Introduction

Mimic™ Simulation Software is a real-time, dynamic simulation platform built to deliver the business results of the Digital Twin to the process industries. It is a key technology towards top quartile performance.

Simulation must be a practical investment for any operations manager to make, regardless of the size of the plant or the industry. It must allow plant operations to reduce the cost and risk of improving the operation and control of the plant and support upskilling of the work force. Mimic provides value to the execution of capital projects and control system modernization as well as the lifecycle operation performance of the plant.
Benefits

Improve control performance
Mimic provides an environment for process control improvement while reducing the risks and errors in new and existing control system configurations.

Improve operator performance
Improve the performance of your operators by allowing training on startup, shutdown, abnormal situations, and infrequent plant upsets. In addition, operator training with Mimic can accelerate new operator skill development and facilitate knowledge transfer from experienced operators to inexperienced operators.

Support cost effective compliance
Mimic can minimize costs associated with compliance by allowing control system and operating procedure validation without impacting the operation of the actual plant.

Reduce risk of plant operations
Mimic’s ability to test process safety levels of protection and other operational tasks in an off-line environment reduces the risks associated with running your plant.

Select model fidelity to meet the requirements of your application
From low to medium to high, all Mimic models provide the best real-time performance in the industry. This unique capability in Mimic allows you to apply the required level of model complexity to fit the requirements of the unit operation or task.

Automatically integrate to DeltaV
Mimic automatically integrates to DeltaV (and other control system simulators). Mimic’s Simulated IO Drivers integrate signals from the IO and process models to control systems using the communication standards required by the control system vendor. One modeling environment can drive IO signals to different control systems at the same time. Setup and integration time is minimized with utilities in Mimic that read the control system configuration and generate the Simulated IO relationship and IO models automatically.

Comprehensive Operator Training
Mimic Train is an option for Mimic Simulation Software that provides a comprehensive environment for operator training using a Digital Twin dynamic simulator. Mimic Train works with process and IO models in a dynamic simulation system, adding the capability of operator training exercises and instructor controls. It functions as a supervisory manager of the training session allowing complete access and control of the Mimic Simulation and any OPC-compatible off-line control system.

Realize lifecycle business results with low total installed cost
Mimic is built for the end user and is very easy to use. A multithreaded, 64 bit real-time simulation engine makes building great process models easy. An open, virtual ready, multi-user software environment makes Mimic scalable to any application, small or large.

Product Description
Mimic Foundation is the base license for building, managing and controlling the digital twin environment. It consists of several applications.

Mimic Explorer
Mimic Explorer allows complete management of the simulation environment from one window. From here, all aspects of the simulation can be configured. It is designed to display the simulation in a hierarchical tree structure, allowing you to better visualize the entire virtual plant. Mimic Explorer controls and menus allow quick access to other applications in the Mimic Software environment.

- One-click start/stop of simulations
- XML import/export of any system components
- Integrated update and support notifications
- Version control for entire system or individual models
- Process Snapshot control and validation

Mimic Explorer - one window to the entire simulation environment.
Mimic Simulation Studio

Simulation Studio is the Mimic model and simulation configuration layer. It provides an IEC 1131 based graphical block view of the simulated process, allowing users to configure models, download models into the runtime engine, and to view the model data flow in real-time. It also allows offline and online viewing of all models. Unit conversions between blocks are automatically calculated by the Mimic Simulation Engine reducing model development and maintenance time by as much as 10%. Links to other models are displayed at each block making Mimic models easy to understand and easy to maintain. Process models can be built in dynamic PFD format.

Mimic User Views

Mimic User Views are user configurable views of dynamic Mimic or OPC data. Views contain graphs and tabular views of model data as well as graphics of the simulation. These objects are used to view the simulation in the following different ways:

- Data View - Tabular Views of simulated IO, or process model data
- Trend View - Dynamic trends of Mimic and OPC Server data
- Graphic View - Dynamic process flow diagrams of Mimic and OPC Server data for instructor station screens.
- Column/Stripper View - Dynamic view of simulated Distillation Column or Stripper performance
- Separator/Reactor View - Dynamic view of simulated Reactor performance
- Pump/Compressor Performance - Dynamic indication of the simulated Pump and Compressor real-time performance
- Bioreactor View - Dynamic view of online real-time trends and profiles of the main reactor variables, providing a deep insight into the object performance.

Mimic External Model Interface (MEMI)

The Mimic External Model Interface (MEMI) allows external models access to the Mimic modeling environment. Every Mimic system has an OPC v3.0 DA Server available for complete access to Mimic models and Operator Training Manager controls. For higher speed, direct access to Mimic Models, MEMI provides a set of direct, data access functions implemented within a DLL. External modeling applications can load the DLL and use these functions to gain real-time, high-speed, read/write access to the Mimic model data.

Model Dependency Viewer

This viewer provides a graphical representation of model interdependency, making it easier to enhance and troubleshoot process models. The user is able to drill down to individual models, see the model as a whole, or look at the interdependencies between each model, area or reference. This allows for quick and simple model troubleshooting.

Mimic Trend View showing batch profiles for viable cell and product concentration in the Bioreactor Object.
Model Version Control
The Model Version Control feature keeps track of models and system enhancements, allowing you to archive, restore and view revisions of all process models. It also enables you to maintain an audit trail of model enhancements which keeps track of process model design for validated or sensitive environments. A database backup will contain the revision history and content files.

Additional Software Options
Mimic Process
Mimic Process Modeling Objects are a set of rigorous first-principles, dynamic models of process plant unit operations designed for high-performance simulations for operator training or automation system testing. These objects include:

- **Mimic Process Modeling Objects - Core**
  Mimic Process Modeling Objects are the base set of rigorous first-principles, dynamic models of process plant unit operations designed for high-performance simulations for operator training or automation system testing. This license includes Vessel, Valve, Pump, Pressure Reducing Valve, Air Cooled Heat Exchanger, Dynamic Heat Exchanger, Compressor, Stream Input & Stream Output, Stream Tee, Advanced Source, Advanced Sink, Pipe Delay, Orifice Plate, Pressure Regulator, Pressure Relief Valve, Joule Thomson Valve.

- **Power Generation Process Modeling Objects**
  The Mimic Power Generation Modeling Objects are rigorous first-principles, dynamic models of boiler with furnace, steam header, fuel, and turbine designed for high-performance simulations for operator training or automation system testing. This license includes Fuel, Boiler with Furnace, Steam Header, Furnace, Multi-Stage Turbine.

- **Separations Process Modeling Objects**
  The Separations Objects are rigorous first-principles, dynamic models of hydrocarbon separators designed for high-performance simulations for operator training or automation system testing. This license includes Separator, Vessel VLE, Surface Condenser, Jet Condenser, Distillation Column and Stripper objects.

It also includes Mimic Advanced Thermo, which is a complete set of advanced thermodynamic methods and data designed for users in the petrochemical, chemical, oil and gas, and refining industries. It allows the Mimic user to configure and employ rigorous thermodynamic model methodologies. This expanded modeling capability stems from the addition of two classes of functionality: Cubic Equation of State Models and Activity models based on the Non Random Two Liquid (NRTL).

- **Solids Process Modeling Objects**
  The Solids Objects include objects for unit operations commonly found in mineral processing plants as well as particle size distribution tracking and tunable breakage matrices for comminution operations. This license contains the Compactor, Crusher, Cyclone, Mill, Screen, Centrifuge Decanter, Flotation Cell and Settling Tank Objects.

- **Reactions Process Modeling Objects**
  Mimic Reactions Modeling Objects include rigorous, first principle models of a wide variety of continuous and batch industrial reactors with configurable reaction kinetics, catalyst activity, incorporated with the Separator Object functionality. This license contains Continuous Stir Tank Reactor and Plug Flow Reactor Objects.

- **Bioreactor Process Modeling Object**
  The Mimic Bioreactor Object is a rigorous first-principles, dynamic model of a bioreactor or fermenter designed for high-performance simulations for operator training, automation system testing, and operations and process improvement.

Mimic Process Infrastructure:
- Powerful data visualization tools
- Easy to implement, quick to tune
- Rigorous First Principles Unit Operation Models
- IEC1131 Function Block objects
- Dynamic Objects with Real Time Convergence
- Unit Operations links with process Streams
- Thermodynamic Properties validated to NIST and DIPPR
- Component Sets Streams Management, Automatic Engineering Unit Handling
- Dynamic Pressure / Flow Solver
- User Views for Process Analysis
- IEC1120 Function Block Objects of Dynamic PFD Objects
Mimic Simulation Software

Mimic Train

Mimic Train is a comprehensive operator training management system that is an option for Mimic Simulation Software. It requires a Mimic Foundation license. Mimic Foundation provides integration and execution of the dynamic simulation of the process running in Mimic Process or a 3rd party modelling platform like AspenTech HYSYS Dynamics.

Mimic Train Core Components Includes

- Training Courses - includes operator training exercises with individual state logic diagrams.
- State Based Training Engine - executes the training exercises.
- Default & Custom Malfunctions - directly linked to the IO or Mimic modeling objects.
- Key Performance Indicator Scoring - critical process data points against which the student’s performance can be evaluated.
- Mimic Train Records & Reports - a record of each exercise that is executed that can be exported to LMS.
- Custom Interfaces - Mimic user types: Engineer, Instructor, Student.
- Mimic Train Views - additional graphical, interactive resources such as Remote access to DeltaV control systems, Component Studio Graphics, Remote Desktop, PDFs, web links, and online resources.

Mimic Test Bench

Mimic Test Bench provides a way to automate Instrument, Control, and Safety System (ICSS) configuration testing and document the testing of these systems. Users can create a test to set, examine, and verify values in both their Mimic simulation and any OPC compliant control system.

Mimic HYSYS Link

The Mimic HYSYS Link allows direct integration of HYSYS Dynamics models into Mimic, allowing those models to be used for control system development and testing, operator training, and continual improvements and OPEx initiatives.

Built upon the proven communication bridge architecture in Mimic, the HYSYS Link provides:

- Movement of IO data between Mimic and DeltaV Simulate or other control systems simulators
- Support for multiple HYSYS cases in a single machine or across multiple machines
- Synchronization of variables between cases in the same machine or across several machines
- Synchronization of execution for multiple cases in the same machine
- Pause and resume the models and external systems
- Running the models and external systems at speeds other than real-time
- Ability to create, store, and restore snapshot

Mimic System Capacities and Requirements

- Simulated IO Tags Per System – 1000 and greater (1000 SIO Tags Increments)
- Runtime Simulation Nodes Per System – 64
- Defined Simulation Nodes Per System – no limit
- Simulated IO Tags Per Node – 20,000
- Remote Terminal Sessions for Mimic Server – 10
- Operating Systems Supported – Microsoft Windows, 10, Microsoft Windows Server 2016

www.emerson.com/mimic
Ordering Information

Mimic is licensed dependent on the number of Mimic SIO Tags required, starting with 1,000 SIO Tags Base License and the ability to scale up in increments of 1000 SIO Tags. A Simulated IO (SIO) Driver should be ordered with every Mimic system with an offline control system. Guardian Support for Mimic is not included with the purchase of MM3-1100 and must be added separately based on Simulated IO Tag size.

Mimic uses a USB Software License Key or a certificate-based license for license security enforcement.

All new purchases of Mimic Base Licenses require the purchase of SER 6404 for North America and International shipments.

Mimic Base Software

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<tr>
<th>Model Number</th>
<th>Description</th>
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<tr>
<td>MM3-1100</td>
<td>Mimic Foundation (100 SIO Tags, Mimic Server, Snapshot Functionality)</td>
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<td>MM3-8101</td>
<td>Mimic 1000 Simulated IO Tags</td>
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Mimic Base Software

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<tr>
<th>Model Number</th>
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<tbody>
<tr>
<td>MM3-2101</td>
<td>DeltaV Railbus SIO Driver</td>
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<td>MM3-2102</td>
<td>DeltaV Simulate OPC SIO Driver</td>
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<td>MM3-2103</td>
<td>Modbus TCP/IP SIO Driver</td>
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<td>MM3-2104</td>
<td>Schneider Unity (OFS v3.2 or higher) SIO Driver</td>
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<td>MM3-2105</td>
<td>HIMA Soft PLC Visualization Gateway SIO Driver</td>
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<td>MM3-2106</td>
<td>Ethernet/IP SIO Driver (Rockwell PLCs only)</td>
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<td>MM3-2107</td>
<td>DeltaV SIS SimulatePro OPC SIO Driver</td>
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<td>Open OPC Client SIO Driver</td>
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<td>Previise Infi90 / Net90 Simulator SIO Driver</td>
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<td>DeltaV COIC/VCIOC/Virtual M and S Controller SIO Driver</td>
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<td>MM3-2112</td>
<td>Mimic SPA SIO Driver</td>
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<td>MM3-2113</td>
<td>ABB 800xA Simulator SIO Driver</td>
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<td>Rockwell Studio 5000 Logix Emulate SIO Driver</td>
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<td>MM3-2115</td>
<td>Siemens/TI 5XX PLC SIO Driver</td>
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<td>MM3-2116</td>
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Mimic Software Options

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<tr>
<td>MM3-1701</td>
<td>Mimic Train</td>
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<td>MM3-3103</td>
<td>Mimic Test Bench</td>
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<td>MM3-3104</td>
<td>Mimic HYSYS Link</td>
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<td>MM3-3105</td>
<td>Mimic Link Tags - 1000</td>
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Mimic Process Modeling Objects

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<th>Model Number</th>
<th>Description</th>
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<tr>
<td>MM3-7111</td>
<td>Mimic Process – Core</td>
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<tr>
<td>MM3-7113</td>
<td>Mimic Process – Power*</td>
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<tr>
<td>MM3-7121</td>
<td>Mimic Process – Separations*</td>
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<tr>
<td>MM3-7131</td>
<td>Mimic Process – Solids*</td>
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<tr>
<td>MM3-7141</td>
<td>Mimic Process – Reactions**</td>
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<td>MM3-7142</td>
<td>Mimic Process – Bioreactor*</td>
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* Requires MM3-7111 (Core) license
** Requires both MM3-7111 (Core) & MM3-7121 (Separations) licenses.

Specifications

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<thead>
<tr>
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<tr>
<td>Operating System</td>
<td>Microsoft Windows 10; Microsoft Windows Server 2016</td>
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<tr>
<td>CPU</td>
<td>x86 2.5 GHz dual-core CPU</td>
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<tr>
<td>Memory</td>
<td>Minimum 4GB</td>
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<td>Disk Space</td>
<td>10 GB free space before installing Mimic</td>
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