DIGITAL ENGINEERING SUMMIT

16-17 June 2025

Rome Marriott Park Hotel, Italy

EMULATE3D

by ROCKWELL AUTOMATION

ROK LIVE EMEA

Creating the Future of INDUSTRIAL OPERATIONS

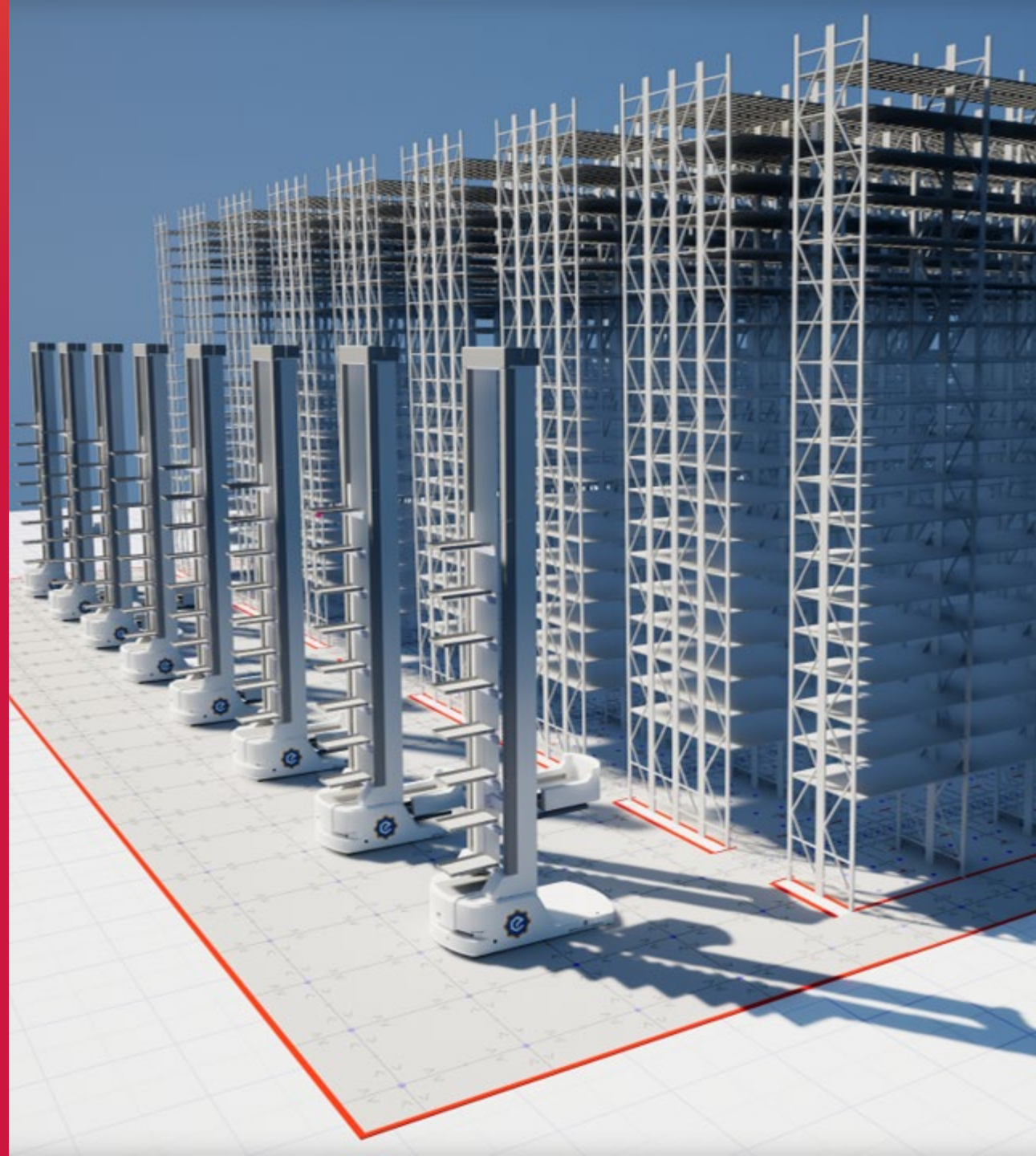
What's New in Emulate3D 2025

Andrew Deeble

Emulate3D Lead Product Manager

Tyler Phillips

Emulate3D Global Business Development



Emulate3D Roadmap

V17.00.00
Emulate3D 2024
March 2024

- Fault Framework
- Device Emulation
- Profiling Tools
- Multi Model
- Omniverse Renders

...and much more!

V17 Minor Releases
Up to v17.00.05
Updates include:

- Unreal Preview
- Tanks and Pipes v3
- Wiring Diagram v3
- Conveyor Updates

V18.00.00
Emulate3D 2025
March 31st, 2025

- Unreal Rendering
- Test Runner
- Version Control
- FMU Import
- AMR Updates

...and much more!

V18 Minor Releases
Regular Cadence
Planned updates:

- Test Runner Updates
- Unreal Updates
- Growing User Forum

V19.00.00
Emulate3D 2026
March 2026

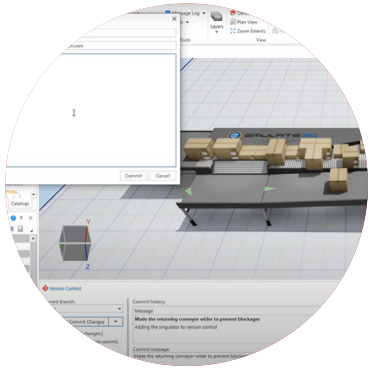
- Assets & Sections
- Containerization
- Wider Connectivity
- Model Advisors
- Industry Catalogs

| 2025 Feature Spotlights

Watch the summary "What's New in 2025 Here".

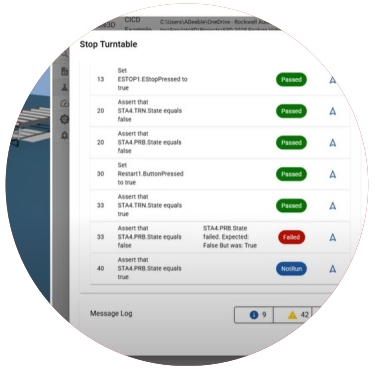
Unreal Rendering Engine:

- Display Settings
- Lighting



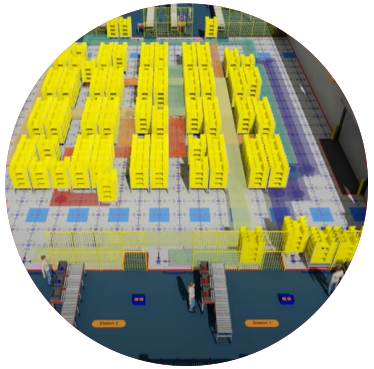
Native GIT Version Control:

- For Models
- For Catalogs



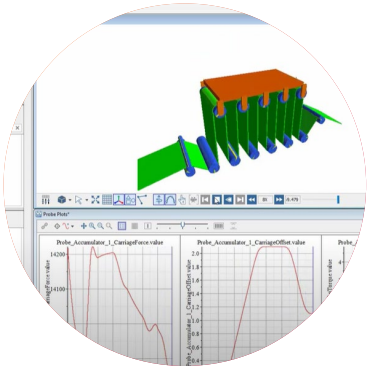
Test Runner for Validation:

- Controls Testing
- Scripted Tests



Test Runner for Simulation:

- Scenarios and Optimizers



Connectivity and Physics:

- FMU Import
- Device Emulation

Unreal Rendering

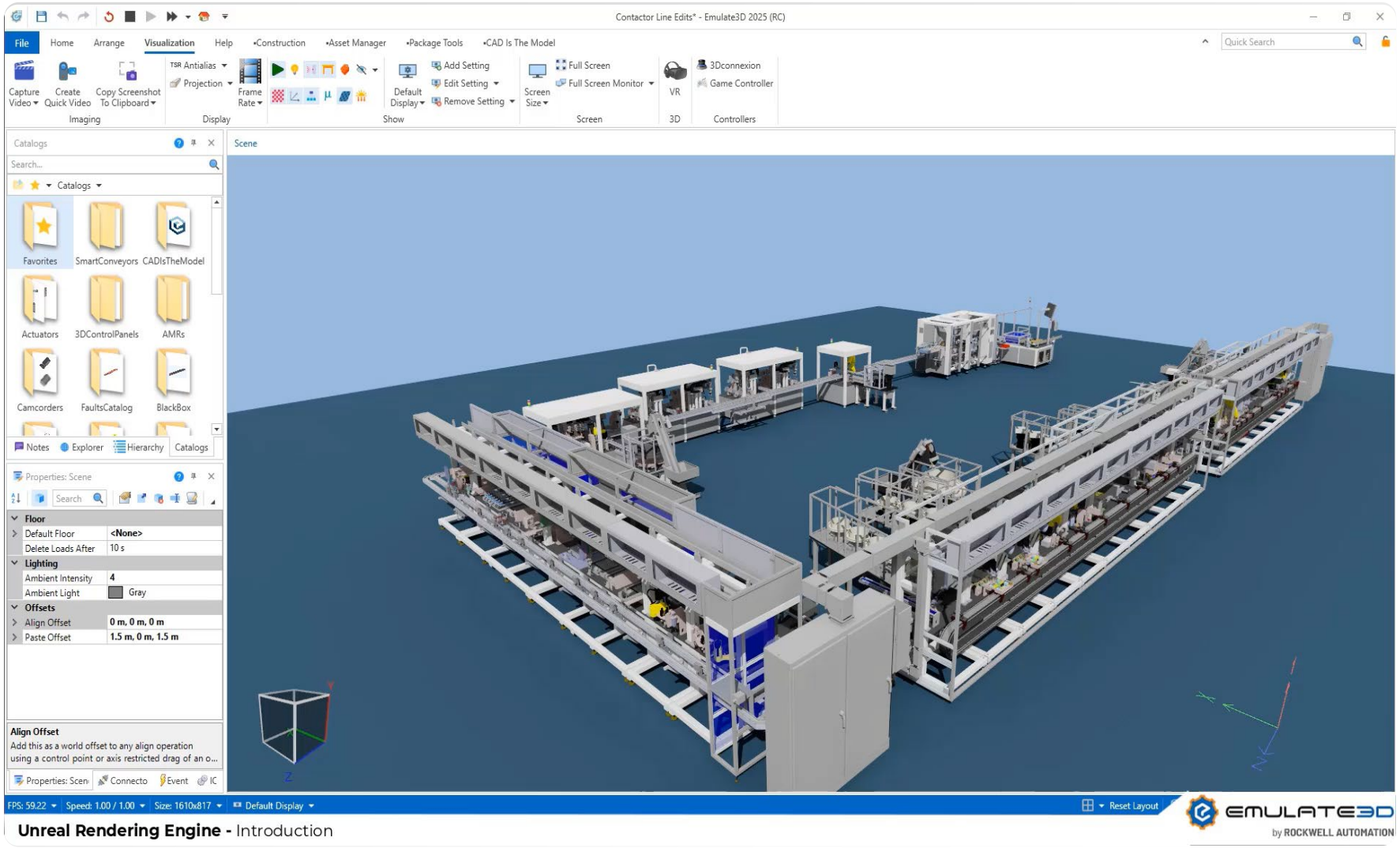
Performance or Detail? Why not both!

New engine produces faster and smoother rendering.

Improved multithreading for faster model run-speed.

High quality lighting, textures, and shadows.

Support for GPU free headless instances.



Unreal Rendering Engine - Introduction

Factory Test

Emulate3D's unique functionality enables full factory scale virtual commissioning.

Collaborative development through Version Control.

Structured testing with Test Runner & Fault Framework.

Distribute and hyperscale with Multi Model.

Amalgamated Factory rendering through NVIDIA Omniverse APIs.

GIT Version Control

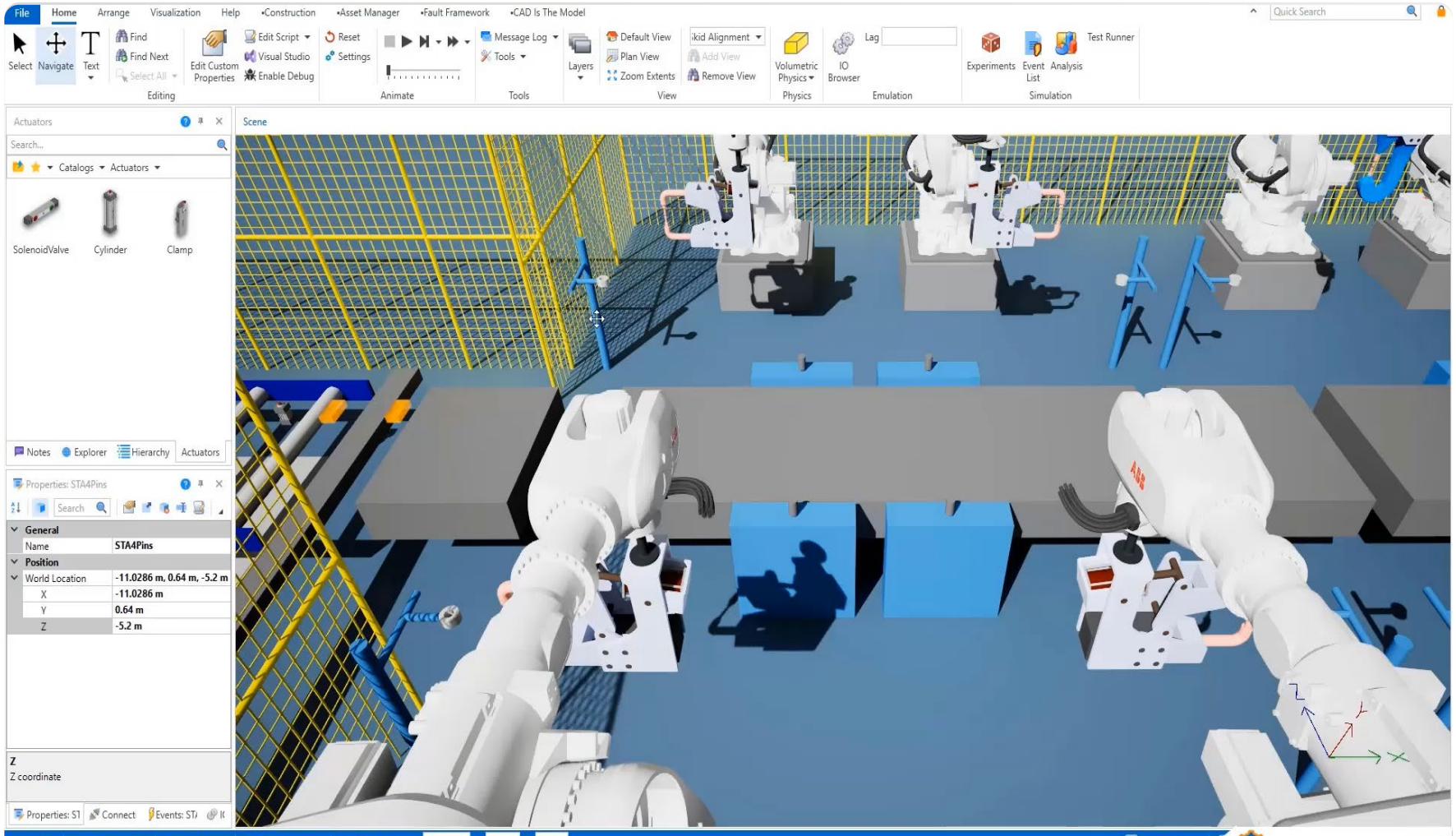
Say goodbye to saving and commit to commits!

Demo3dx and Catalog3dx formats for version control.

GIT Version Control user interface from within E3D.

Commit changes, view history, branch, revert, or switch to past commits.

GIT Vendor agnostic.



Native GIT Version Control - Who Changed What and When?

| Test Runner for Virtual Commissioning

Use Emulate3D as the testbed for your Industrial DevOps.

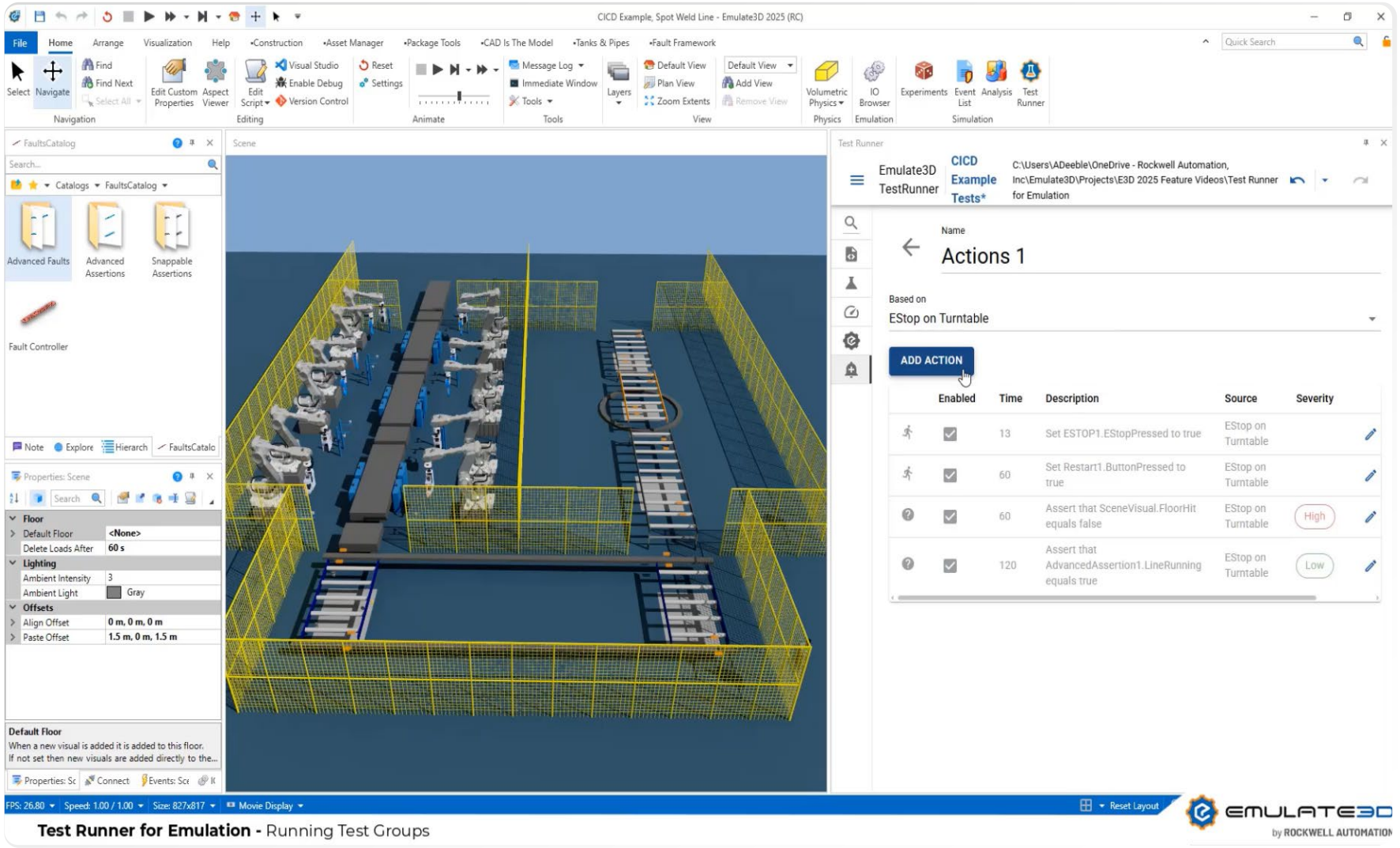
Create Test Scenarios which perform actions.

Schedule HMI interaction, E-Stops, or device faults.

Define test assertions to validate the PLC response.

View dashboards of results

Run after every commit!



Fault Framework

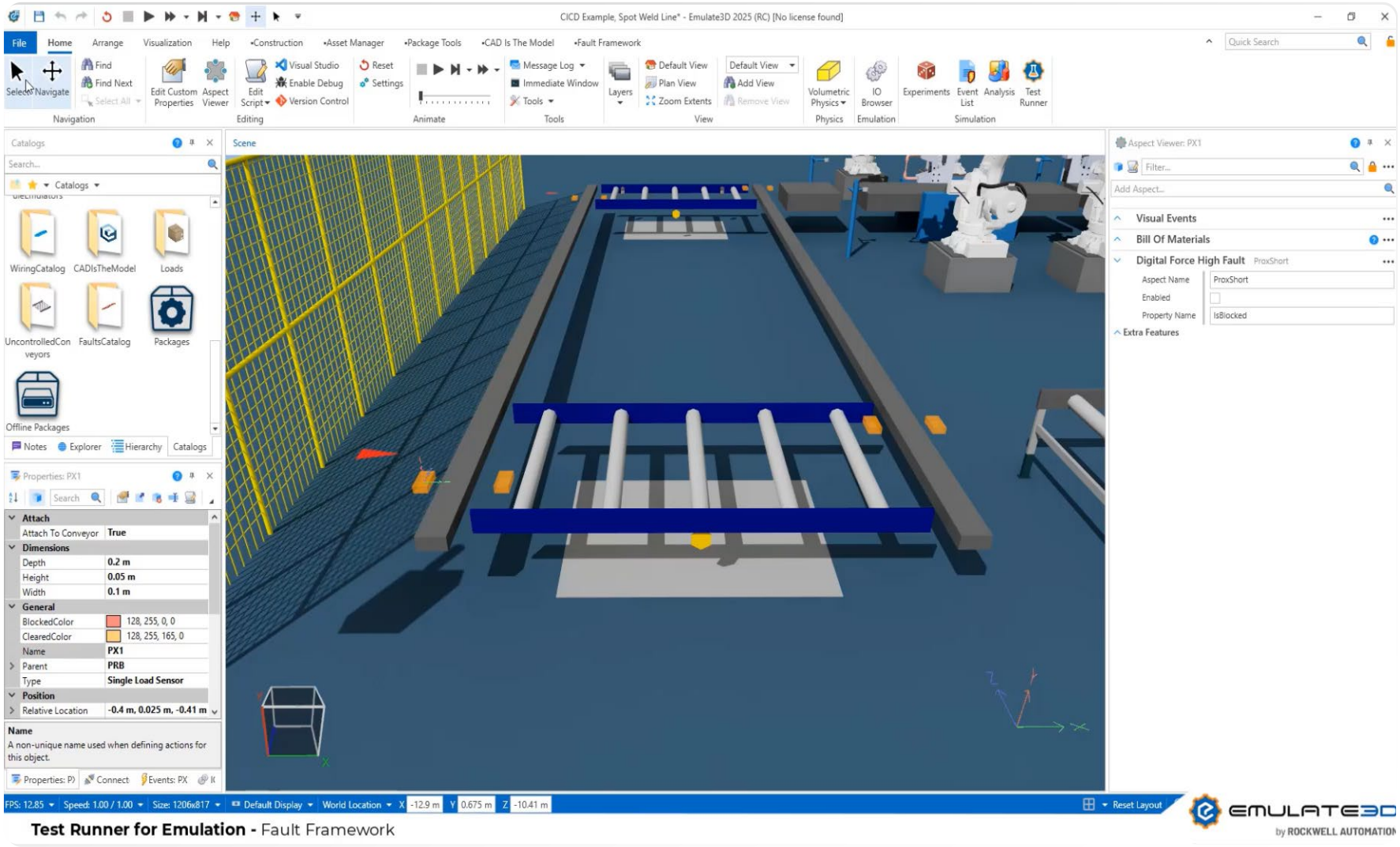
Simulate device faults for “off the happy path” virtual commissioning.

Force the value of any property to represent faults.

Examples include signal drift, disconnect, stalled valves, power loss, frozen values, and more.

Monitor properties with assertion aspects.

Create custom faults using QuickLogic or C#



Test Runner for Emulation - Fault Framework

Test Runner for Simulation

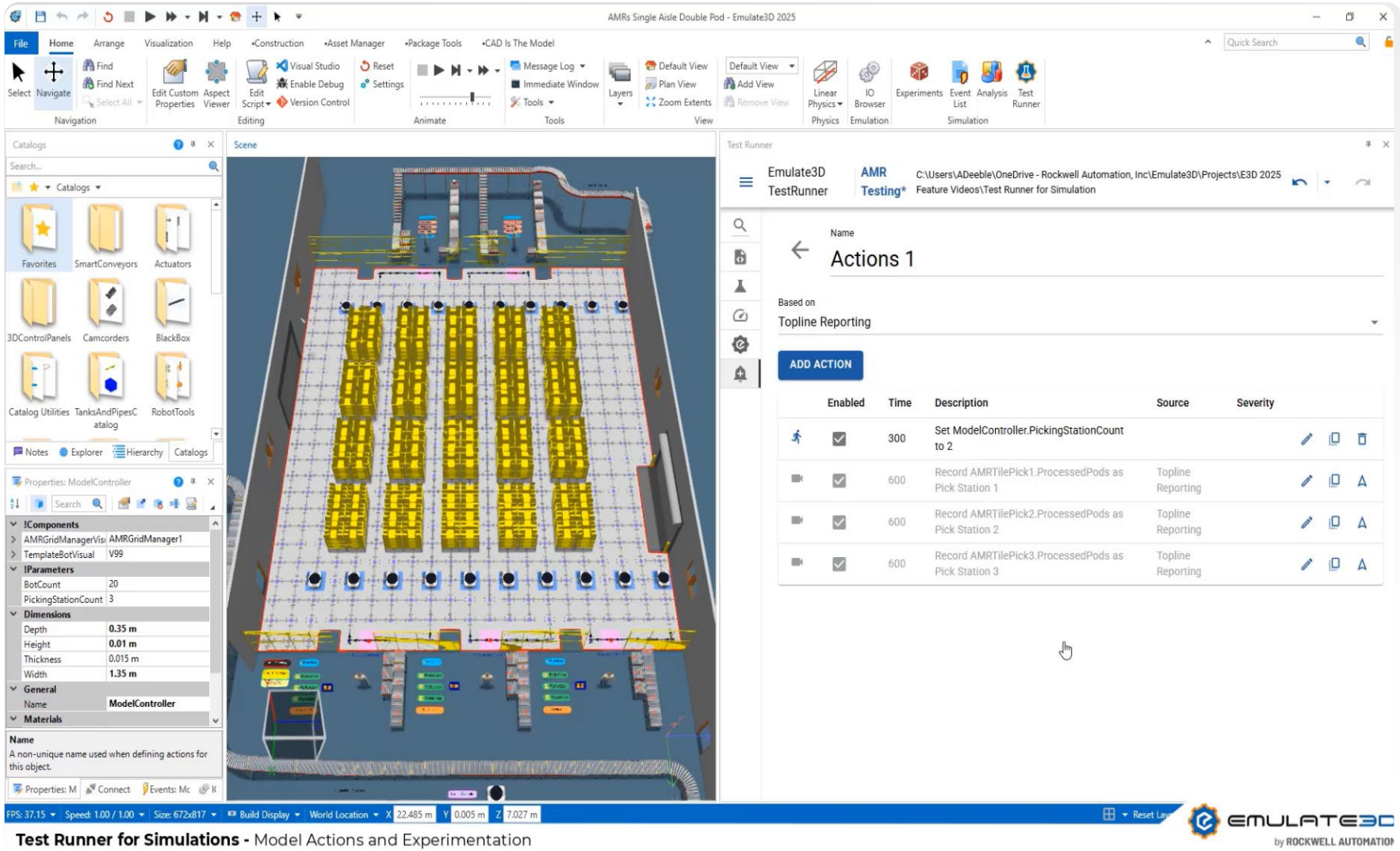
Understand and optimize your system designs

Create simulation scenarios to justify design decisions.

Compare layouts, fleet sizes, order schedules etc.

Display KPIs and output detailed model data.

Use metaheuristics to automatically optimize system parameters.



Test Runner for Simulations - Model Actions and Experimentation

Test Runner for Catalog Development

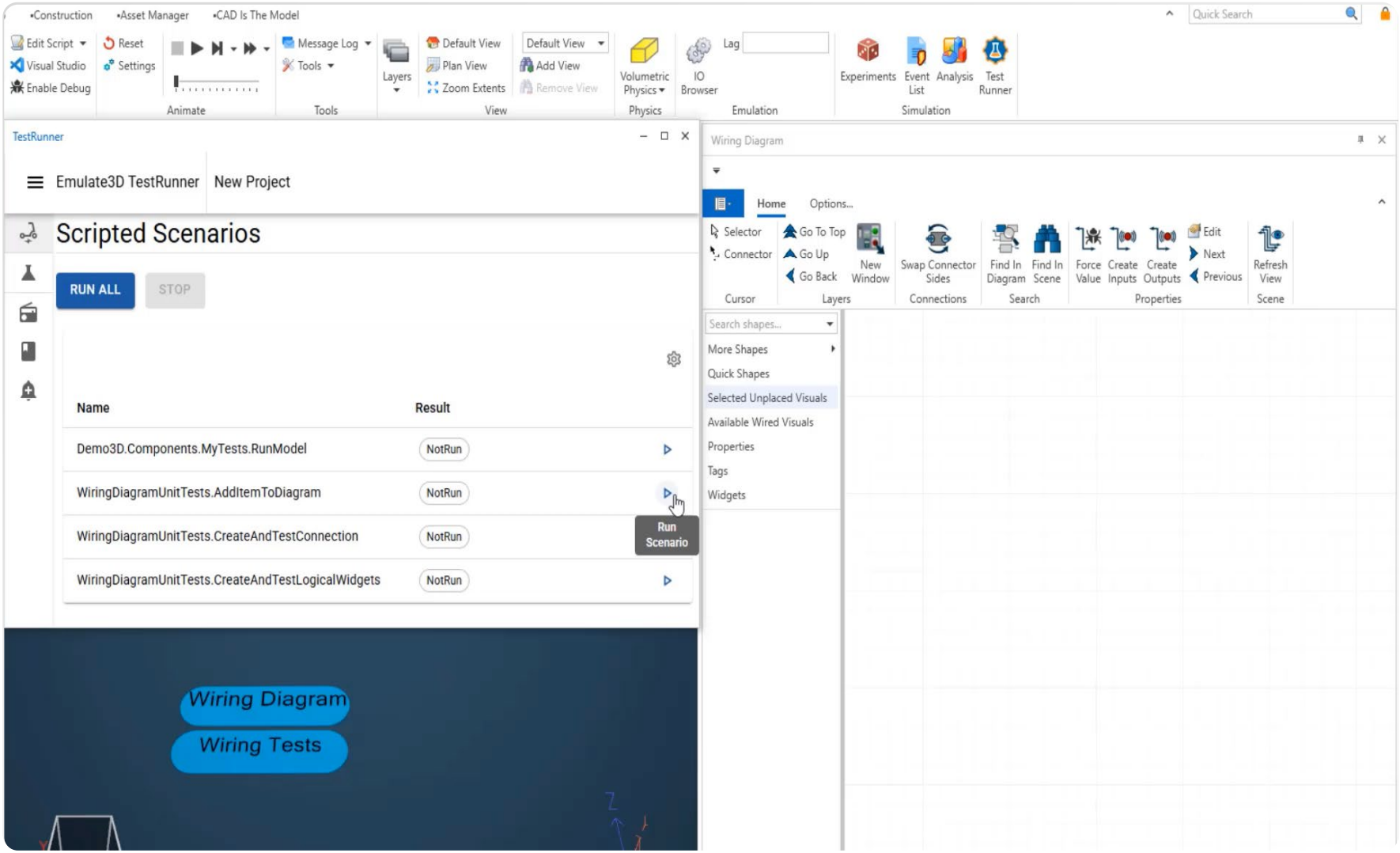
Use Version Control and Automated Testing to create robust and reusable catalogs.

Extensive APIs built upon NUnit Test Framework

Define unit tests and regression tests for models and for custom catalogs.

Run tests headless as part of a build pipeline.

Deploy and update through the package manager.



Tanks and Pipes v3 Update

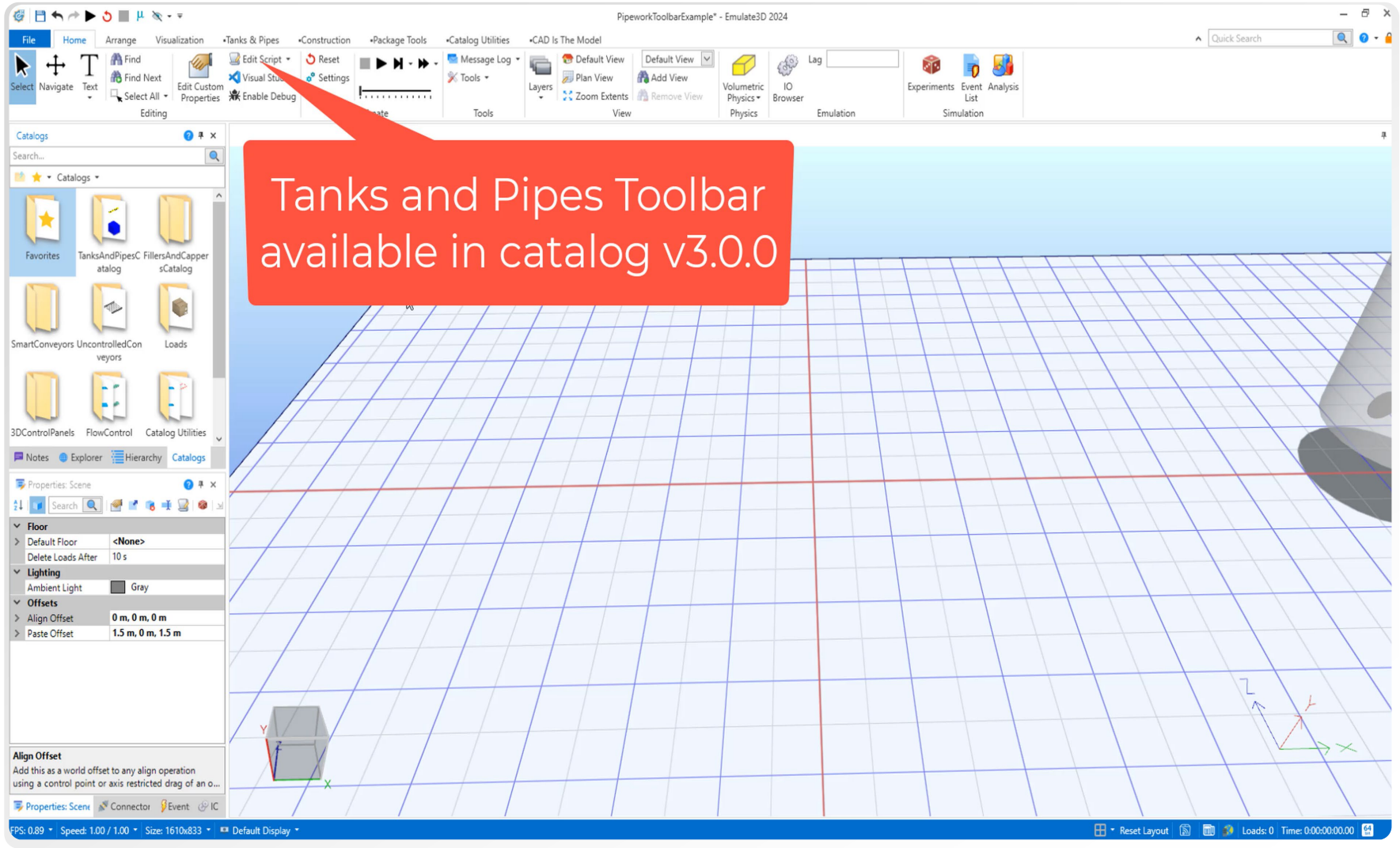
New features and tools to accelerate hybrid and process model creation.

Toolbar for automatic pipework creation.

Improved draining and siphoning logic.

Many new tools:

- Sensor and pump noise
- Pipe cleaning with air
- Mechanical pipe cleaning
- Signal scaling aspects
- Discontinuous pipe



| FMI for Multi-Physics Models

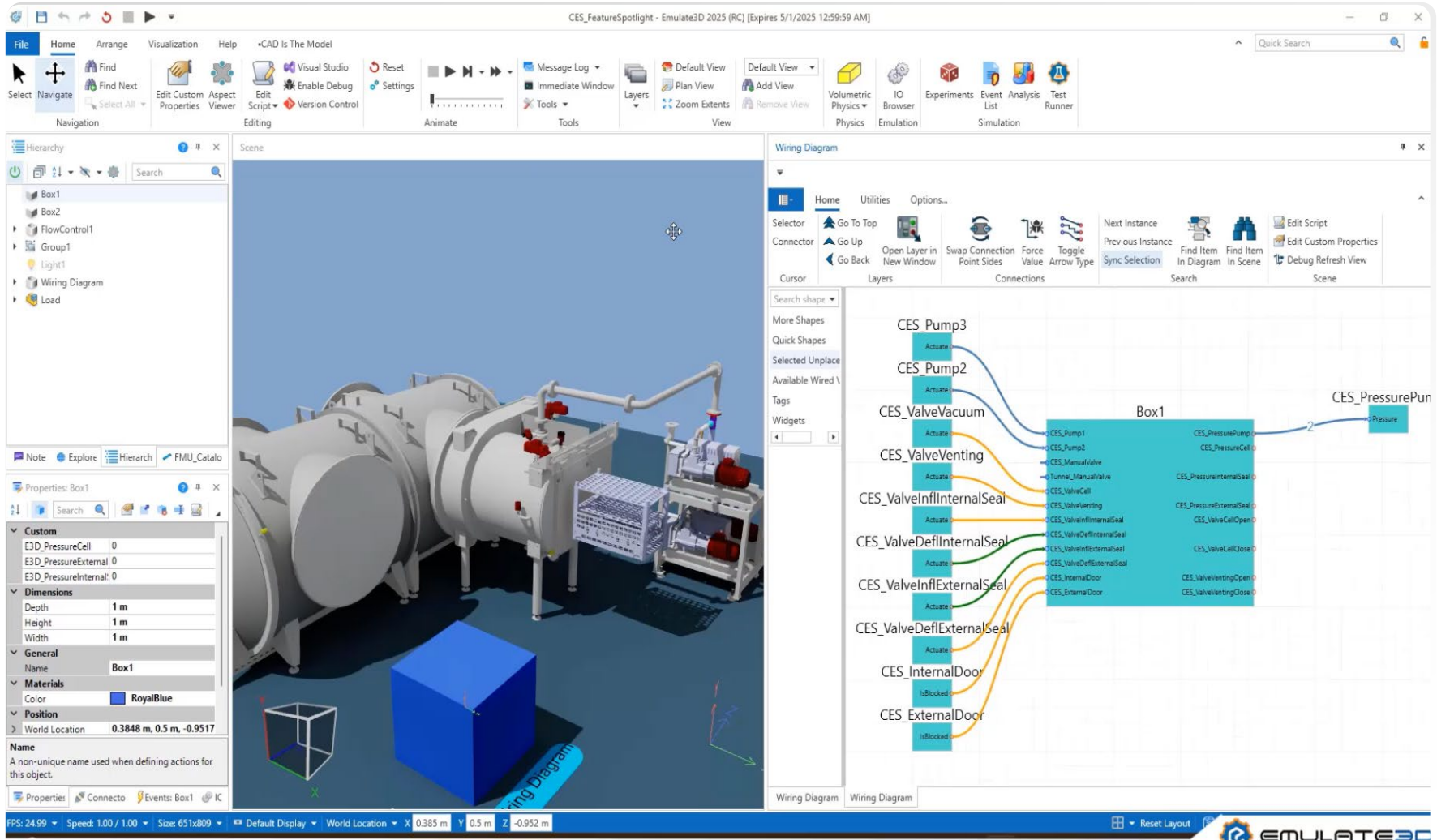
Import FMUs, connect to properties and tags, and cosimulate to extend physics capabilities.

Import FMUs, which use an open standard for model exchange called FMU.

Examples include:
- MATLAB Simulink
- Ansys
- Maplesim
- Modelica

and more!

Bind FMU properties to E3D properties and tags.



FMU Import - Vacuum Carburizing Application

Communication Updates

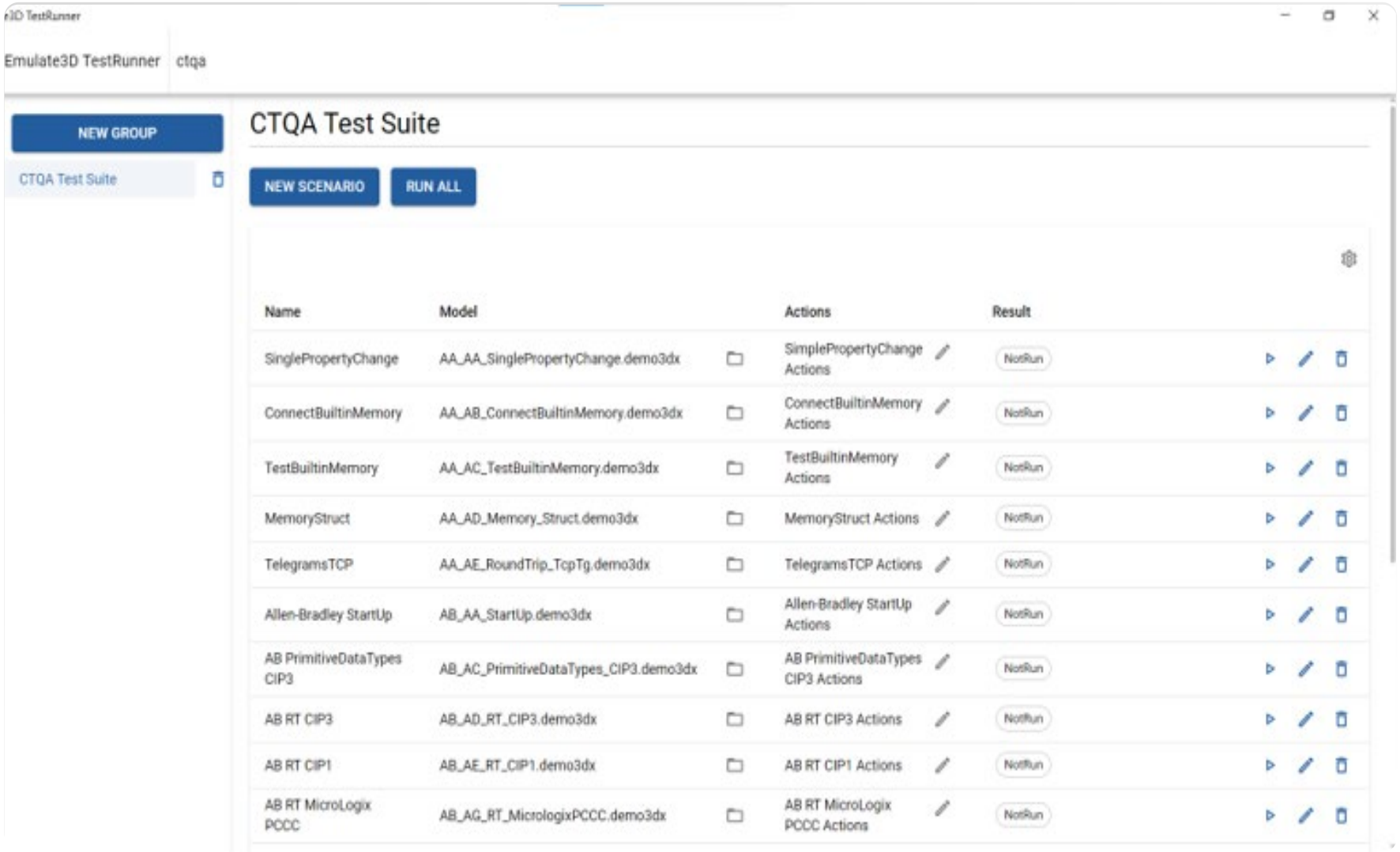
Connectivity improvements for larger and more detailed virtual commissioning.

Cosimulation engine improvements for FactoryTalk Logix Echo and Siemens PLCSim Advanced

New connection types for Siemens PLCSIM Advanced and LS Electric.

Improved performance and data type support for Allen-Bradley and Omron

MicroLogix 1100 Emulator



Device Emulation

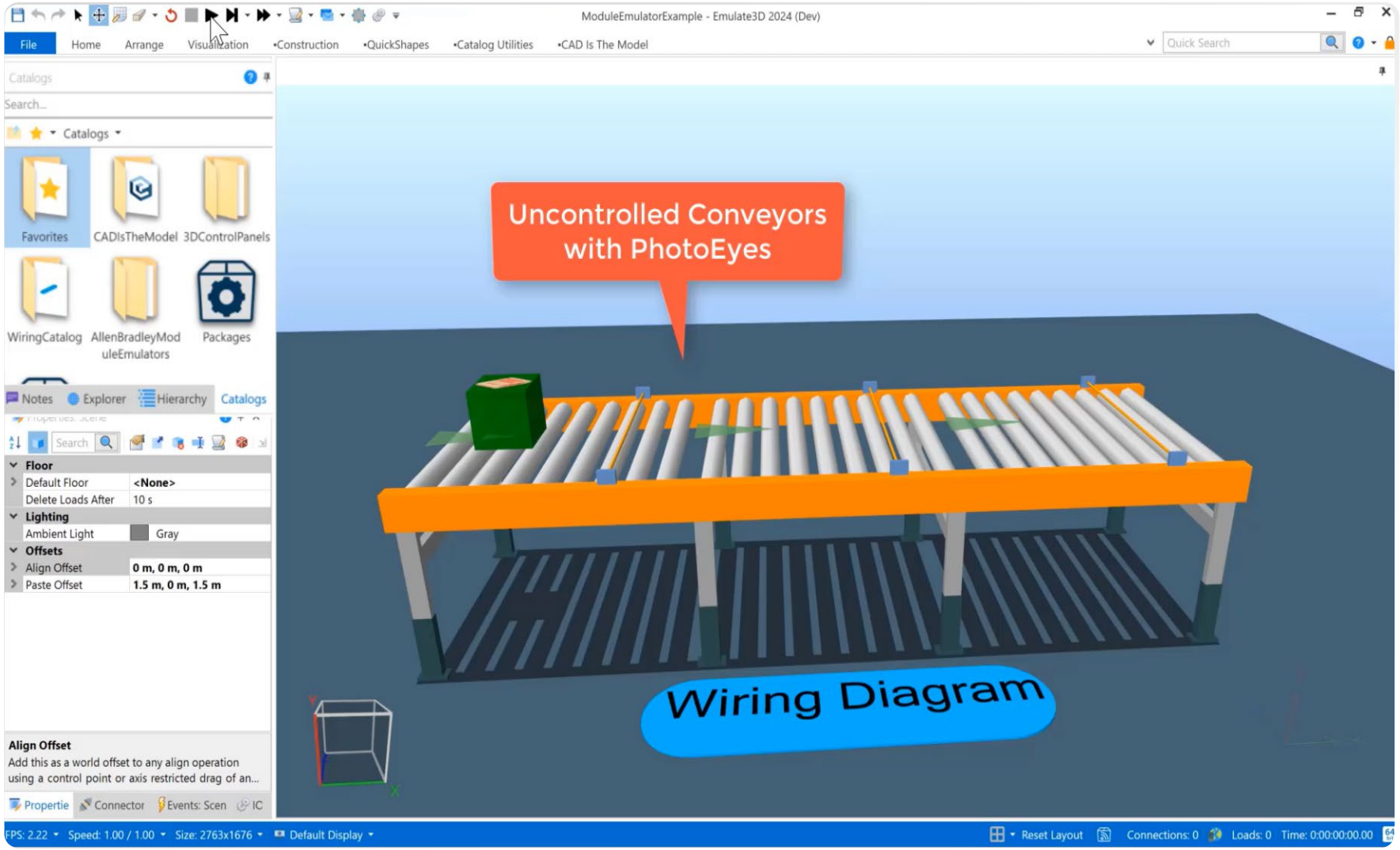
Satisfy that CIP Class 1 connection, and perform more detailed tests without inhibiting modules.

Communicate via CIP Class 1

PLC thinks it's talking with the real hardware module; status bits are satisfied.

Module Emulators model internal logic, now supported by CIP Class 3 & Echo API

A range of Allen-Bradley IO Modules and Drives are available via catalog.
API to develop your own.



Wiring and Control Panels

Parametric components and tools to model control panels and signal propagation.

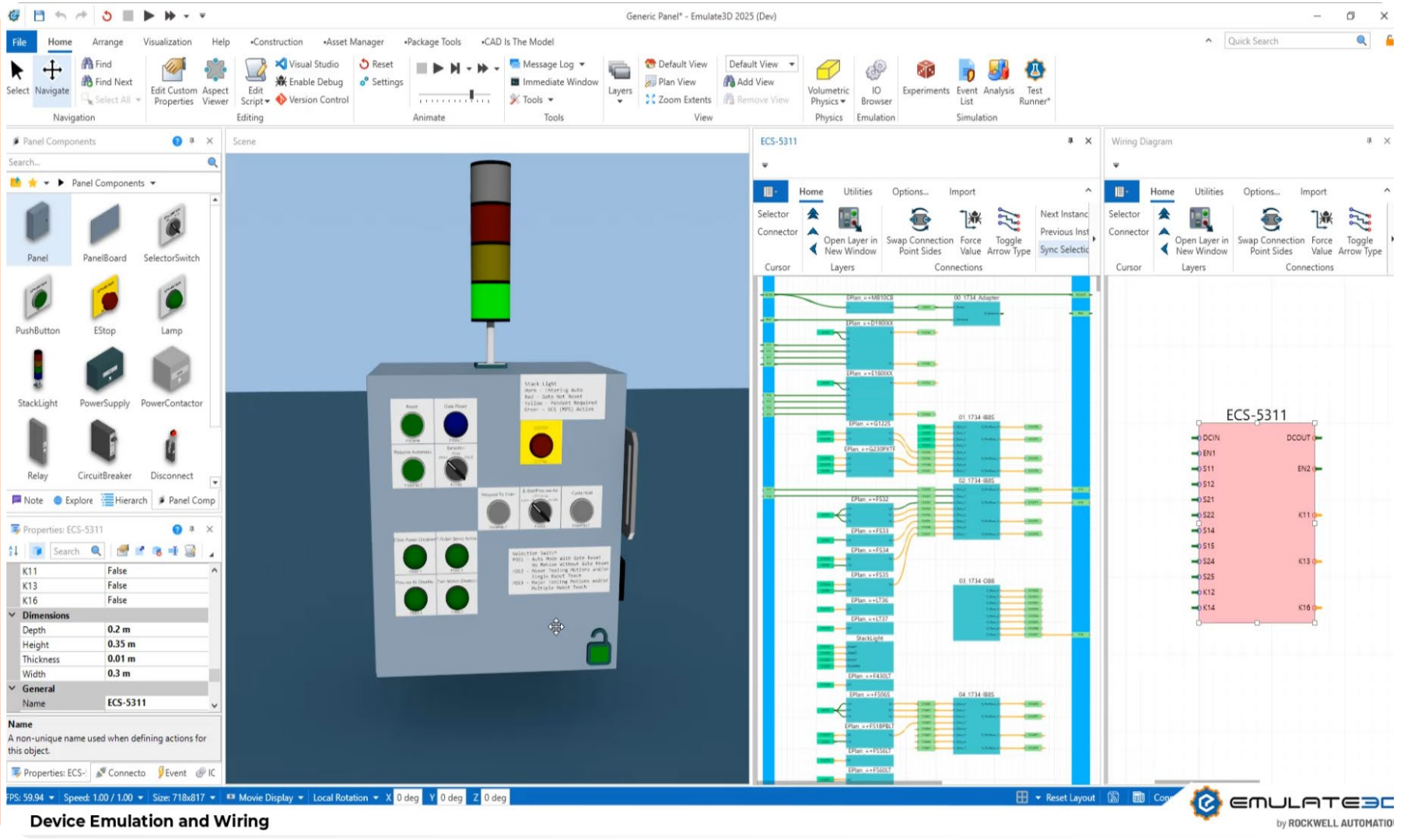
Significant Wiring Diagram performance improvements for build and for runtime.

Support for multiple simultaneous wiring views.

New tools and API for quickly generating diagrams.

New 3D Control Panel items.

EPLAN Schematic Import



AMRs and ACRs

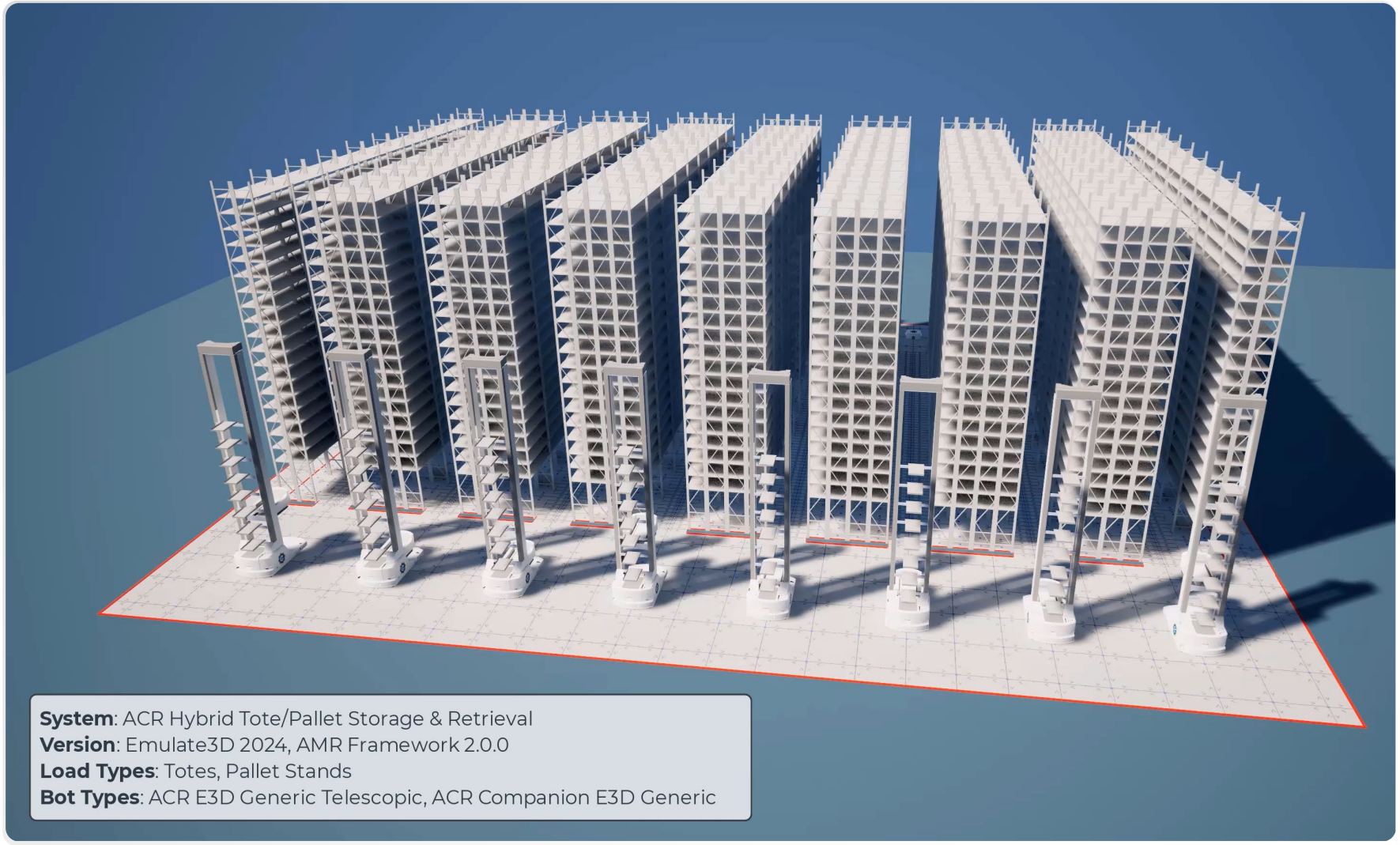
Fully customizable AMRs for Simulation and Fleet Emulation

Generic AMRs with built in transfer logic.

Parametric ACRs with internal storage.

Parametric AMR Racks, which snaps to AMR Tiles.

New properties and events for greater customisability.



System: ACR Hybrid Tote/Pallet Storage & Retrieval
Version: Emulate3D 2024, AMR Framework 2.0.0
Load Types: Totes, Pallet Stands
Bot Types: ACR E3D Generic Telescopic, ACR Companion E3D Generic

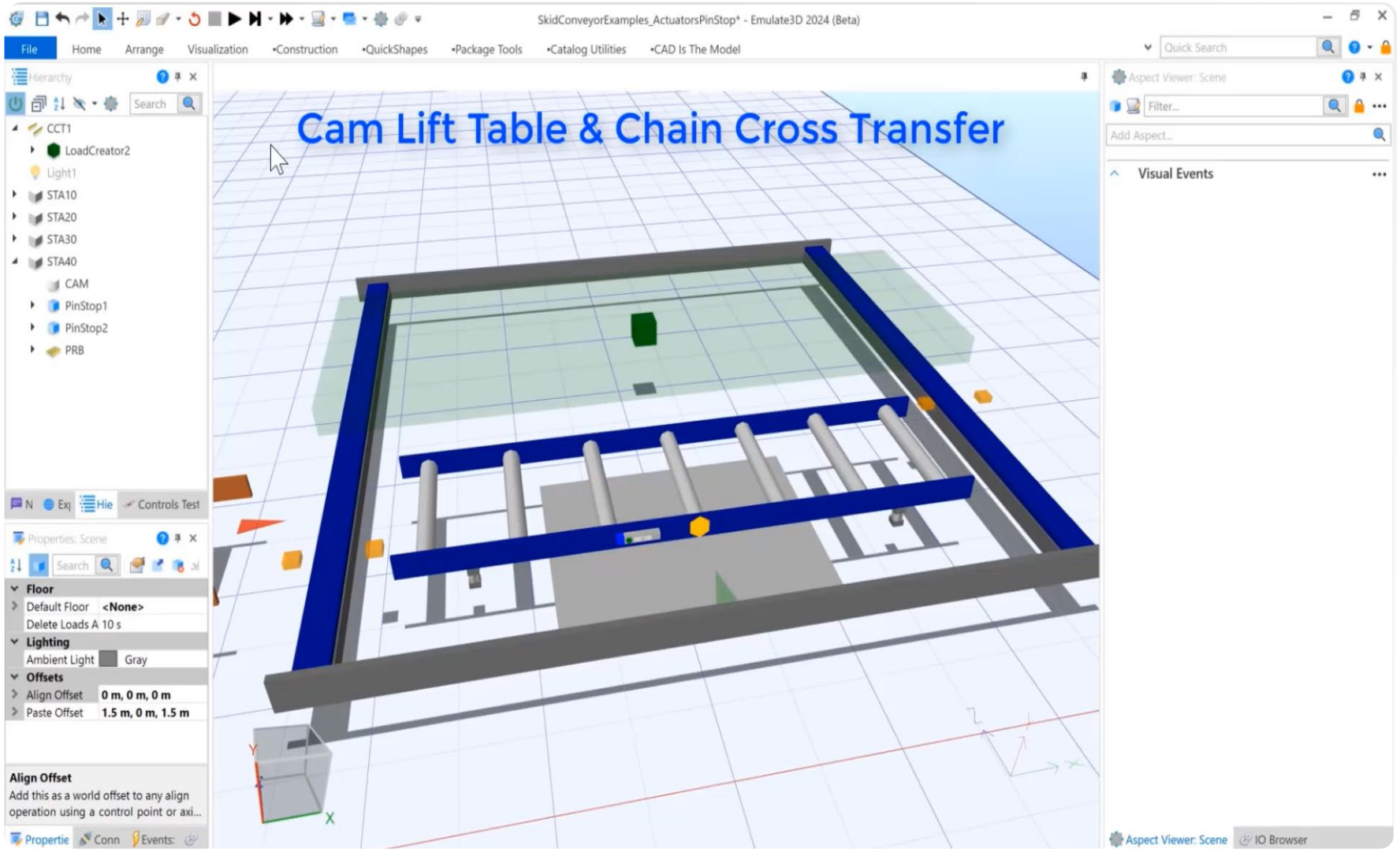
Conveyance Updates

Parametric catalog items suitable for both simulation and emulation.

New examples adding CiTM motors, drives, joints,& sensors to conveyors.

Tutorials and examples, for Rockwell & Siemens.

New conveyor protocols and options for simulation, inc:
-Index slug creation
-Pressure accumulation
-Transfer State Lifts
-Improved inter-protocol transfers



Robotics Updates

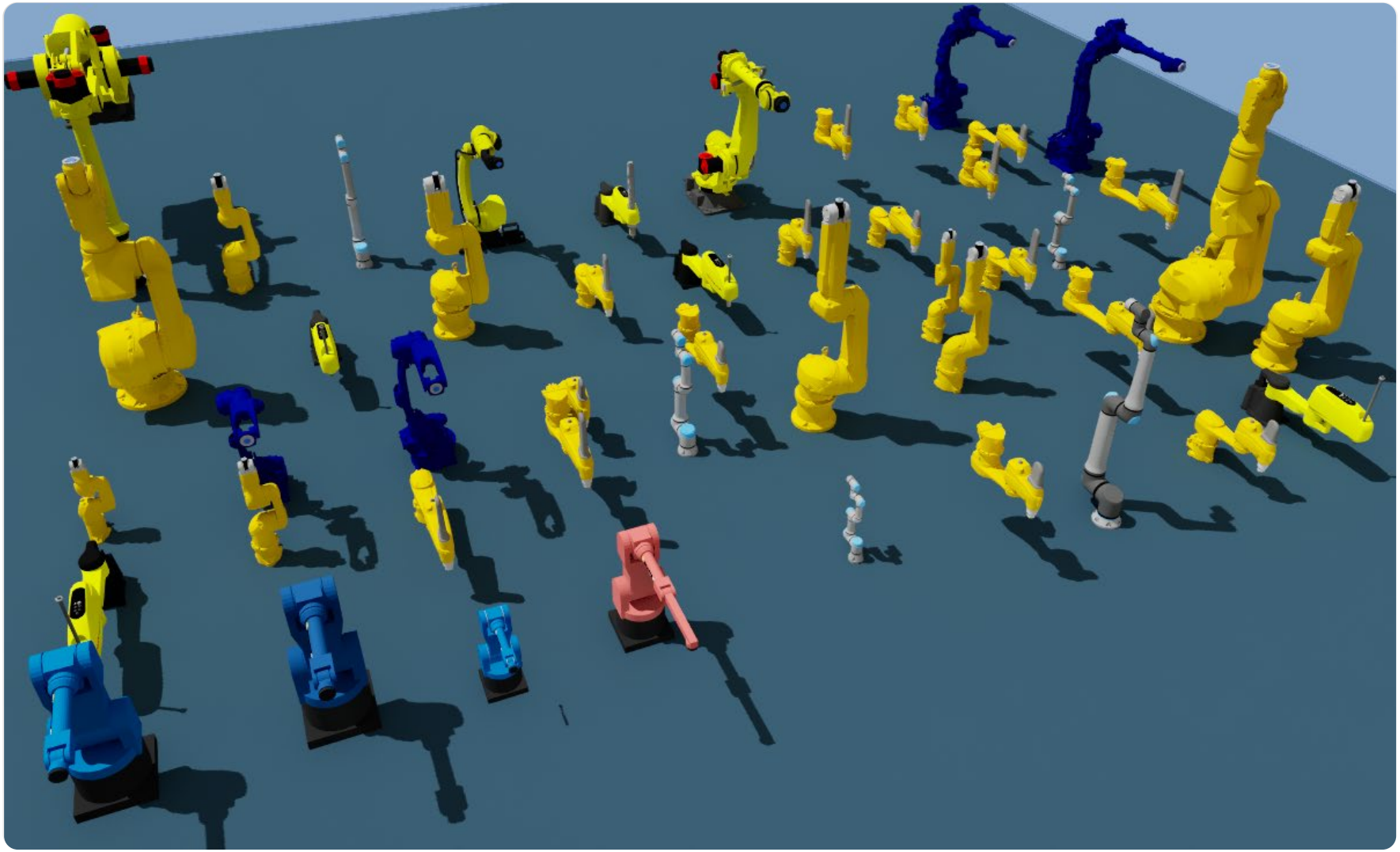
New robots, new tools, and new move options.

Generic Parametric Robots

New marked up robots for:
- Staubli
- Yaskawa
- FANUC
- Universal Robotics

Paths can be created dynamically through scripting, using the API.

New gripping options for robot tools.



Other Catalog Updates

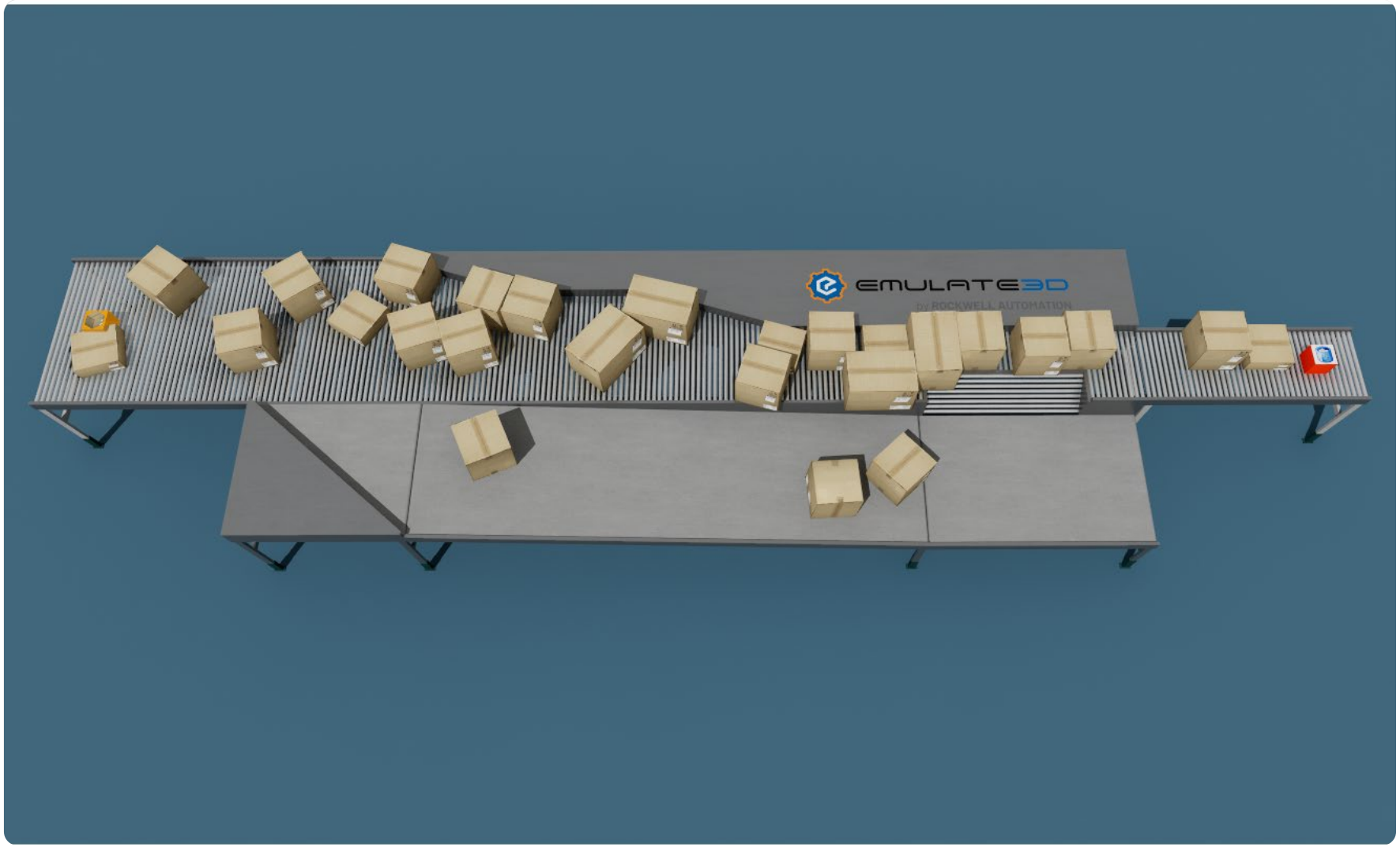
Continuous updates and improvements to the 1000s of catalog items.

New Parametric Singulators

New Case Erector

Updates to:
- Baggage Handling
- Loads Catalog
- Vision Camera
- Flight Bar
- Palletizer and Depalletizer
- Fillers and Cappers
- Actuators ....and more!

Unreal Textures added to many components.



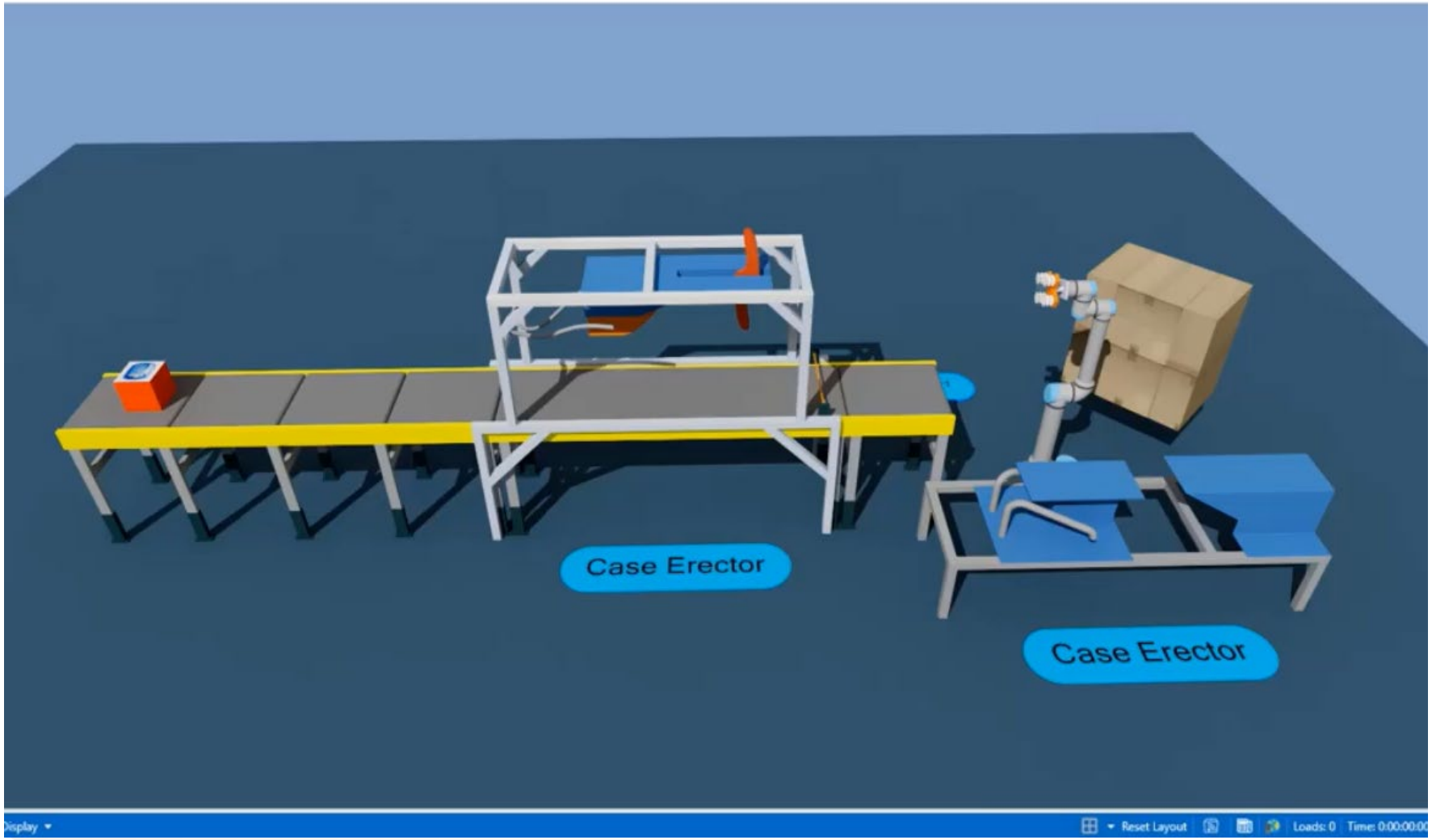
Physics Updates

New features making use of the engineering grade AGX physics engine.

Chain and hose generator, with definable mass, compliance, damping, and breaking tension.

Elastoplastic joints, useful for modelling carboard and flexible loads.

Dynamic Feedback Motors, allowing position control. Also useful for springs.



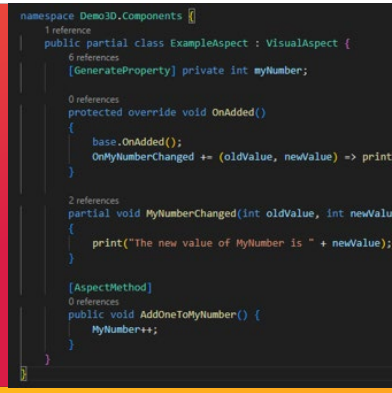
Other Updates

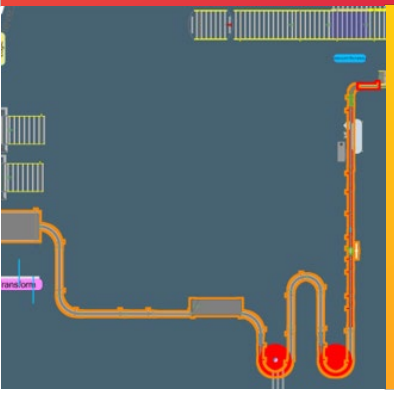
Import, Quality of Life, and Performance Improvements.

Updated Importer, adding:
JT, NX, CATIA v4/5/6,
3DExperience, Parasolid,
SolidEdge, .dwf, and more!

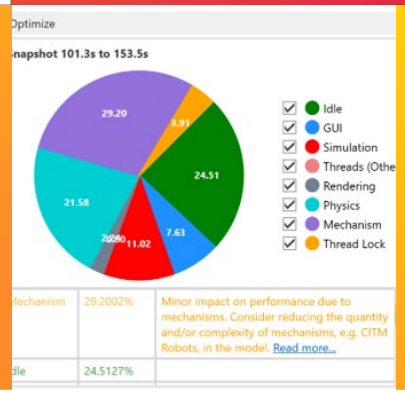
HOOPS EXCHANGE

Logic Improvements including new widgets, QuickLogic error tracing, snippets from aspects, and C# Source Generators





Usability Improvements including reworked ribbons, layer presets, hierarchy colours, property import, and linear path visualization



Performance improvements to rendering, physics, scripting, and many catalogs.
Performance Profiler Updates

Forum and Documentation

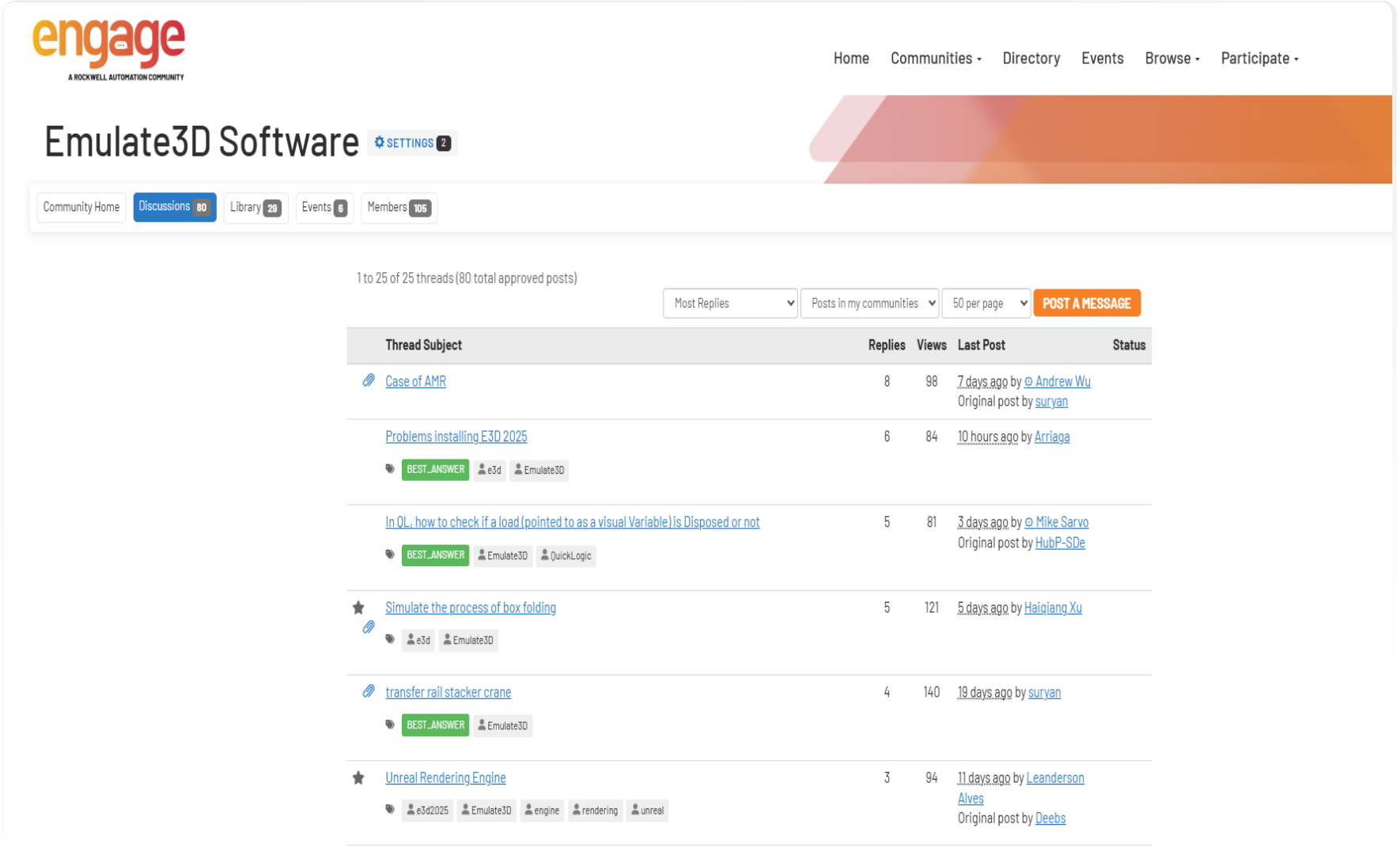
Accelerate Emulate3D adoption by providing example models and best practice advice.

Dedicated Emulate3D Forum as part of Engage.

Suitable for “How do I” or “Any advice” style questions, and sharing example models

Model specific issues are covered support.

Supplemented by significant expansion of HelpConsole.



Emulate3D 2025 License Simplification

Why and how should the Emulate3D license offering be changed?

Simplify Sales

Emulate3D 2024 has:
- Fourteen perpetual license types
- Six subscription license types
- Plus, Academic licenses

License differences are complex, and do not stack linearly. Licenses “branch” between Sim3D and Controls Testing.

Advanced features need to be explained to differentiate licenses.

Goal is to create a streamlined set of licenses that are clear to explain.

Realign Feature Sets

New licenses were historically created as advanced features were added.

These features are now becoming standard practice for building models.

New 2025 features combine these optional features into powerful standard workflows, for example Version Control and Experimentation on Controls Testing models.

Goal is to realign features & prices to enable modern customer workflows.

Seamless Transition

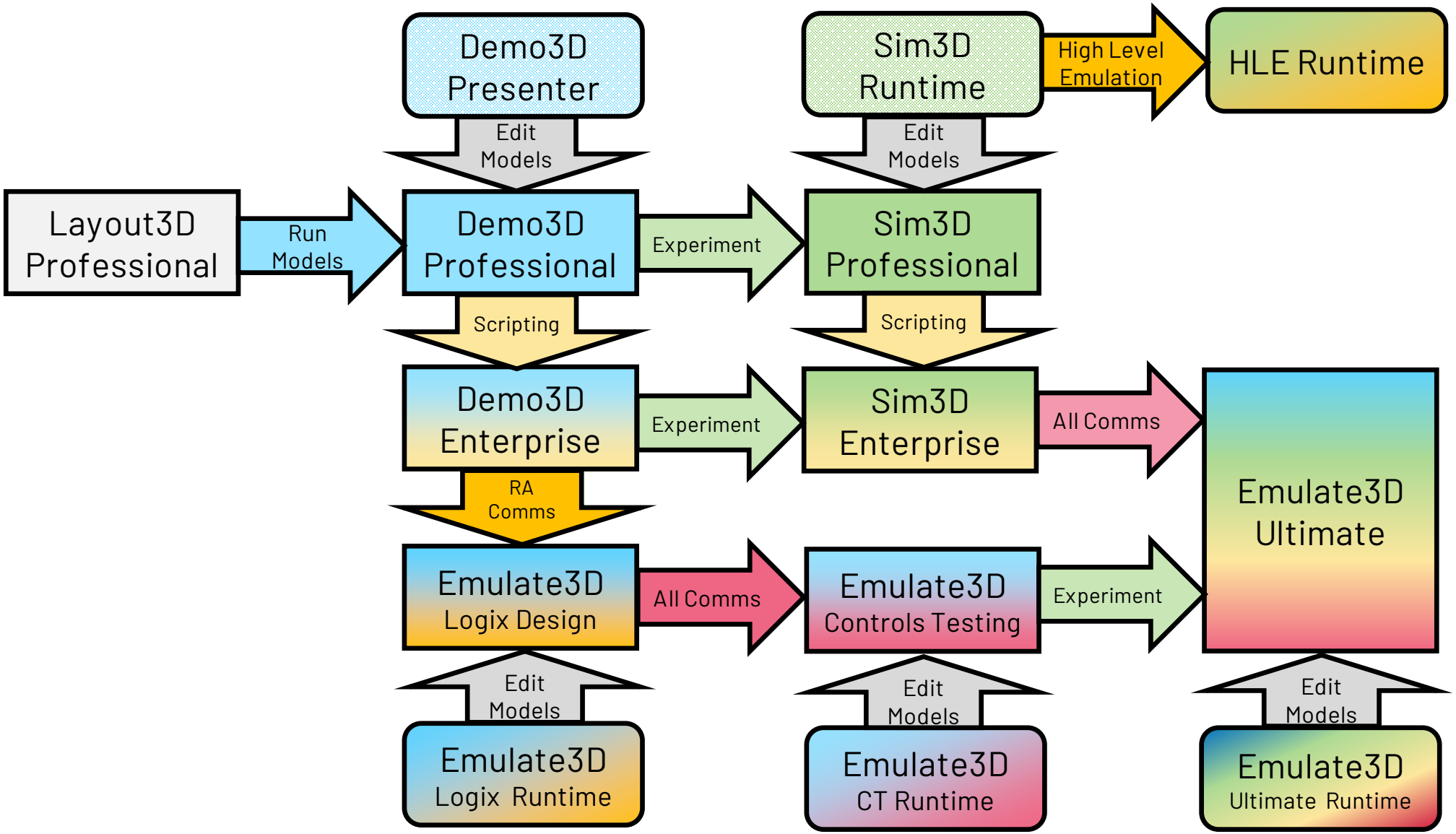
A large customer base exists with perpetual licenses and ongoing subs.

Existing licenses need to be able to activate Emulate3D 2025. New licenses need to be able to open old editions of E3D, to run old models.

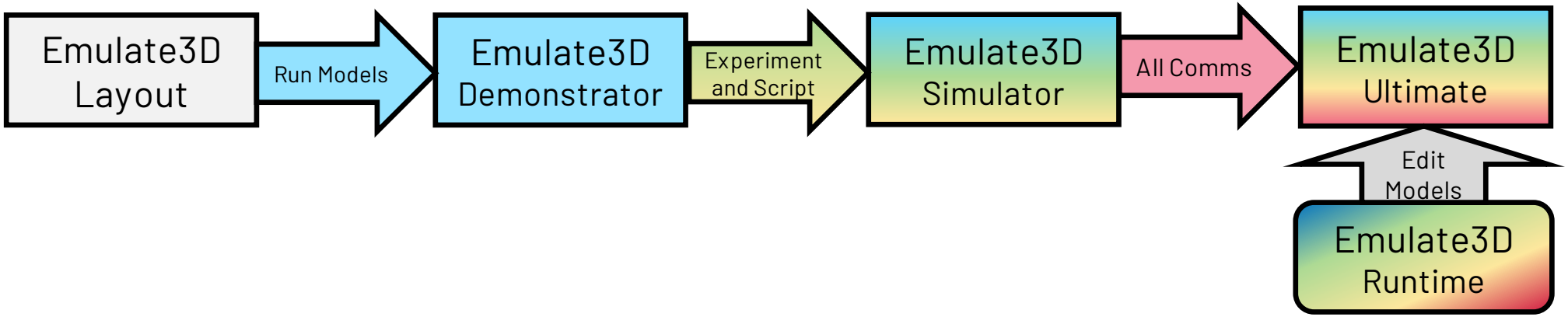
No customer should lose out from the license simplification process.

Goal is for every customer to get more, as part of a seamless update process.

Legacy License Offering (2024 and Before)



2025 License Offering



Streamlined License Offering

Contains features of previous editions

Unified Runtime

Emulate3D Layout	Emulate3D Demonstrator	Emulate3D Simulator	Emulate3D Ultimate	Emulate3D Runtime
Import CAD	Import CAD	Import CAD	Import CAD	Run Existing Models
Use & Create Catalogs	Use & Create Catalogs	Use & Create Catalogs	Use & Create Catalogs	Fine Tune Equipment
Rendering, VR & AR	Rendering, VR & AR	Rendering, VR & AR	Rendering, VR & AR	Edit Test Scenarios in Simulator Models
	Run Models	Run Models	Run Models	Edit Connections and Test Scenarios in Ultimate Models
	All Physics Modes	All Physics Modes	All Physics Modes	
	Create QuickLogic	Create QuickLogic	Create QuickLogic	
		C# Scripting	C# Scripting	
		Test Runner & Analysis	Test Runner & Analysis	
		GIT Version Control	GIT Version Control	
			IO Browser Connectivity	
			Device & Fault Emulation	
			Process & Hybrid	

What's New in Emulate3D 2025

Full Emulate3D 2025 Release Notes Here.

Build and Demonstrate

Create high quality images
Unreal Rendering Updates

Capture model & catalog changes with
GIT Version Control Tools

Combine multiple live models with
Factory Scale Testing with Omniverse

Updated and expanded
CAD & **eCAD importers**

Pipework generation tools with
Tanks and Pipes V3 Update

Advice and support from
Forum & **HelpConsole Expansion**

Simulate

Run models faster with improved
Visualisation & Simulation Performance

Compare model variants with
Test Runner Scenarios

Perform automatic optimizations with
Metaheuristic Parameter Optimization

Expanded fleet modelling with
Vehicle, AMR, and ACR Updates

Flexible out of the box behaviour from
Updated Smart Conveyors

Expanded robotics capabilities with
New Robots and Hose Generator

Emulate

CI/CD workflows for controls code with
Test Runner for Controls Testing

Detailed device emulation with
Allen-Bradley IO Module Catalog

Improved connectivity for
Allen-Bradley, Siemens, and Omron

Open Cosimulation with
FMI Import Support

Multi Physics simulations with FMUs from
MATLAB Simulink, Ansys, & MapleSim

More powerful and scalable
Electrical Wiring Simulation

Rockwell Automation

expanding **human possibility**®

Thank you

www.rockwellautomation.com

Legacy to New License Mapping

Legacy Edition	New Edition	Additional Existing Features	Additional New Major Features
Emulate3D Ultimate	Emulate3D Ultimate Edition		Unreal Rendering, Version Control, Test Runner, FMI Import
Emulate3D Controls Testing	Emulate3D Ultimate Edition	Linear Physics, Experiments & Analysis	Unreal Rendering, Version Control, Test Runner, FMI Import
Emulate3D Logix Virtual Design	Emulate3D Ultimate Edition	Linear Physics, Experiments & Analysis, All PLC Protocol Connectivity	Unreal Rendering, Version Control, Test Runner, FMI Import
Sim3D Enterprise	Emulate3D Simulator Edition		Unreal Rendering, Version Control, Test Runner
Sim3D Professional	Emulate3D Simulator Edition	Scripting	Unreal Rendering, Version Control, Test Runner
Demo3D Enterprise	Emulate3D Simulator Edition	Linear Physics, Experiments & Analysis	Unreal Rendering, Version Control, Test Runner
Demo3D Professional	Emulate3D Demonstrator Edition	Linear Physics	Unreal Rendering
Layout3D Professional	Emulate3D Layout Edition		Unreal Rendering
Emulate3D Ultimate Runtime	Emulate3D Runtime Edition		Unreal Rendering, Version Control, Test Runner
Emulate3D ControlsTesting Runtime	Emulate3D Runtime Edition	Linear Physics, Experiments & Analysis	Unreal Rendering, Version Control, Test Runner
Emulate3D Logix Virtual Design Runtime	Emulate3D Runtime Edition	Linear Physics, Experiments & Analysis, IO Browser Connectivity*	Unreal Rendering, Version Control, Test Runner
Emulate3D HLE Runtime	Emulate3D Runtime Edition	Linear Physics, Experiments & Analysis, IO Browser Connectivity*	Unreal Rendering, Version Control, Test Runner
Sim3D Runtime	Emulate3D Runtime Edition	IO Browser Connectivity for Ultimate Models	Unreal Rendering, Version Control, Test Runner
Demo3D Runtime	Removed		
Demo3D Presenter	Removed		

Available for models initially saved using Emulate3D Ultimate Edition

All Runtime licenses are unified into **Emulate3D Runtime Edition**

If the old license has PLC connectivity, it is now **Emulate3D Ultimate Edition**

If the old license has scripting or experiments, **Emulate3D Simulator Edition**

Demo3D Professional now has Linear physics as **Emulate3D Demonstrator Edition**

Layout3D is unchanged, and renamed to **Emulate3D Layout Edition**

2025 Feature Matrix

Function	Layout Edition	Demonstrator	Simulator Edition	Ultimate Edition	Runtime Edition	Academic Edition	Notes
Model Navigation Tools	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	Multiple View Windows, Model Heirarchy, Explorer , Message Log, Search, Differences Window, Layers, Saved Views, Notes, Help.
Edit Simple Properties and Locations	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	Use of the Properties Grid. Reposition visuals (such as sensors), and configure simple parameteric properties on catalog items.
Save Models, Export Models	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	Save .demo3d file format, export a wide range of 2D and 3D formats. Access to the print menu.
Record Videos and Create Renders	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	Change textures, lighting, and visualisation settings. Create high quality images. Define camera paths and create dynamic videos.
NVIDIA Omniverse and WebGL Connection	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	Stream updates to external visualisation. Export to NVIDIA Omniverse for high quality renders. View dynamic models via WebGL.
VR/AR Connectivity	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	Connect to a wide range of headsets. Allow multiple users to join the same model. Interact with the model if the model is running.
Create New Models	TRUE	TRUE	TRUE	TRUE	FALSE	TRUE	Create models from 1000s of parametric catalog items.
Import CAD	TRUE	TRUE	TRUE	TRUE	FALSE	TRUE	Import from a wide range of native and interchange formats. Bidirectional updates when using CAD is the Model plugins.
Edit Advanced Properties and Aspects	TRUE	TRUE	TRUE	TRUE	FALSE	TRUE	Add and edit aspects, edit Advanced Properties, create new Custom Properties, define Simple Properties, Property Paster tool
Edit QuickLogic Procedures	TRUE	TRUE	TRUE	TRUE	FALSE	TRUE	Create and Edit QuickLogic procedures to define custom model behaviour. Use the Events tab to create new procedures.
Create and Edit Catalogs	TRUE	TRUE	TRUE	TRUE	FALSE	TRUE	Create custom catalogs, define simple and advanced properties, add these catalogs to a shared package feed.
Model Building Tools	TRUE	TRUE	TRUE	TRUE	FALSE	TRUE	Dimension Tool, Frames and Transforms, Snap and Alignment, Connectors, CAD editing tools, Paint Tools, Mesh Profiler, Bill of Materials.
Run Models	FALSE	TRUE	TRUE	TRUE	TRUE	TRUE	Start, stop, step, and reset model runs.
Discrete Event Simulation	FALSE	TRUE	TRUE	TRUE	TRUE	TRUE	Linear Physics and Planar Physics, customisable automatic merge control, customisable random number generation
Physics Simulation	FALSE	TRUE	TRUE	TRUE	TRUE	TRUE	Volumetric Physics. High precision direct/hybrid solver using AGX. High performance iterative solver using PhysX. Friction Coefficient Matrix.
CAD is the Model and Mechanisms	FALSE	TRUE	TRUE	TRUE	TRUE	TRUE	Dynamic and Kinematic mechanism solver. Joints, sensors, motors, controllers, encoders, physics geometries.
Create and Interact with Control Panels	FALSE	TRUE	TRUE	TRUE	TRUE	TRUE	3D Control Panels. 2D XAML, Table, and Grid Control Panels. Wiring Diagram for electrical schematics.
Performance Profiling	FALSE	TRUE	TRUE	TRUE	TRUE	TRUE	Performance Profiler tool, with recommended actions. Hardware Benchmarking tool.
Test Runner and Experiments within E3D	FALSE	FALSE	TRUE	TRUE	TRUE	TRUE	Create tests that vary initial model state, or inject model actions. Metaheuristic optimizer to automatically vary parameters to achieve a goal.
Data Presentation and Analysis	FALSE	FALSE	TRUE	TRUE	TRUE	TRUE	Data reporting of any parameter, outputted live to the Analysis window. In model charting, plotting, and labels. KPI dashboard in Test Runner.
External Test Runner Application	FALSE	FALSE	TRUE	TRUE	TRUE	TRUE	Run models headless (without a User Interface), collecting results of scripted, optimiser, or scheduled tests into a dashboard view
GIT Version Control with .demo3dx	FALSE	FALSE	TRUE	TRUE	TRUE	FALSE	Native GIT Version control support. Commit, view history, switch, and revert from inside Emulate3D. GIT Repository agnostic.
Create, Edit, and Debug Scripts	FALSE	FALSE	TRUE	TRUE	FALSE	TRUE	Create C# scripts and projects using VS Code, Visual Studio, or Internal editor. Native debugging tools. Create JScript scripts.
Script catalog and model unit tests	FALSE	FALSE	TRUE	TRUE	FALSE	TRUE	C# Unit Testing framework. Run scripted tests to verify model or catalog behaviour after making changes. Pass/Fail dashboard.
Connection and Controls Testing for PLCs	FALSE	FALSE	FALSE	TRUE	TRUE*	TRUE	Connect to a wide range of PLCs using native protocols. Cosimulate with virtual PLCs.
View and Interact with HMIs	FALSE	FALSE	FALSE	TRUE	TRUE*	TRUE	View and interact with web based HMIs using the Web Browser Visual.
Telegrams for High Level Emulation	FALSE	FALSE	FALSE	TRUE	TRUE*	TRUE	Simplified connection to high level controllers such as MES, WMS, and Vehicle Fleet Managers using TCP, UDP, and MQTT Telegrams
Robot Emulation	FALSE	FALSE	FALSE	TRUE	TRUE*	TRUE	Connect to native robot simulation packages such as ROBOGUIDE, RobotStudio, and MotoSim to perform accurate robot emulations.
Device Emulation	FALSE	FALSE	FALSE	TRUE	TRUE*	TRUE	Satisfy CIP Class 1 Connection and model the behaviour of a range of Allen Bradley IO Modules and PowerFlex Drives
Fault Framework with Test Runner	FALSE	FALSE	FALSE	TRUE	TRUE*	TRUE	Run test scenarios which inject device faults and operator actions. Monitor the control systems response using Pass/Fail Assertions.
Process and Hybrid with Tanks and Pipes	FALSE	FALSE	FALSE	TRUE	TRUE*	TRUE	Model liquid flow, with physics, to test valve and pump sequencing. Extendable complexity of process modelling using custom logic.
FMI Import and Cosimulation	FALSE	FALSE	FALSE	TRUE	TRUE*	TRUE	Import FMUs from physics modelling applications. Cosimulate with Emulate3D to increase physics fidelity where needed.
Load Models Saved in Academic	FALSE	FALSE	FALSE	FALSE	FALSE	TRUE	Models saved in Academic licenses are suitable only for further Academic use. Academic licenses can load models from Commercial licenses.

TRUE* - Enabled if model was built and saved in Ultimate Edition

Purple features are significant changes for 2025