

# DYNAMIC DIGITAL TWIN SOFTWARE

DIGITALLY BRINGING  
YOUR MECHANICAL  
DESIGNS TO LIFE



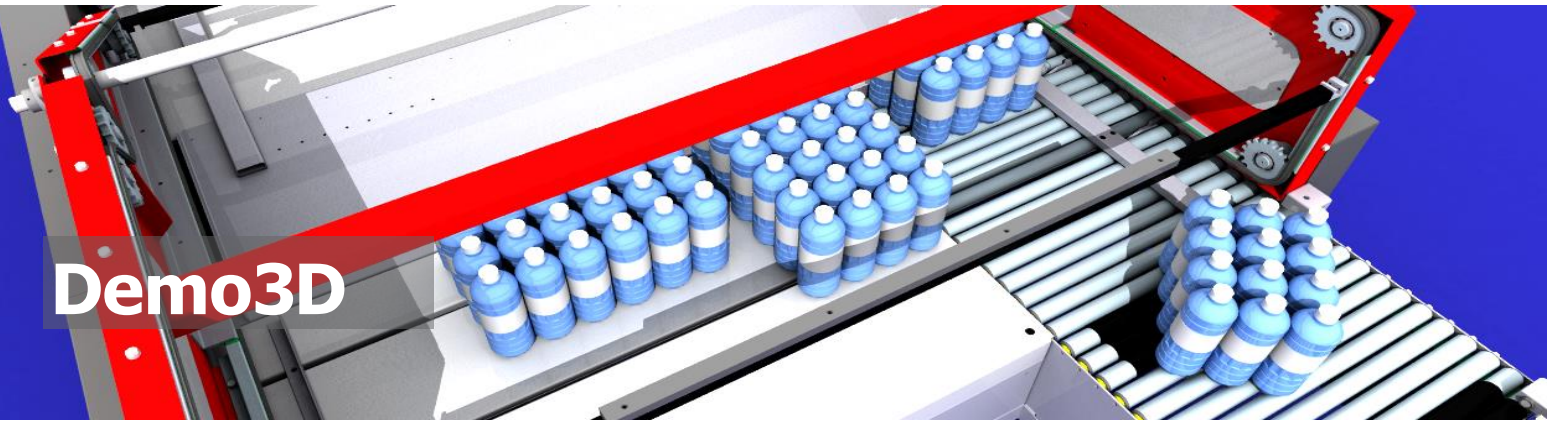
**EMULATE3D**

by ROCKWELL AUTOMATION



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## Demo3D Awesome models and fast

Create impressive models fast, without spending the project budget before you even get it.

Demo3D is a three-dimensional, physics-based software product most commonly used for modeling industrial material handling, packaging, manufacturing, and warehousing and distribution systems. Demo3D models are used for the presentation of concepts, visualization of proposals, proofs-of-concept, and validation of system designs. Models are dimensionally and physically accurate; momentum, friction, and inertia play an active role in the way products move, accumulate, and transfer from one part of a system to the next. Models can also be reconfigured as project requirements change. Demo3D is designed to help develop and communicate ideas within a company, or between companies involved in the integration and improvement of automated systems.

### The Benefits of using Demo3D:

- **Providing the features and functionality you need to create impressive models fast, without spending the project budget before you even get it.**
- **Creating model fast with equipment catalogs**
- **Adding your own control and logic for demonstration**

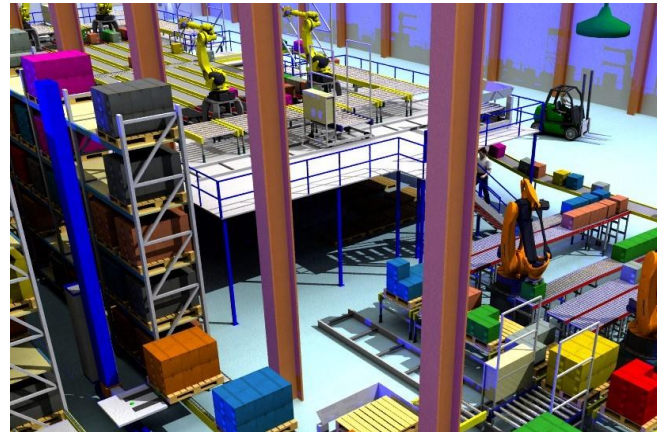
### REALISTIC MODELS, REALLY FAST

Demo3D stands out in the modeling world as it incorporates realistic physics to show the way loads and other model elements interact. The Demo3D world takes into account mass, friction, force, inertia, gravity, and momentum to represent the interactions between various model elements.

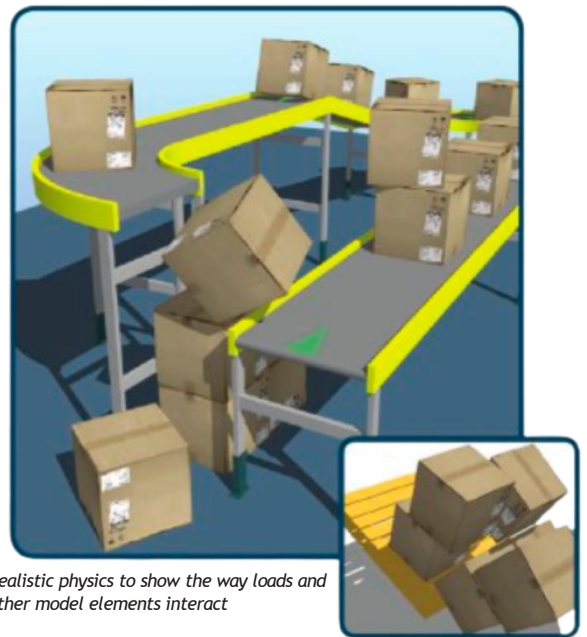
Products on Demo3D conveyors behave according to real world physics, as you would expect them to. They can bump into each other, slide, jam, and even fall to the floor.

Demo3D elements have the same properties and behaviors as their counterparts in the real world, Conveyor sections have moving surfaces and unmoving sides; a product thrown fast onto a slower moving surface will slide and may be even tip, before friction brings its speed down to the surface speed.

Loads have mass, a center of gravity, can have a degree of softness, and are made of materials.



*Demo3D uses to demonstrate your concept, POC and validation of system design*



*Realistic physics to show the way loads and other model elements interact*



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## Model Fast with Equipment Catalog

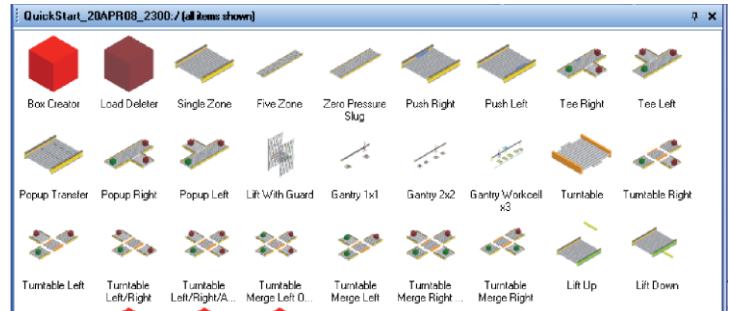
### THE Demo3D WORKSPACE

The workspace consists of a central area which can be in Navigate or Select mode. The Navigate mode is used for demonstrating a running model, and model elements cannot be manually dragged, selected, or deleted. Model elements may have functions associated with them which are triggered when the user clicks on them in this mode. Dragging a catalog element into the workspace switches the model into Select mode, shown by a floor grid, and elements can then be dragged, turned, copied, and deleted. The panel to the left of the workspace is split in two. The top half provides access to the various catalogs supplied by Emulate3D, created by the user, or by other Demo3D users. The model Explorer and Notes are also accessed here. You can add Notes to a model to help users in many ways. Notes can be multiple pages, and can include images and hyperlinks

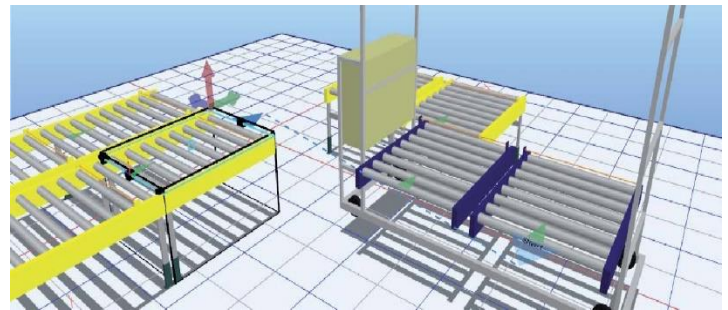
### BUILD LAYOUT FROM CATALOGS

Catalogs are arbitrary collections of model elements, which may range from simple to very complex. You may have a basic conveyor section in your catalog, or you may have a fully operational section of a production environment, complete with functioning logic that can take into account the state of the model it is joined to.

Demo3D is supplied with several catalogs to allow rapid modeling - the QuickStart catalog contains many commonly-used material handling elements and load types.



Demo3D is supplied with QuickStart catalogs contains many commonly used elements to allow rapid modelling



Commonly used elements allow to build your layout fast by drag and drop

## ADD YOUR OWN CONTROL

### QuickStart CONTROLLERS

The simplest way to modify default operation is to use QuickStart Controllers, which usefully separate logic from the layout in a way which makes development and modification of the control straightforward. Controllers carry out a wide variety of logical tasks from product routing to robot palletizing, and advanced users can also add to them by using the QuickStart Framework to create their own.

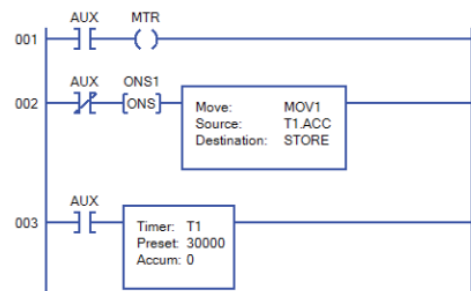
### CREATING CUSTOM LOGIC

Demo3D is designed to help you build realistic models, fast. The QuickStart Catalog is not only the most immediate way of doing this, but it also uses the Demo3D Framework to demonstrate how users may create their own custom catalog items. Advanced users can open supplied catalog items and modify the internal logic, and create their own - Demo3D uses Microsoft Jscript as its internal script. Many users will want to create flow logic, sorting algorithms, or generate basic statistics, and this can all be carried out most conveniently using the drag and drop QuickLogic objects.

QuickLogic allows you to focus on creating the logic you need, without having to contend with the bureaucracy of a programming language. Within certain movement systems such as robots, fork lift trucks, AGVs, and the Operator, you will find QuickLogic Procedures which are tailored to each specific device. Robot procedures can specify linear moves or point to point moves, for example, while the Operator procedures can control individual hand movements and steps.



Creating custom logic to demonstrate what elements move and interact each other.



Creating ladder logic focus on logical operation

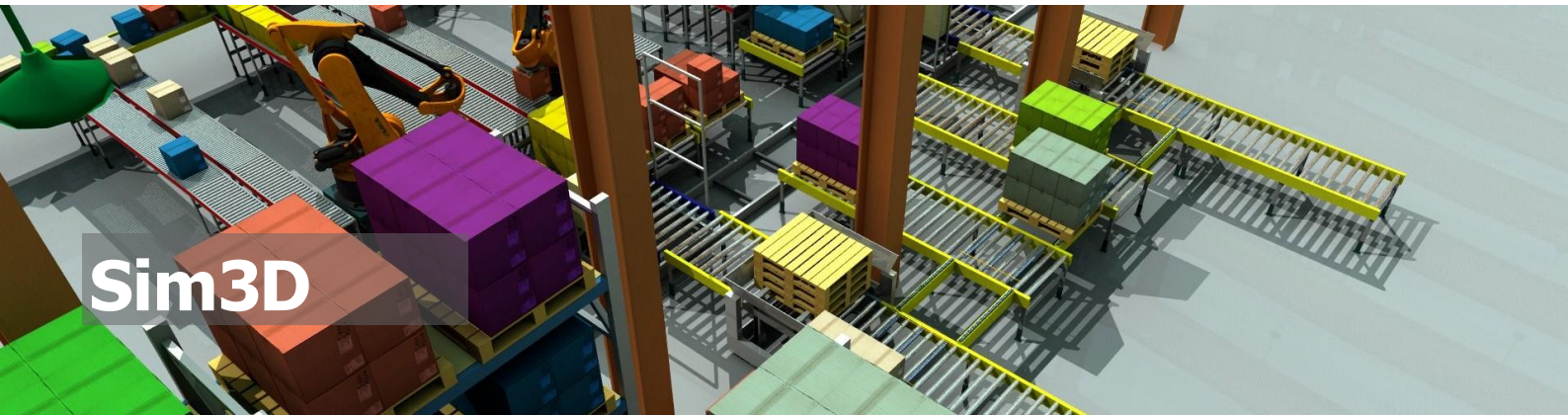


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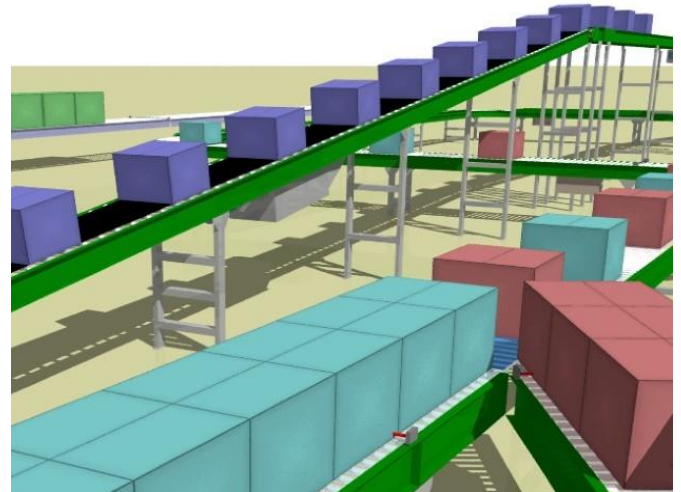
## High Performance System Simulation from Emulate3D

### The Advantages of Simulation

Sim3D helps you to analyze system throughput, identify bottlenecks, dimension layouts accurately, and test out different operational modes to increase your understanding of how a system responds to changes. Bring “what if” scenarios to life and compare results to select the best configuration and functional parameters for your requirements. Simulation helps to determine “the best” solution, but also leads to robust models that provide a complete understanding of system behaviour across a broad range of operational scenarios. Sim3D helps you to reduce the risks associated with your project decisions.

### Build Robust Models Quickly with Sim3D

The Sim3D modeling framework enables users to create model layouts quickly using standard drag and drop catalog components. Once the system layout is complete, the default operational logic of each element can be modified by overlaying system-specific logic which represents the business rules of your model. A wide variety of CAD formats can be imported to enhance the visual aspect of the model, or to help with the layout. Users can create their own company-specific catalogs and equipment items with behaviors defined by custom logic, and which may incorporate imported CAD



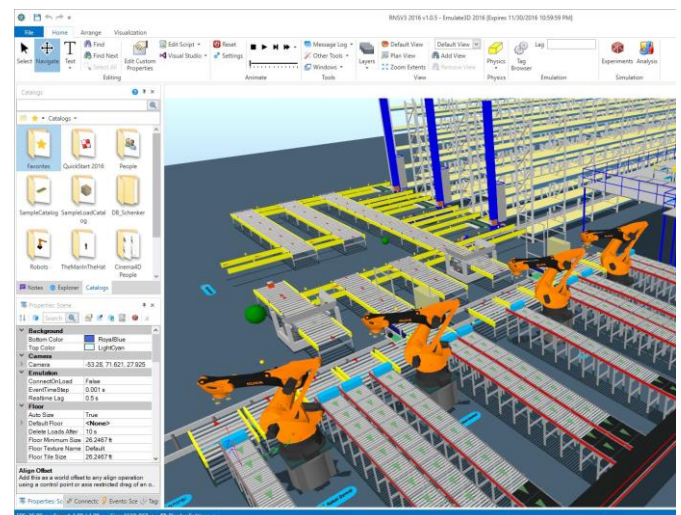
Sim3D models provide a reliable way of testing competing solutions

### Simulation Benefits:

- Enhances Communication - provides a common representation of the project state
- Enables unbiased comparisons between different proposed solutions
- Allows a complete understanding of the system behavior
- Produces statistical results to reinforce decisions
- Reduces the overall investment risk associated with the project

### Sim3D - Designed for a Wide Range of Users

Sim3D users can add project-specific operational logic in several ways, reflecting the diverse user base of Emulate3D technology across many industries. Power users benefit from the integration of Microsoft's Visual Studio C# editor and debugger as a productive and familiar work environment, which accelerates their workflow. Other users appreciate the straightforward drag and drop logic editor, and those more used to working with PLCs can even create logic with the internal ladder logic editor.



The interactive build environment enables users to create even complex models fast



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## Understand your System through a Dynamic Simulation Model

Manufacturing facilities, baggage handling systems and distribution centers are complex systems whose performance is hard to predict. The systems involved are dynamic, with multiple product movements, resource allocation choices, and variable operator cycle times adding further complexity. While the bigger picture may be difficult to comprehend, each system is the result of clear business rules applied to a collection of machines, operators and handling equipment, making it an ideal subject for industrial simulation modeling.

## Refer to an Impartial Judge

Simulation helps to break the deadlock between personal experience and opinion - an accurate model provides the clarity to make confident decisions, backed up by repeatable results. When there are equipment choices to be made, clear simulation models help to settle the debate decisively.

## Clearly Communicate Benefits, Results and Outputs

Simulation models enhance team communications and system understanding at several levels, beginning with the initial requirement of bringing together enough knowledge and data to build the model. This essential stage highlights areas where operational decisions have yet to be made, and often acts as a catalyst for progress. A running model is an easily understood representation of the future system, and outputs can be communicated and shared with project stakeholders in several ways:

- A wide range of video types - mp4, wmv, AVI, etc
- 3D stereo Augmented Reality using Microsoft HoloLens
- 3D stereo Virtual Reality using HTC Vive, Oculus Rift, Samsung Gear VR, and Google Cardboard
- Free VR smartphone apps for Apple's iOs, Android, or Windows
- 360 degree stereo videos on smartphones and YouTube
- Live models running on the internet using the WebGL viewer
- Animated 3D PDF animations in documents

Users can define multiple model runs to determine optimal parameter sets for any given goal - and simulation models can write outputs to Excel spreadsheets for a wide range of graphical representation options.

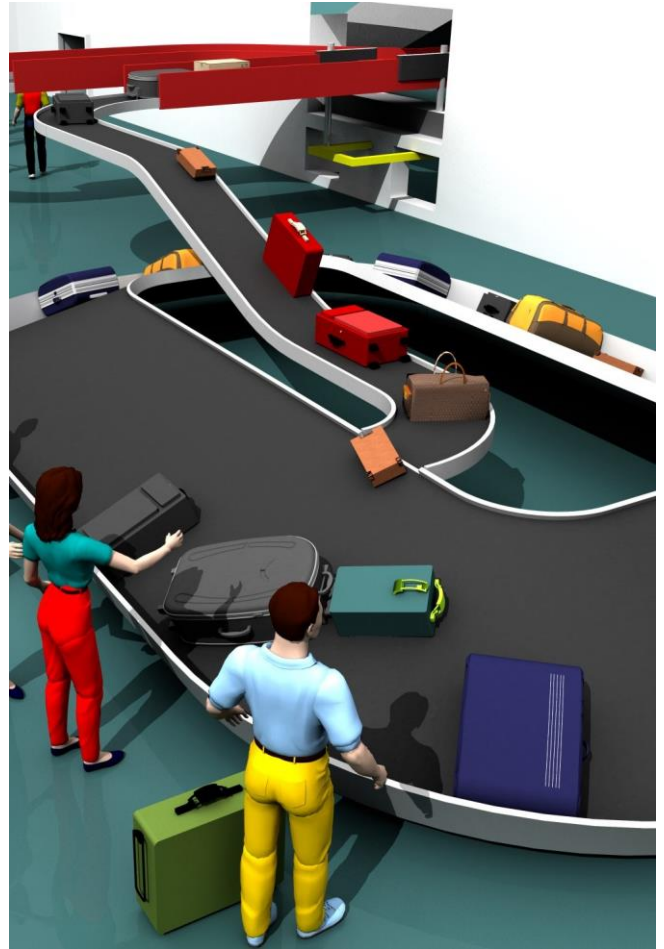
## Your Next Steps

Learning more about Sim3D and how it can help your company is straightforward - first check out the website, and then call us to arrange a 90 minute online demo.

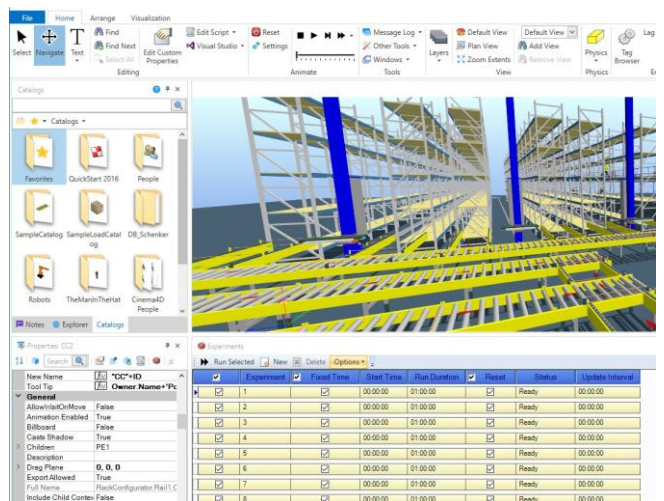
- Check our YouTube channel: search for Emulate3D on YouTube
- [Register](#) for a \$299 Online Introductory Workshop for a clear understanding of how Sim3D can put you ahead of the competition. Check the website for details.
- [Contact us](#) to discuss your requirements and for further information

## Emulate3D Industrial Software

Emulate3D develops industrial engineering software to assist in the conception, design, development, implementation and running of industrial systems. The four ranges are Emulate3D, Sim3D, Demo3D, and Layout3D; each developed to provide specific engineering solutions to industry. Central to each is a core technology which enables users to have a straightforward workflow between the different products. This common workflow minimises rework and errors, and leads to increased productivity as more of the products are adopted company-wide.



Sim3D models help users to communicate results clearly in a wide variety of ways



Create multiple runs with different parameter sets using the Experiment Manager



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## EMULATE3D CONTROLS TESTING

### Test Your Control System Offline with Emulate3D Reduce Commissioning Time and Costs with Virtual Controls and PLC Testing

Emulate3D Controls Testing software enables you to test and debug your control system offline, before the real equipment is built, and without disrupting existing production. Take logical testing off your automation project's critical path and work efficiently in parallel with the system build and installation. Reduce commissioning time and costs, and speed your time to market by running logic tests on your system's Dynamic Digital Twin in a safe and controlled virtual environment before going on site. View, control, and demonstrate your machine within a virtual reality (VR) environment for maximum impact. Invite your clients to join the VR experience by logging in to your model remotely, so you can discuss the latest project changes. With Emulate3D technology, meetings can be spontaneous, more frequent, and with practically no carbon footprint.

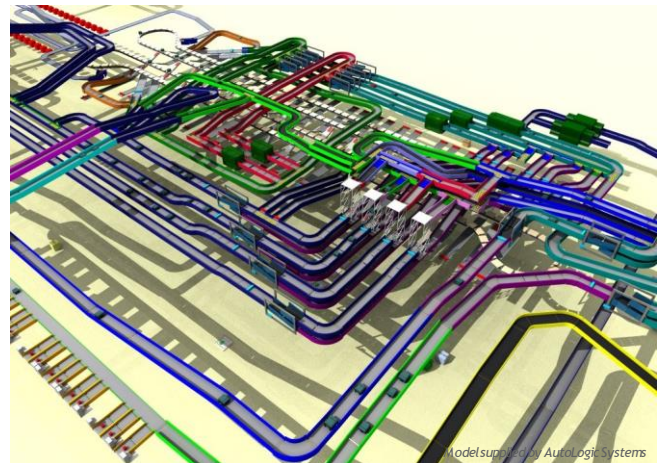
#### The Benefits of using Emulate3D Controls Testing:

- Take logical controls testing off your project's critical path
- Test automation systems thoroughly under controlled conditions
- Significantly reduce onsite commissioning time and costs
- Create robust, fully-tested controls safely, on time, within budget

#### TEST YOUR CONTROLS WITH A TRUSTED DYNAMIC DIGITAL TWIN

Virtual commissioning users connect accurate models featuring low-level elements such as sensors, actuators, and motors to the control system. By creating a controlled arrival pattern of products into the model, events are generated and inputs changed as sensors are blocked and cleared. The control system responds as it would with the actual system, and the Dynamic Digital Twin reacts and reflects reality accurately.

Emulate3D Controls Testing (ECT) models combine generic equipment primitives with CAD data, control element properties, and PLC IO connections within the model environment to generate your virtual system with minimum effort. Your automated solutions will be ready to test faster with Emulate3D.



Model supplied by AutoLogic Systems  
Airport Baggage Handling systems can be tested for a wide range of operational situations



Model supplied by Intralox  
Use ECT to test single machines or complete Automated Material Handling Systems



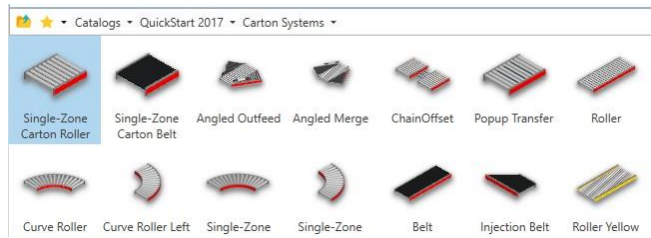
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## Develop Fully Tested Control Systems On Time, Within Budget

Emulate3D models are built by assembling standard equipment elements from generic catalogs and connecting their IO to a wide range of PLCs, or higher level controllers. Users can create company-specific catalogs of operational equipment to accelerate their workflow, and Emulate3D's open framework also enables connections to other company applications. Emulate3D offers a SOLIDWORKS add-in which helps machine builders develop controls testing models within the CAD product, and users can generate models automatically from their existing product configurators.



Building Emulate3D Controls Testing models is fast and straightforward using catalog items

When models are run, each virtual load or product is detected by sensors and then processed, transported, manipulated, pushed, or queued within the system in response to the control outputs, just as it would be in the real machine. Users observe the behaviour of the running model, and carry out control logic changes if necessary, before running the model again to verify the effects of their modifications.

### CONNECT TO A WIDE RANGE OF CONTROL SYSTEMS

Emulate3D Controls Testing is used to model a wide range of externally-controlled systems, often connected to several controls at different levels. Model types frequently created and tested by users include baggage handling, automotive systems, distribution centers, sorting systems and individual machines.



### TRAINING AND SUPPORT

We offer training and support services to meet your needs. Experience shows a program of two-hour online sessions to be the most effective way to bring you up to speed and get you operational, as well as being convenient to schedule. If you'd prefer face to face training, however, we can provide that too.

### LEARN MORE NOW

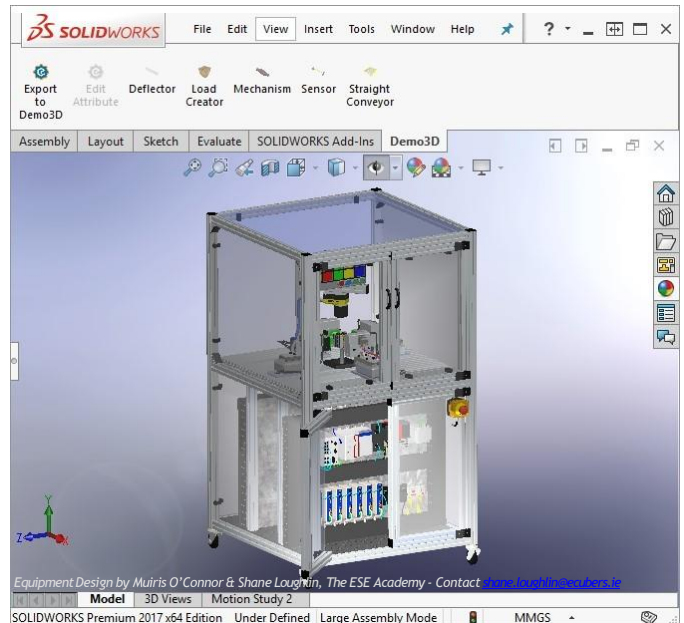
To find out more about how Emulate3D technology can help you, contact us for a 90-minute online presentation. If you'd like to try it out, register for a seat at the online Introductory Workshop at [WWW.DEMO3D.COM](http://WWW.DEMO3D.COM)



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Contact us now to arrange a  
**Free Demonstration!**



Control element properties can be accessed and modified within the CAD environment

## PLC CONNECTIVITY

**PLCs - Allen Bradley:** ControlLogix, CompactLogix, MicroLogix, SLC500, PLC5 - EtherNet/IP, PCCC, RSLinx - Auto-optimization: Protocol analysis, tag database analysis, tag merging  
**Beckhoff:** TwinCAT 2 and 3 - ADS **B&R:** Automation Studio - PVI **Mitsubishi:** FX, MELSEC-Q Series, MELSEC iQ-R Series - MX Component, GX Works2, MT Developer2 - GX Works2 integration: Import tags from GX Works2 project **Omron:** NJ, NX, CJ Series, Sysmac Studio - Ethernet/IP, OPC **Schneider Electric:** Modicon M340, Quantum, and others - Modbus, OPC **SEW:** MOVI-PLC - OPC, Modbus **Siemens:** S7-300, S7-400, S7-1200, S7-1500 - PROFINET, PROFIBUS, S7 Functions, MPI, PUT/GET, Fetch/Write **Unitronics:** Modbus **Others:** OPC-DA, OPC-UA

**Protocols and Field Buses - CANopen - DeviceNet - Allen Bradley - EtherNet/IP - Allen Bradley (ControlLogix, CompactLogix), Omron, and others - Fetch/Write - Siemens - Modbus - Schneider Electric, Unitronics, and others - MX Component - Mitsubishi - OPC - Any PLC with corresponding OPC server - PCCC - Allen Bradley (MicroLogix, SLC500, PLC5) - PROFIBUS - Siemens, and others - PROFINET - Siemens - PROFISAFE - Siemens - RSLinx - RSLogix 5000 Emulate, Allen Bradley PLCs over hardware links - S7 Functions / MPI - Siemens - Simulation Unit (SIMBA) - Siemens**

**Hardware and Field Bus Gateways - Beckhoff Field Bus Cards - FC312x PROFIBUS - FC512x CANopen - FC520x DeviceNet - QTS AN-X - PROFIBUS - SST Woodhead PCI - PROFIBUS - Siemens Simulation Unit (SIMBA) - PROFIBUS, PROFINET, PROFISAFE**

**Servers - Emulators - MicroLogix 1100 - Siemens PROFIBUS DP-DP Coupler - HMI and SCADA testing - S7 Functions PUT/GET server - Modbus server (configurable function code support)**



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AUGMENTED AND MIXED REALITY  
FREE APP - 360 DEGREE VIDEOS  
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