamic Simulation operator training simulator provides safer operation while improving performance and productivity.

DYNSIM Dynamic Simulation is now available via the cloud in addition to the traditional on-premise access method.

Summary

State-of-the-art, field-proven dynamic process simulation program. The process plant modeling environment covers the entire lifecycle of the plant, from simulation through system checkout, operator training and start up.

DYNSIM Dynamic Simulation is available online anywhere, anytime via AVEVA™ Cloud.

Business Value

- Meet and beat the dynamic challenges of designing, commissioning, controlling, and operating a process plant safely, reliably, and profitably
- Reflects the combined experience of over 1200 projects worldwide, saving you time and increasing ROI
- Preserve the equity you have by leveraging and reusing model designs in any product such as DYNSIM Dynamic Simulation and AVEVA™ Process Engineering (formerly PRO/II)

Setting New Standards for Rigor, Robustness, Openness, Ease of Use

Process plants face the same real-world challenges to operational excellence that their predecessors did, but the stakes today are higher than ever before. The constantly changing nature of plants, and their internal and external environments, can threaten safe, profitable plant operations. Uncontrolled upsets can cause start-up delays, production outages, severe equipment damage, and even catastrophic failures.

DYNSIM Dynamic Simulation is a state-of-the-art, field-proven dynamic process simulation program. DYNSIM Dynamic Simulation enables you to meet and beat the dynamic challenges of designing, commissioning, controlling, and operating a process plant safely, reliably, and profitably. DYNSIM Dynamic Simulation is an advanced, process plant modeling environment for use throughout a plant's lifecycle:

- Rigorous dynamic process simulation for engineering design
- High fidelity modeling used for control system checkout
- Rigorous process modeling for Operator Training for first time startup
- Plant performance and operation improvement tool for operating plants

DYNSIM Dynamic Simulation offers a cost-effective, professional grade alternative to other commercial dynamic simulation products. Over 1200 projects around the world have already used DYNSIM Dynamic Simulation to satisfy their process design, operator training, and operational analysis requirements in the upstream, gas processing/LNG, Refining, Petrochemical, and Chemical industries. The combination of industry experience, proven technology and service expertise can give you the right tools to achieve and maintain optimal control of your plant.

DYNSIM Dynamic Simulation is now available via the cloud in addition to the traditional on-premise access method. AVEVA Cloud offers benefits beyond other cloud services because it is developed with simulation users in mind.

- Increased efficiency due to the ability to adapt to changing needs by scaling up or down the computing power with varying number of machines of instances or simulation templates for engineering test or training scenarios.
- A secure user access control that allows the administrator to add & delete users or edit privileges as needed.
- Simplified IT overhead since the product is on pure on-demand cloud machines via a secure URL, new versions available as soon as they are released.
- Seamless collaboration by splitting the content from the product allowing the content, such as simulation models, to be managed easily with file history log in a central repository.
- Flexible usage and pricing with a pure SaaS business model based on hourly usage.

Industries Served

- Upstream Oil & Gas
- Pipelines
- Refining
- Power & Utilities
- Petrochemicals, Chemicals, Polymers, Fertilizer
- Mining, Food & Beverage, Pulp & Paper

Benefits Summary

- Reduce the cost of process equipment designed to meet transient requirements
- Increase plant safety by evaluating flare and relief systems
- Validate process control strategy to reduce risk during abnormal events
- Evaluate plant start-up and shut-down procedures and operation to reduce the risk of startup delays
- Validate operation to prevent production interruptions and increase plant performance efficiency
- Evaluate batch operations from dry startup
- Provide operator training simulator, process modeling, engine & instructor station interface

Simulation Applications

- Distillation tower relief analysis to accurately set flare capacity
- Compressor surge studies to reduce the possibility of damage to rotating equipment
- Cryogenic depressuring to determine low temperature metallurgy requirements
- Boiler draft studies to assess the risk of furnace implosion
- Refinery steam system analysis to improve reliability

The Perfect Dynamic Simulation and Training Tool for Engineers and Operators

Scalability Protects Your Investment in DYNSIM Dynamic Simulation

DYNSIM Dynamic Simulation is unique in its ability to seamlessly scale from engineering design applications to control checkout and operator training, all within the same graphical user environment. Its modular architecture and open interfaces ensure that DYNSIM Dynamic Simulation meets all your simulation requirements throughout the lifecycle of your plant.

Import Existing AVEVA Process Engineering Simulations

DYNSIM Dynamic Simulation preserves the equity you have built in any existing AVEVA Process Engineering (formerly PRO/II) model. DYNSIM Dynamic Simulation can translate a steady-state AVEVA Process Engineering simulation into a running dynamic simulation to eliminate tedious data re-entry and preserve the thermodynamic methods that you trust. All that is required is to complete the process control strategy to operate the plant.

First Principles Equipment Models Ensure Accuracy and Robustness

DYNSIM Dynamic Simulation's first principles models, including rigorous thermodynamic and fluid flow calculations, bring a superior level of robustness and accuracy to dynamic process simulation at your plant. DYNSIM Dynamic Simulation rigorously handles even the most complex plant layouts and systems, using a robust and high performance solution algorithm. Furthermore, DYNSIM Dynamic Simulation robustly models cold startup from purged conditions to normal operation and then back to shutdown.

Connect with DCS and PLC Control Systems

DYNSIM Dynamic Simulation takes full advantage of modern, open software standards to interface with other important plant applications, such as DCS and PLC control system emulators. DYNSIM Dynamic Simulation also connects easily with control system emulators (such as AVEVA™ Foxboro Control Simulation and AVEVA™ Triconex Control Simulation) to drive operator training systems with a rigorous simulation foundation. DYNSIM Dynamic Simulation provides an open API to connect any third-party simulation system.

Runtime Licenses

DYNSIM Dynamic Simulation is available in runtime licenses to reduce OTS deployment costs. Runtime licenses provide the full power of the operating model but restrict the modification of the simulation database that defines the process model. The Engineer environment access mode is disabled during instructor, administrator, and operator environments.

Unit Operation / Models

Process Models

- Source
- Reboiler
- Sink
- Valve
- Relief Valve
- Mixer / Splitter
- Header
- Drum
- Distillation Tower w/packing
- Atmospheric Tank
- Separator with Weir
- Pump with NPSH
- Gas Expander and Turbines
- Reciprocating Compressor
- Centrifugal Compressor
- Rotating Equipment Shaft
- Multi Stream LNG Exchanger
- Utility Exchanger (Air cooler)
- Heat Exchanger
- Fired Heater with refractory
- Segmented Pipe w/Sonic Flow
- Plug Flow Reactors
- Slate Change
- Stream Set
- Stream Send/Receive
- OLGA Send/Receive
- Combustor

Electrical Models

- Bus
- Circuit Breaker
- Voltage Transformer
- Power Source/Sink
- Circuit Disconnect
- Motor
- Electrical Load

Control Models

- Function Generator
- Master
- Transmitter
- Summation
- Latch
- PID Controller
- Surge Controller
- Calculation
- Lead/Lag
- Pulse Positioner
- Dual Input Switch Timer
- Counter
- Custom Logic
- Rate Limiter
- Timer

Mining Library

- Conveyor
- Crusher
- Cyclone Separator
- Hydrocyclone
- Flotation unit
- Mill
- Roaster
- Screen
- Solid Separator

Polymer Library

- Polymerization reactors (CSTR, GPRP)
- Degasser

Thermodynamics

Component Systems

- Acids
- Alcohols
- Pseudo-Components
- Aldehydes
- Amides
- Aromatic hydrocarbons
- Elements
- Esters
- Ethers
- Halogenated derivatives
- Ketones
- Naphthenic hydrocarbons
- Other nitrogen derivatives
- Paraffinic hydrocarbons
- Salts and minerals
- Silicon derivatives
- Sulfur derivatives
- Unsaturated hydrocarbons

Thermodynamic Systems

- Alcohol Package
- Amine Package
- API/EPA Sour Water Package
- Benedict-Webb-Rubin-Starling
- Braun K10
- Chao-Seader (CS)
- Erbar Modification to CS
- Flory-Huggins Theory
- Glycol Package
- GPA Sour Water Package
- Grayson-Streed (GS)
- Erbar Modification to CS and GS
- Hayden-O

- HEXAMER
- Ideal
- Ideal Dimerization (IDIMER)
- Improved Grayson-Streed (IGS)
- Lee-Kesler (LK)
- Lee-Kesler-Plocker (LKP)
- Margules Equation
- Modifications to UNIFAC
- NRTL Equation
- Panagiotopolous-Reid Modified (PRM)
- Peng-Robinson (PR)
- PC-SAFT
- Predictive Peng-Robinson (PPR78)
- Predictive Soave-Redlich-Kwong (PSRK)
- PR-Panagiotopoulos-Reid (PRP)
- Redlich-Kwong (RK)
- Regular Solution Theory
- Soave-Redlich-Kwong (SRK)
- Sour Water Package
- SRKH and PRH
- SRK-Kabadi-Danner (SRKKD)
- SRK-Modified Panagiotopoulos-Reid (SRKM)
- SRK-Panagiotopoulos-Reid (SRKP)
- SRK-SIMSCI (SRKS)
- Steam Tables Industrial Form
- Steam Tables Scientific Form
- Truncated Virial (TVIRIAL)
- Twu-Bluck-Coon (TBC)
- UNIFAC
- UNIQUAC Equation
- UNIWAALS
- van Laar Equation
- Wilson Equation

System

Features

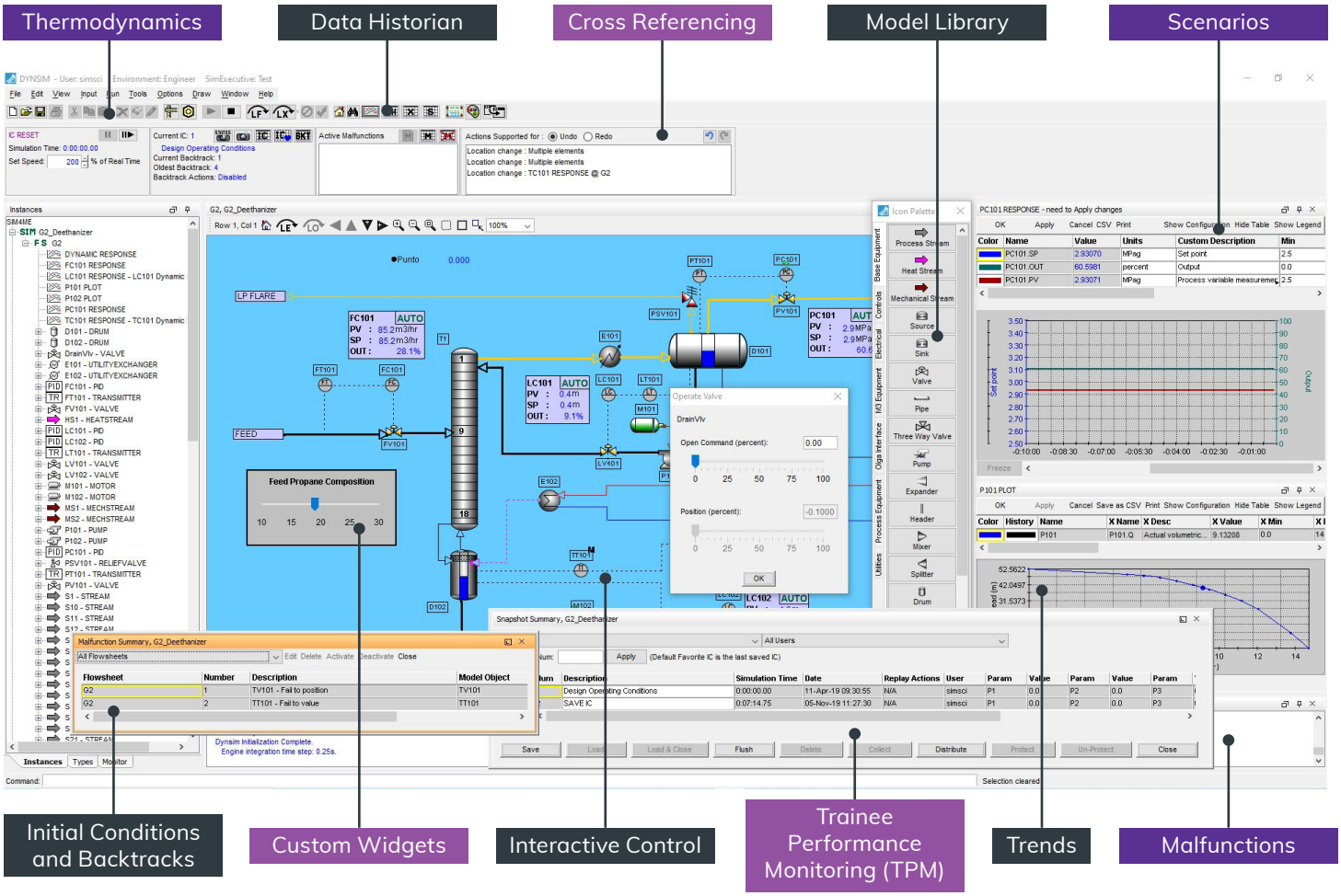
- Add C++ user added models
- Disable any unit operation or flowsheet
- Online help and search
- Flowsheet interactive control widgets
- Color coded input guidance
- Add equations to model parameters

Instructor Features

- Administrator, engineer, instructor, and operator access modes
- Scenarios, trends, and profile plots
- Integrated model building graphical user interface
- Trainee performance monitoring
- Built in control cross-referencing
- Built-in model malfunctions
- Snapshots for initial conditions and backtracks
- Remote functions/field operated devices

Connectivity

- SPT OLGA™
- Microsoft Excel®
- OPC
- AVEVA Foxboro Control Simulation (for EcoStruxure Foxboro DCS)
- AVEVA Triconex Control Simulation
- Major 3rd Party Control Systems
- AVEVA Process Engineering Translator



Engineering / Model Building

OTS Instruction Station

Both Engineering and OTS

For more information on dynamic simulation software and AVEVA engineering services, please visit:
sw.aveva.com/engineer-procure-construct/process-engineering-and-simulation/dynamic-simulation

AVEVA

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