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What's New in Emulate3D 2024 / V17

expanding **human possibility**®

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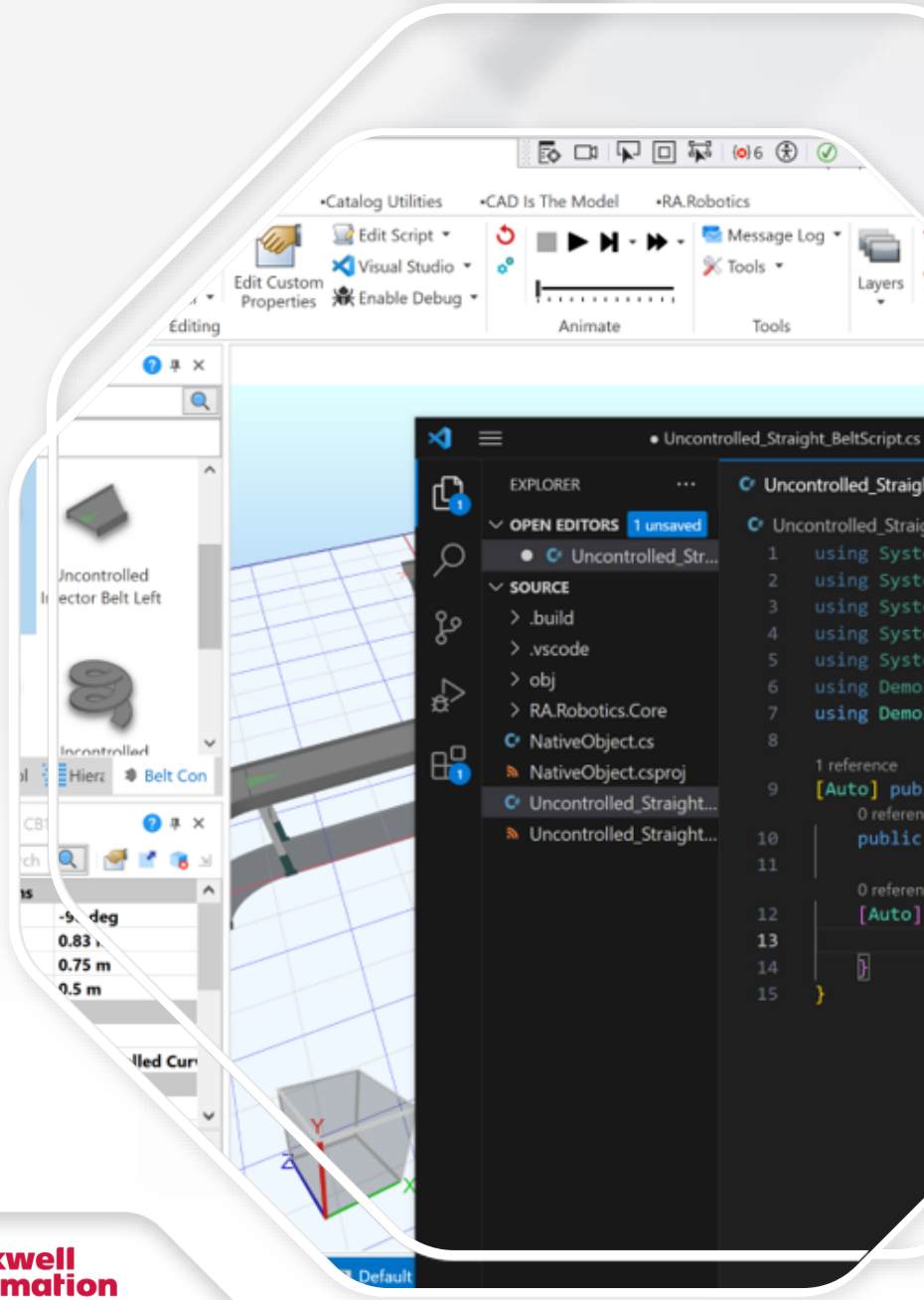
Visual Studio Code

Code editing. Redefined.

- Emulate3D 2024 integrates with VS Code
- Streamlined code editor with the right features to support scripting in Emulate3D
- Free for both private and commercial use



IntelliSense

Run and Debug

Built-in Git

Extensions

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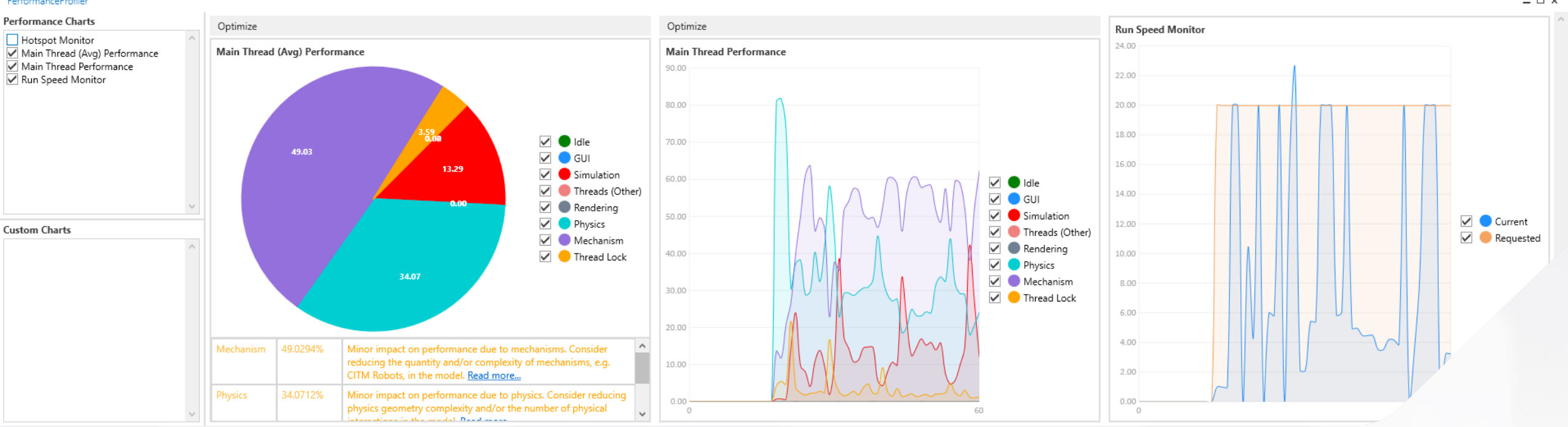
Core Performance Enhancements

Core technologies powering Emulate3D

- Unreal Engine Beta
- Net 6 -> Net 8



Performance Profiler

Analyze your model's performance with a Task Manager style tool!

E3D tracks time spent running physics, mechanisms, rendering, etc... Users can add categories for their scripts

Advice and links to tools to improve the performance once the bottleneck is identified

Performance Chart Creation:

1. Create PercentageTime counters.
2. Create/add chart.
3. Create/add sample for each counter.

```
AMRPerformanceCounters = new Dictionary<string, PercentageTime>
{
    { "Path Finding", new PercentageTime(("AMRs", "Path Finding")) },
    { "Visualization Tiles", new PercentageTime(("AMRs", "Visualization Tiles")) }
};

PerformanceProfiler.CreateNewPerformanceSampleCategory("AMR Performance");
foreach (var kvp in AMRPerformanceCounters)
{
    var name = kvp.Key;
    var counter = kvp.Value;
    PerformanceProfiler.CreateNewPerformanceSample("AMR Performance", name, counter);
}
```

4. Increment counter to update chart.

```
(AMRGridManager.AMRPerformanceCounters["Path Finding"]).IncrementBy(sw.Elapsed.Ticks);
```

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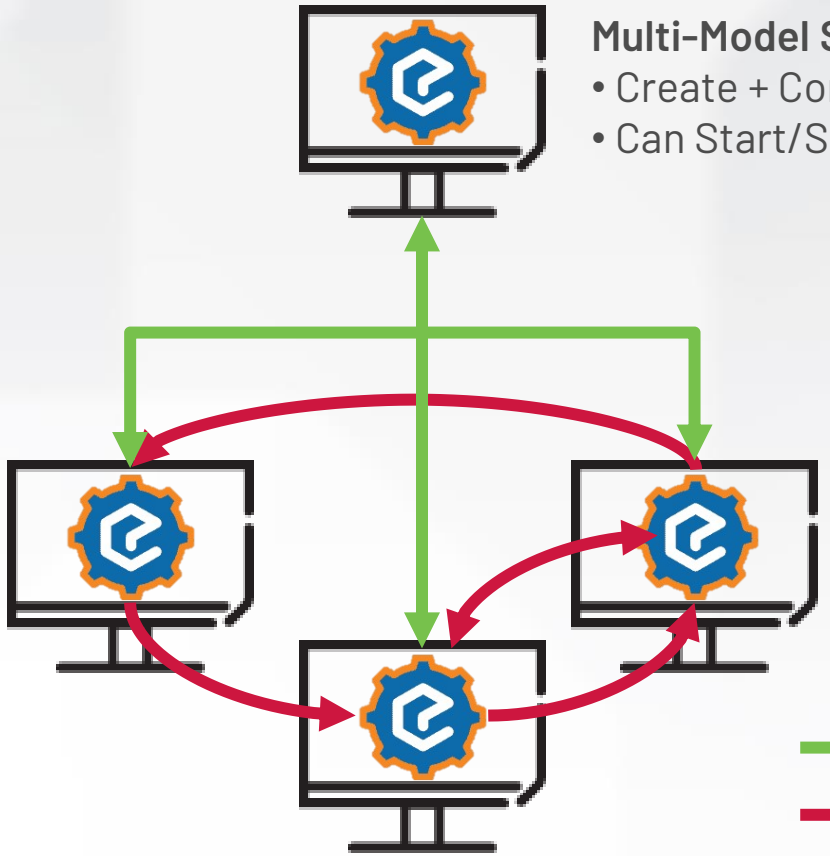
Multi Model Emulation

- Hyperscale your E3D models!
- Distribute large emulation models across multiple Emulate3D instances
- Coordinate models from a server, and specify load routes between models
- Use lightweight mono and bidirectional load transporters to move loads seamlessly from one model to another



Multi-Model Server
- Create + Configure load routes
- Can Start/Stop/Reset Clients

Multi-Model Clients
- Sends and receives loads
- User Application Models

Network Comms

Loads Routes b/w Models

Physics Updates

PhysX physics engine updated to version 5.1.3

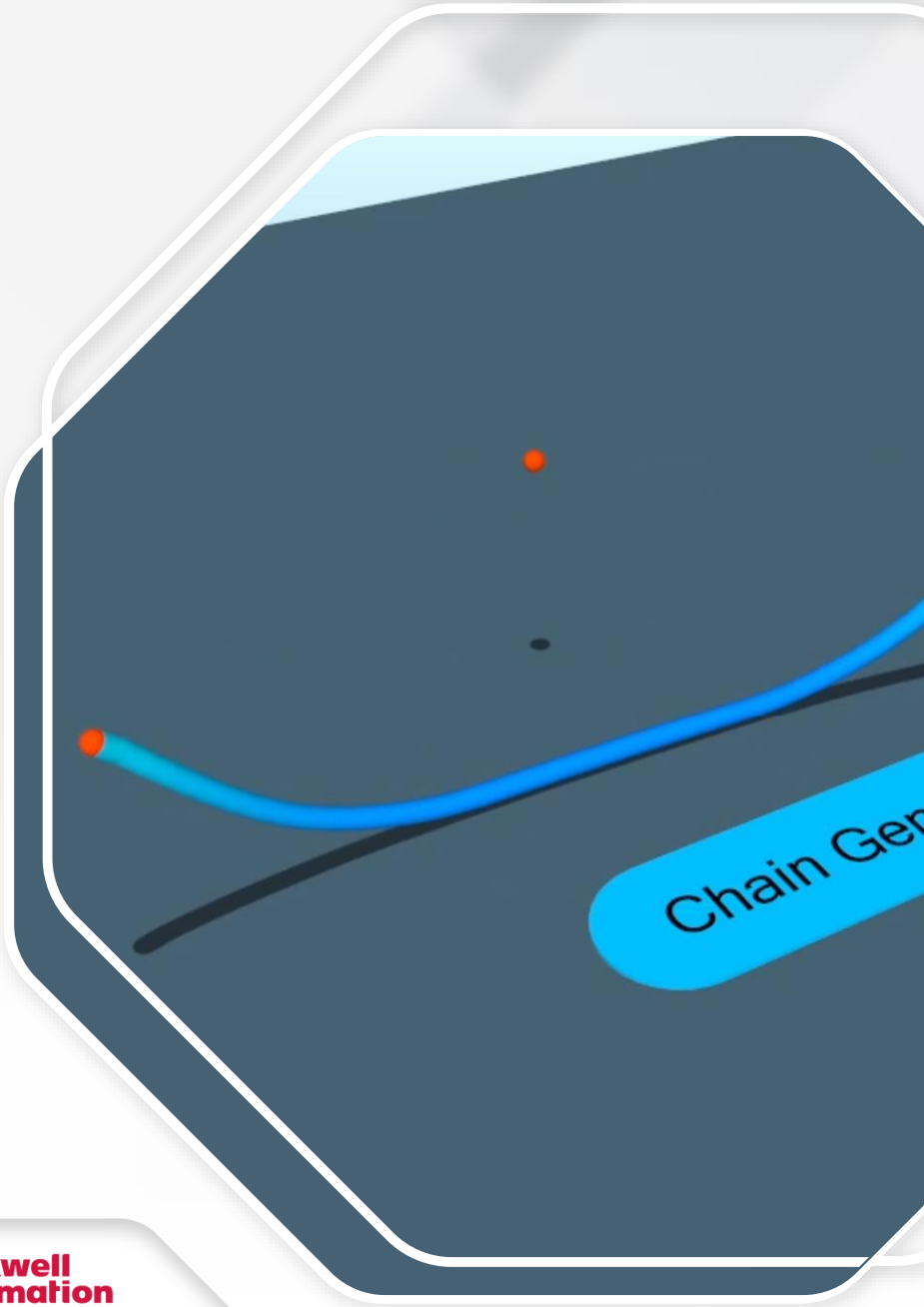
- Improved performance and stability.

Algoryx AGX additional features

- Compliance and damping added to Dynamic Fixed Joint, enabling better chains, flexible structures and springs.
- Dynamic joint friction, supporting both static and dynamic (viscous) friction.

Improved chain generator component

- Compliance and damping parameters replace "rigidity" parameter.
- Configurable maximum/breaking tension.
- Tension rendered using HSL interpolation.
- Paths are more precisely configured using NURBS interpolation.



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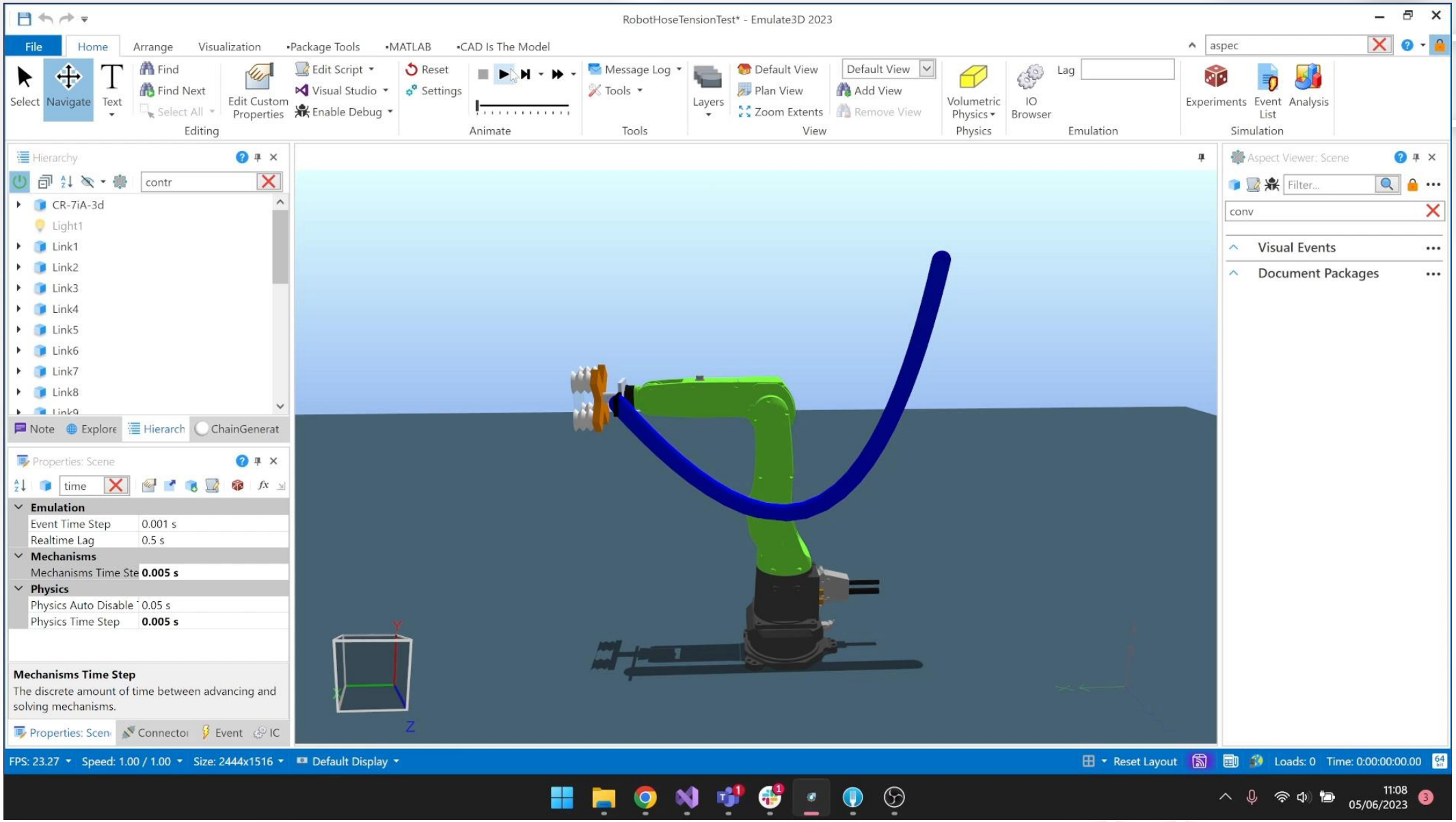

RobotHoseTensionTest* - Emulate3D 2023
File
Home
Arrange
Visualization
•Package Tools
•MATLAB
•CAD Is The Model
Select
Navigate
Text
Find
Find Next
Select All
Edit Custom Properties
Edit Script
Visual Studio
Enable Debug
Reset
Settings
Message Log
Tools
Layers
Default View
Plan View
Zoom Extents
Add View
Remove View
Volumetric Physics
IO Browser
Lag
Experiments
Event List
Analysis
Editing
Animate
Tools
View
Physics
Emulation
Simulation
Hierarchy
CR-7iA-3d
Light1
Link1
Link2
Link3
Link4
Link5
Link6
Link7
Link8
Properties: Scene
Emulation
Event Time Step 0.001 s
Realtime Lag 0.5 s
Mechanisms
Mechanisms Time Ste 0.005 s
Physics
Physics Auto Disable 0.05 s
Physics Time Step 0.005 s
Mechanisms Time Step
The discrete amount of time between advancing and solving mechanisms.
Aspect Viewer: Scene
Visual Events
Document Packages
FPS: 23.27
Speed: 1.00 / 1.00
Size: 2444x1516
Default Display
Reset Layout
Loads: 0
Time: 0:00:00:00.00
11:08
05/06/2023

Omniverse Animations

Emulation Updates

Module Emulation Framework

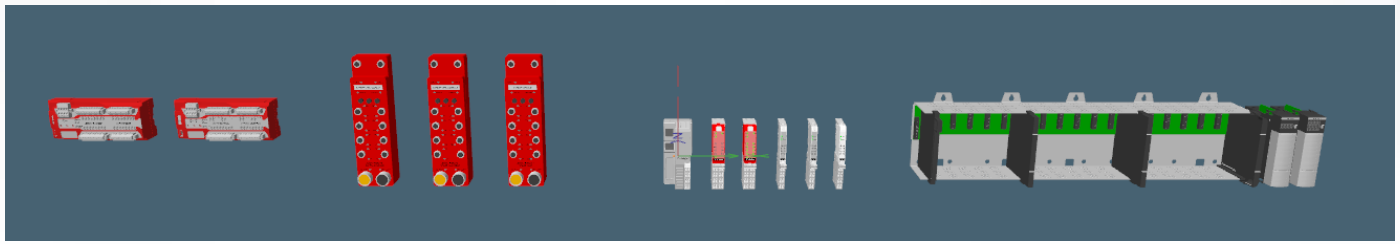
- Emulates logic of the device, such as alarms, input filters, faults, power supply, and more
- Create your own, or use the ones we've written for you

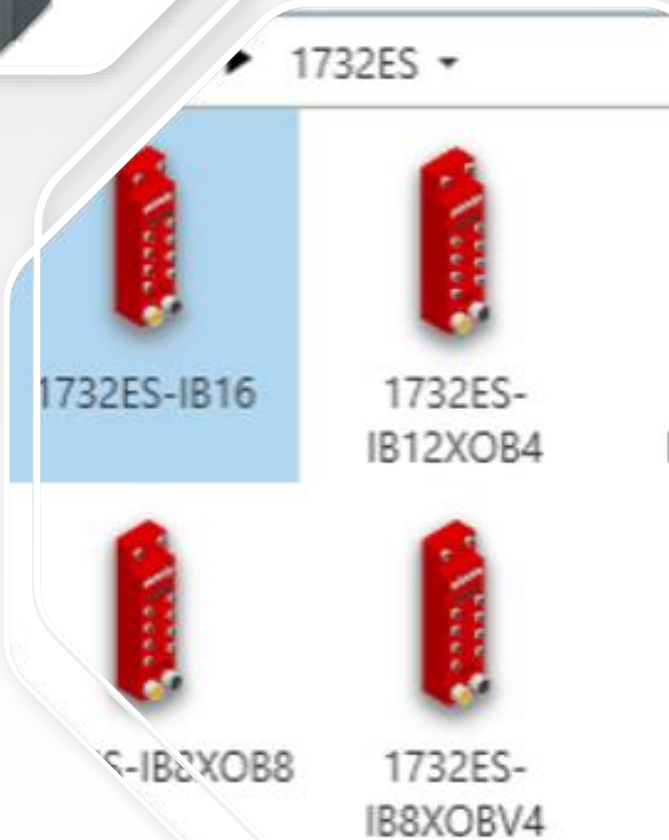
SIMIT Communications

- Shared Memory
- External
- Co-Simulation

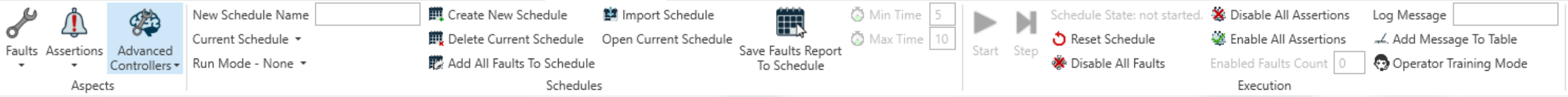
Allen Bradley Velocity Drives Catalog Updates

Automated Testing for QA



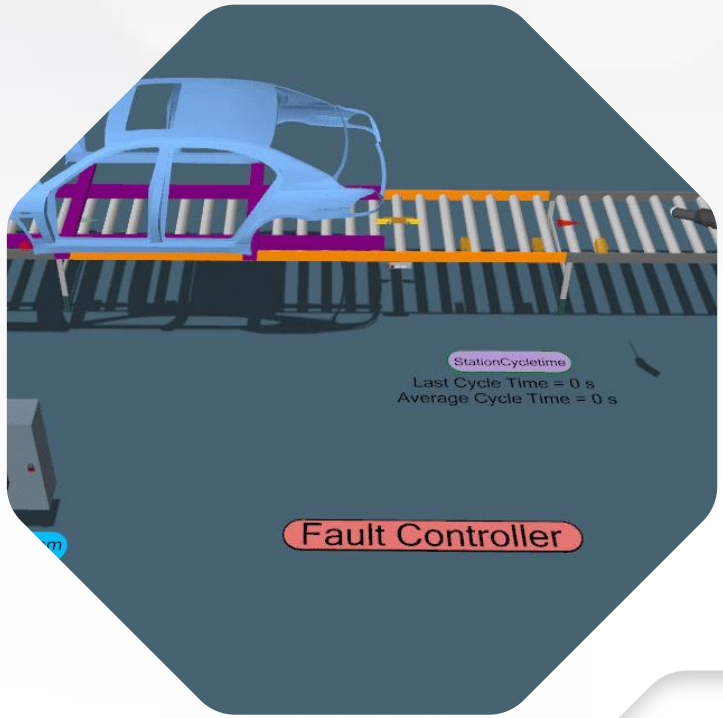


Fault Framework



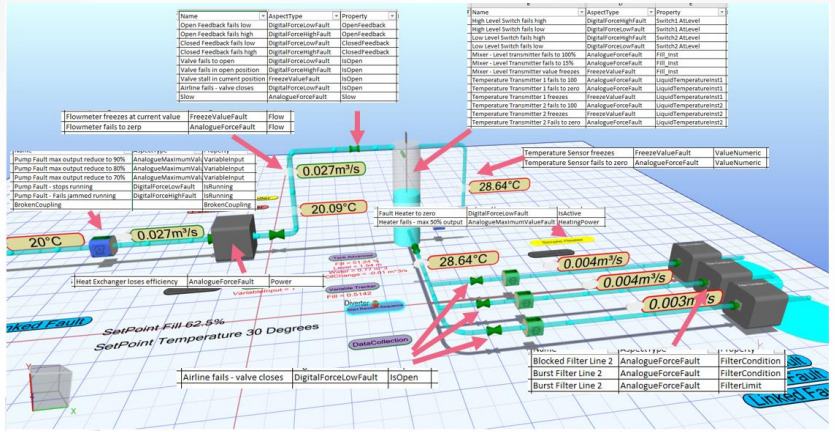
Add fault aspects to any visual

Force any value within the model to represent a device failure



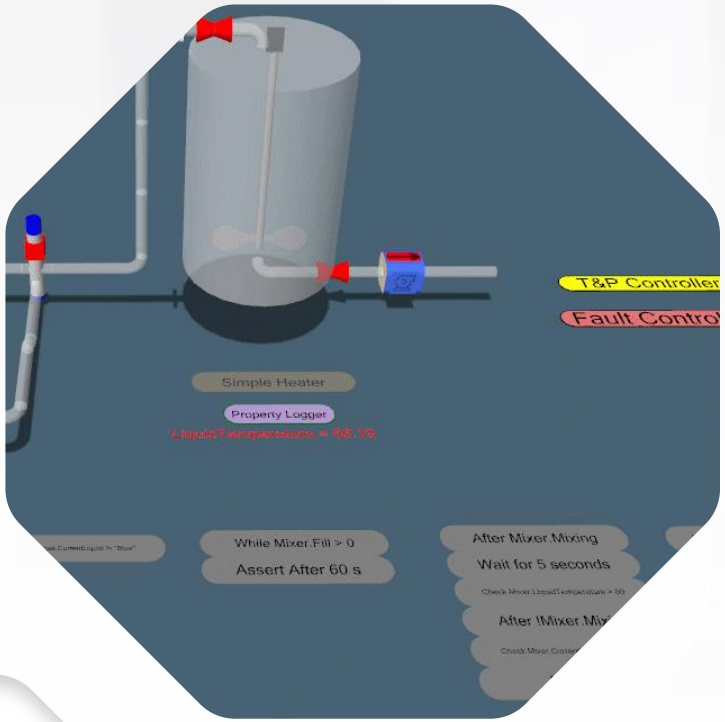
Save out your scenarios

Schedule faults to test your code or your operators



Add assertions to check behaviour

Run your controls tests or training scenario and report pass or fail



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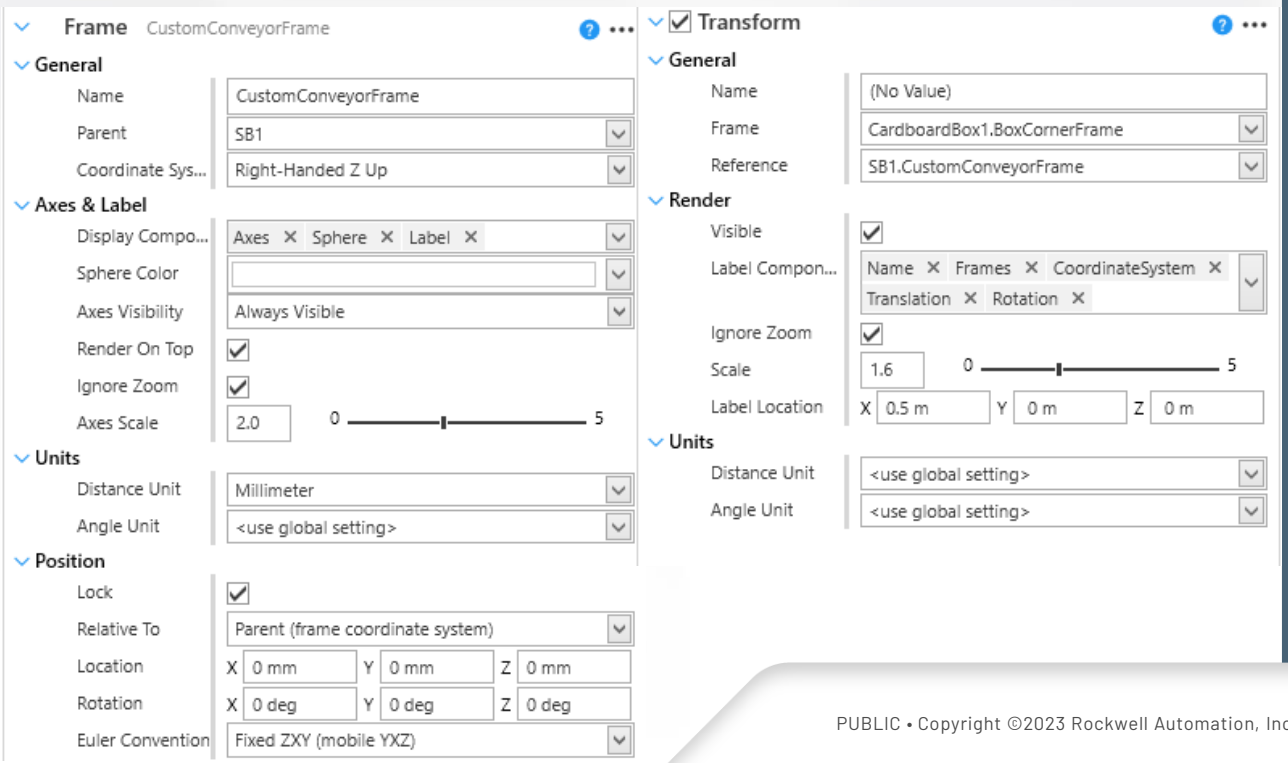
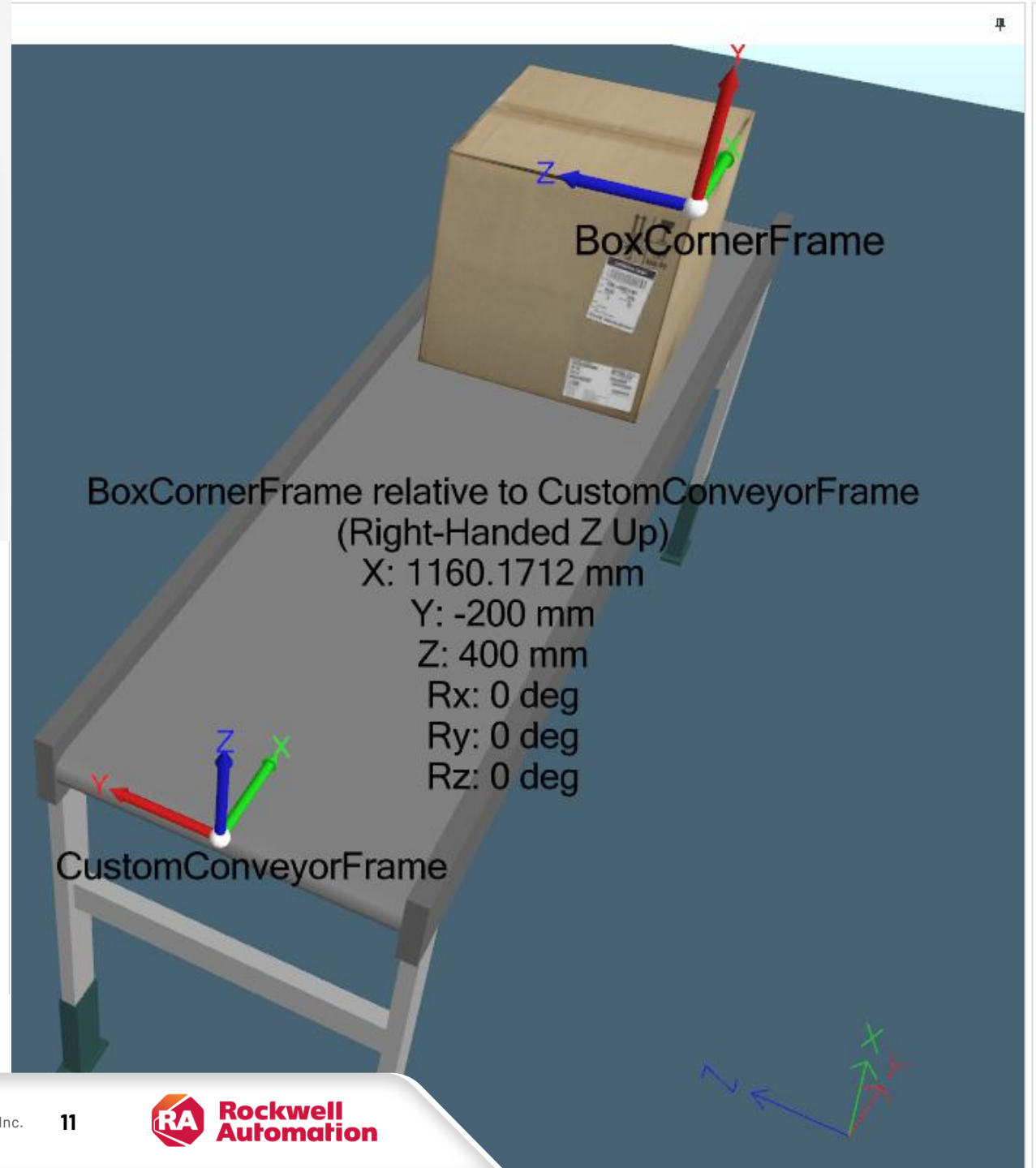
Frame Aspects

Right Handed Coordinates in E3D

Camera systems, robotics, and more!





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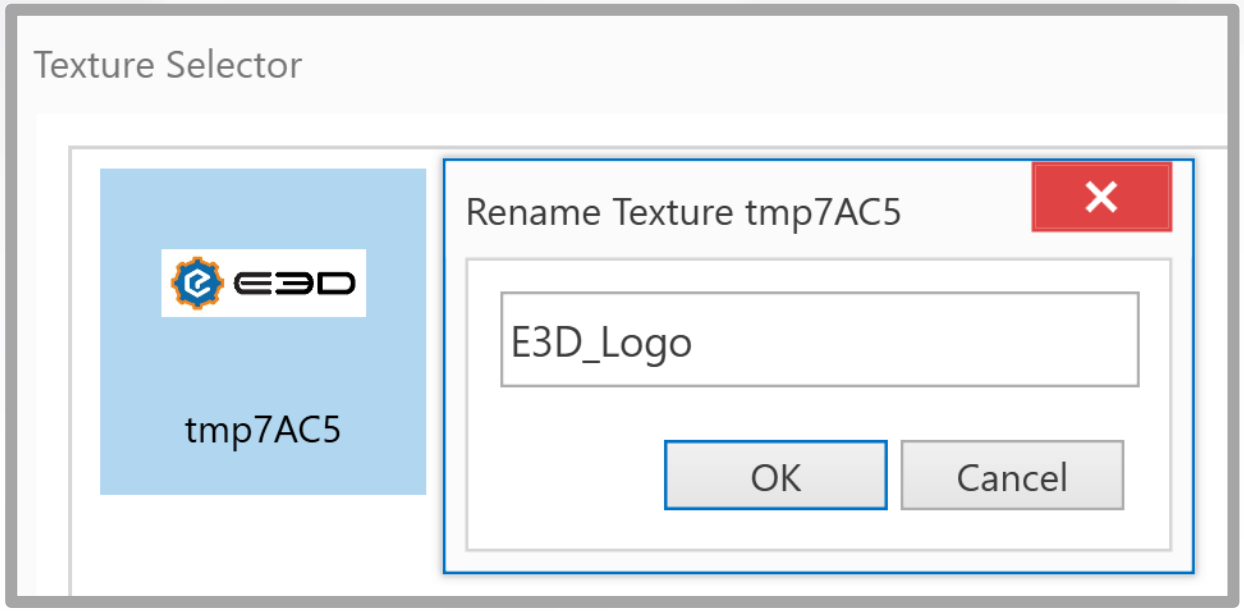
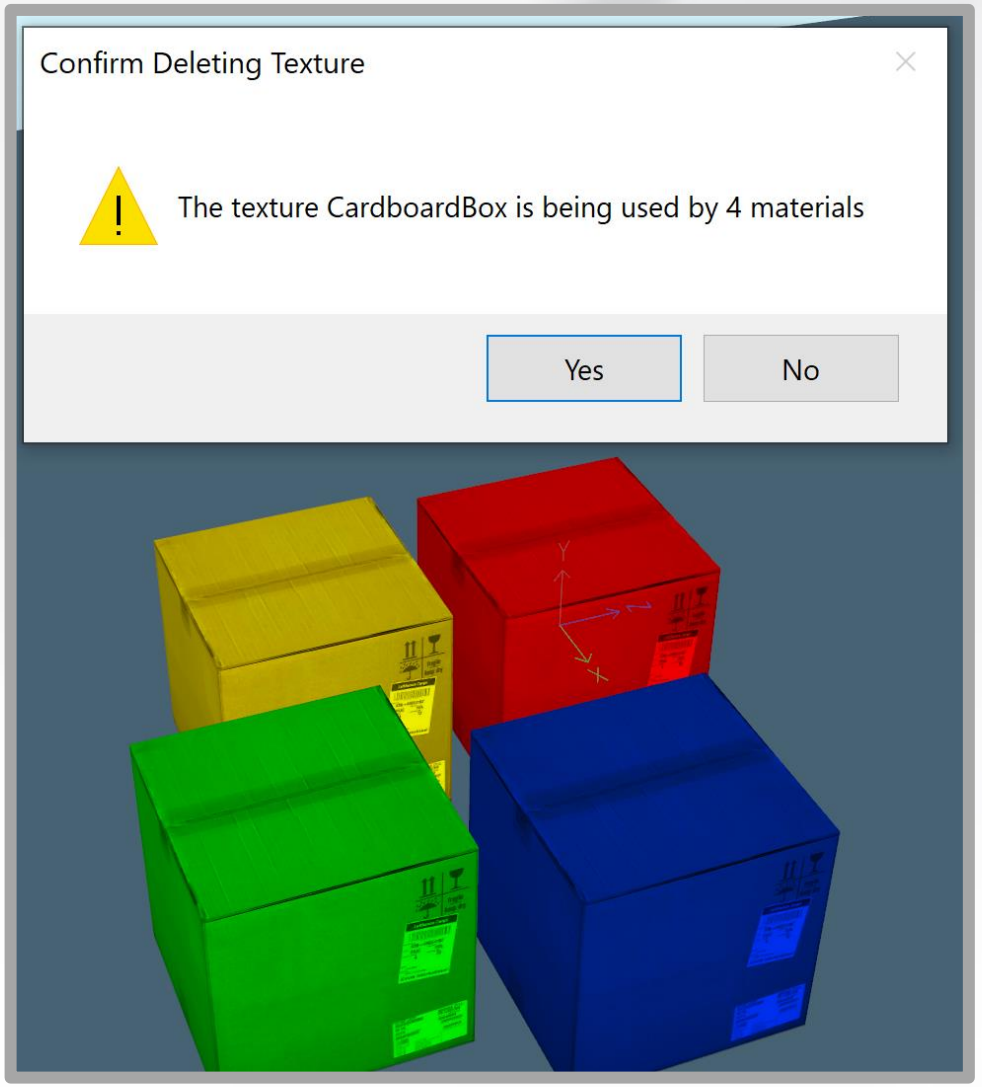
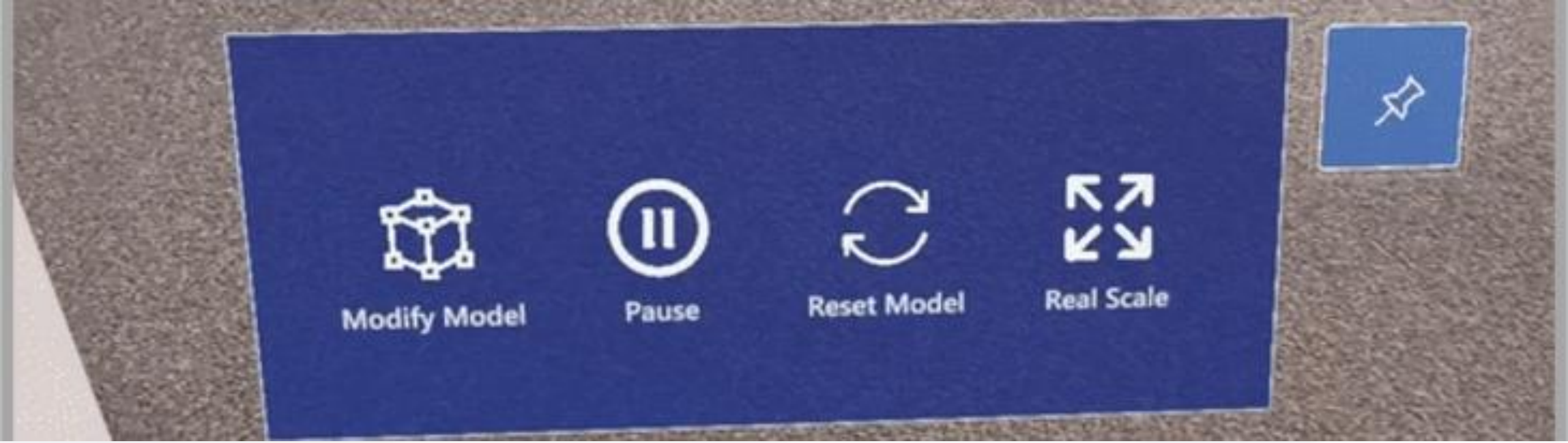
Texture Removal and Renaming

Textures can now be deleted or renamed from the Texture Selector

Deleting a texture will remove the texture from all materials, with confirmation dialog







HoloLens 2 Update

New Augmented Reality menu

- Automatically follows your movement
- Pin menu to a fixed world position

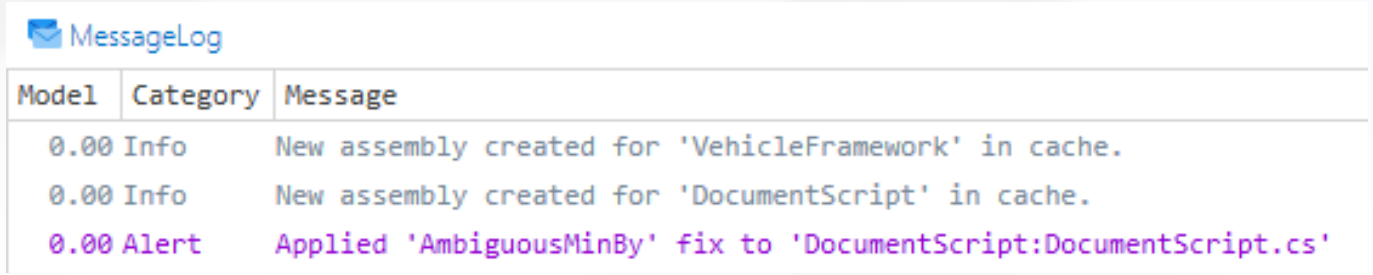
Toggle model updates with Pause / Play button

Scale E3D model to life-size

- Use the AR slider to choose the exact percentage scaling

Automatic Script Upgrades

- Fix known compilation errors in scripts and catalogs which have straight forward fixes.
- These fixes are automatically applied and displayed as alerts in the message log.
- Currently 4 automated fixes including:
  - Emulate3D Namespace changes.
  - Minor support for Net48->Net6 API changes.
- Future enhancements:
  - Allow local configuration of script fixes.
  - Support more complex fixes.
  - Show additional help for some issues that can't easily be fixed.
  - Additional automatic fixes.

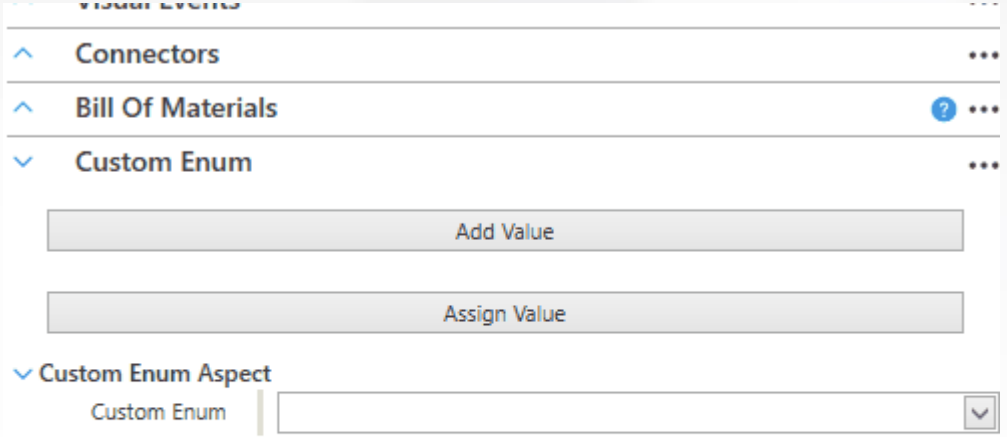

MessageLog

Model	Category	Message
0.00	Info	New assembly created for 'VehicleFramework' in cache.
0.00	Info	New assembly created for 'DocumentScript' in cache.
0.00	Alert	Applied 'AmbiguousMinBy' fix to 'DocumentScript:DocumentScript.cs'

Custom Enums in the Aspect Viewer

- Added support for Custom Enum properties in the Aspect Viewer

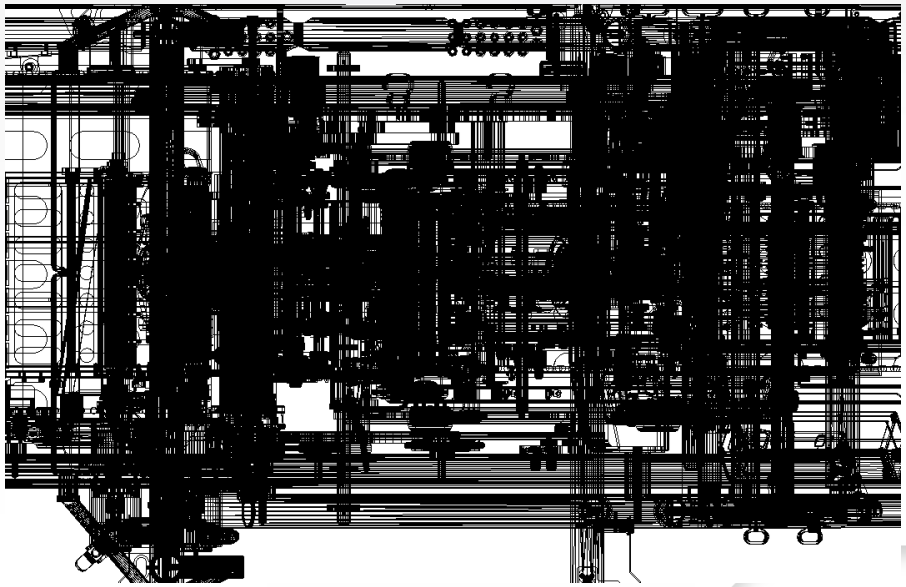
- Both the assigned value and available values can be updated dynamically, and the viewer will update to show the new values.



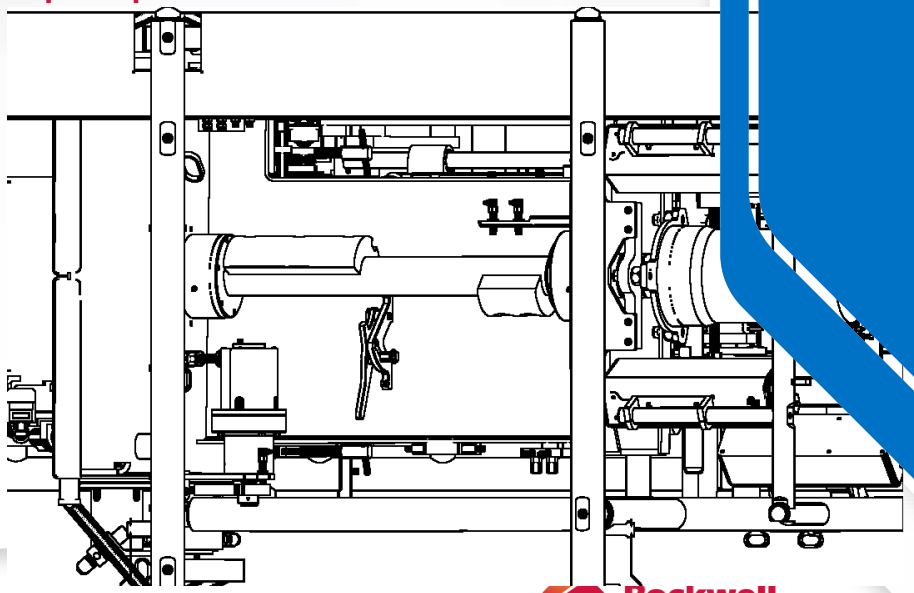
Print Menu – Opaque Wireframe

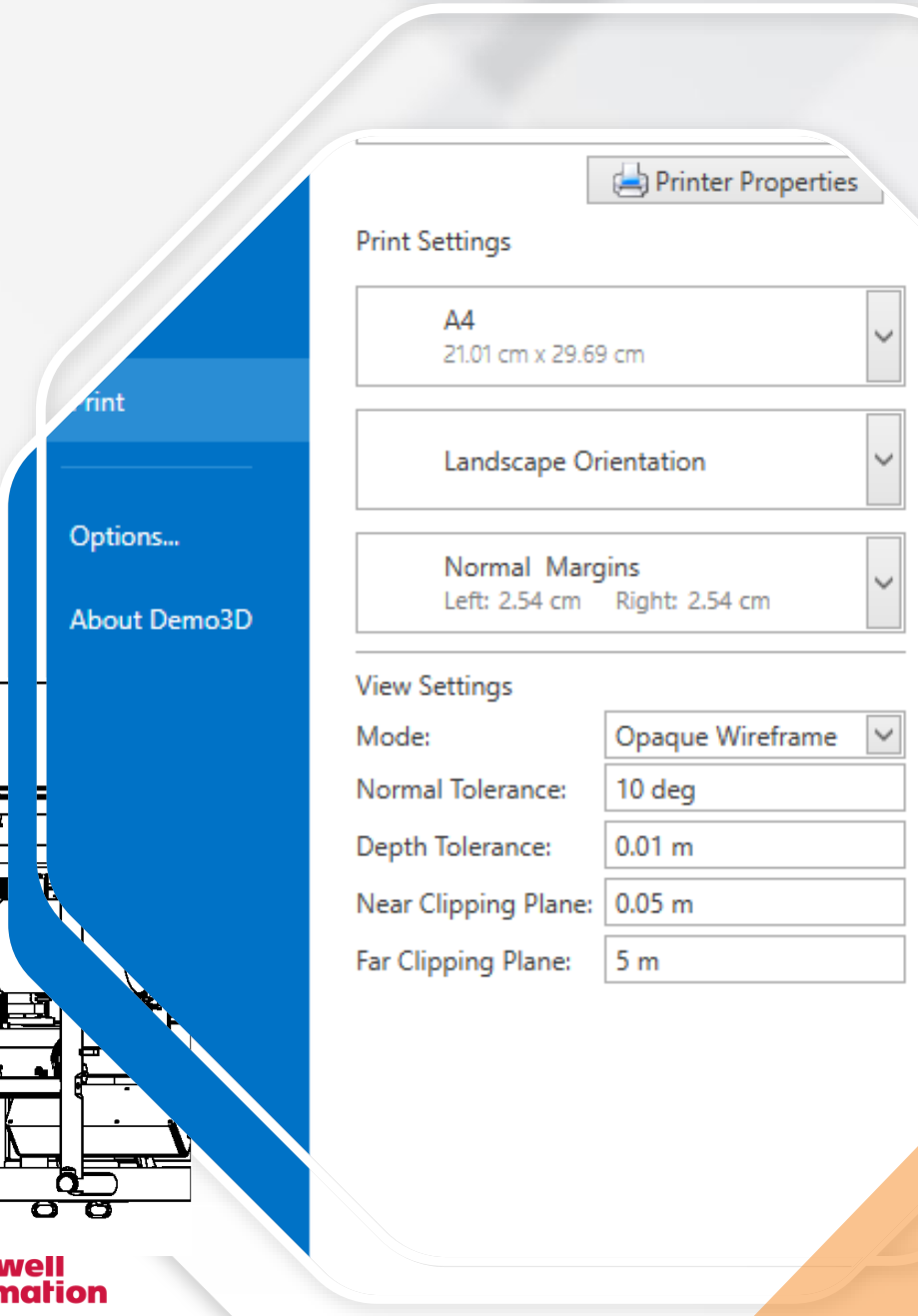
- Added the option to render using opaque wireframe views in the Print Menu.
- Lines behind Visuals are not drawn
- Optional parameters to create cut-outs

Wireframe



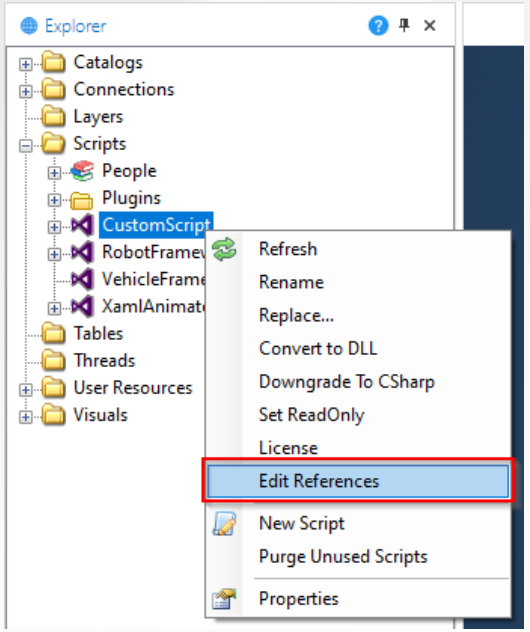
Opaque Wireframe

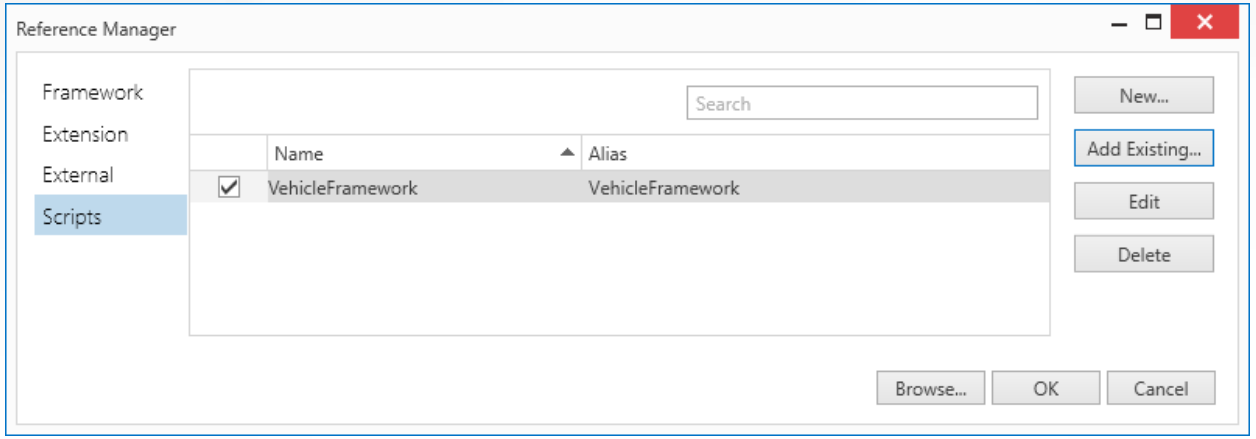




Scripting Reference Manager

- Now accessible in the world explorer via right click -> Edit References.
- Enables users to manage script references for project scripts inside Emulate3D.
- Script references can be added/removed without opening Visual Studio, which results in less time spent loading/reloading projects.

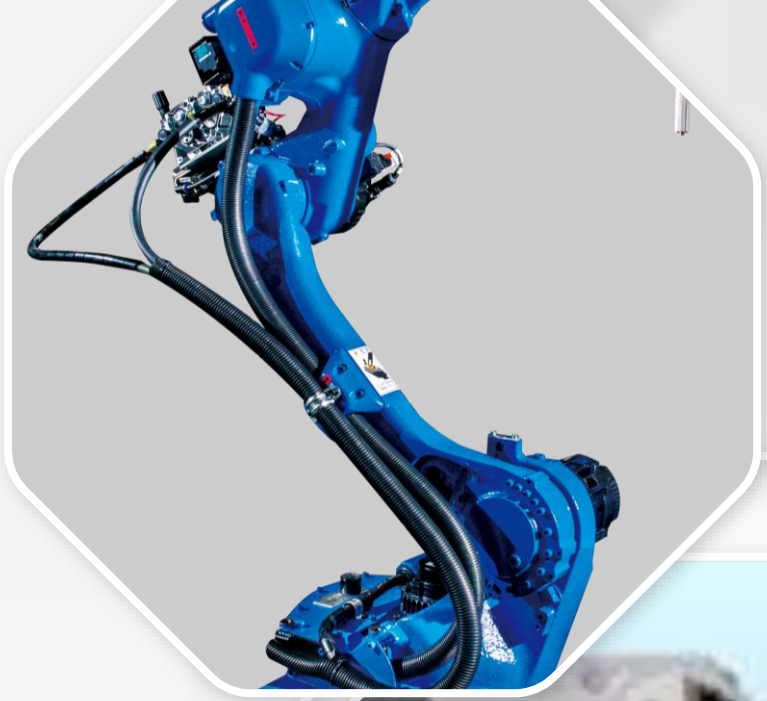




Robotics Update

More robot models – More OEM Integration

- New CITM robot libraries for KUKA, Codian, Autonox, and Atom.
- Yaskawa MotoSim Integration (Emulation support for Yaskawa robots)
- New Variable Joint Limits Aspect for creating proper joint couplings.
- Reach Zone Generator improvements (Delta Common Workspace generation).
- Dedicated Robot Tools catalog containing CITM tools.



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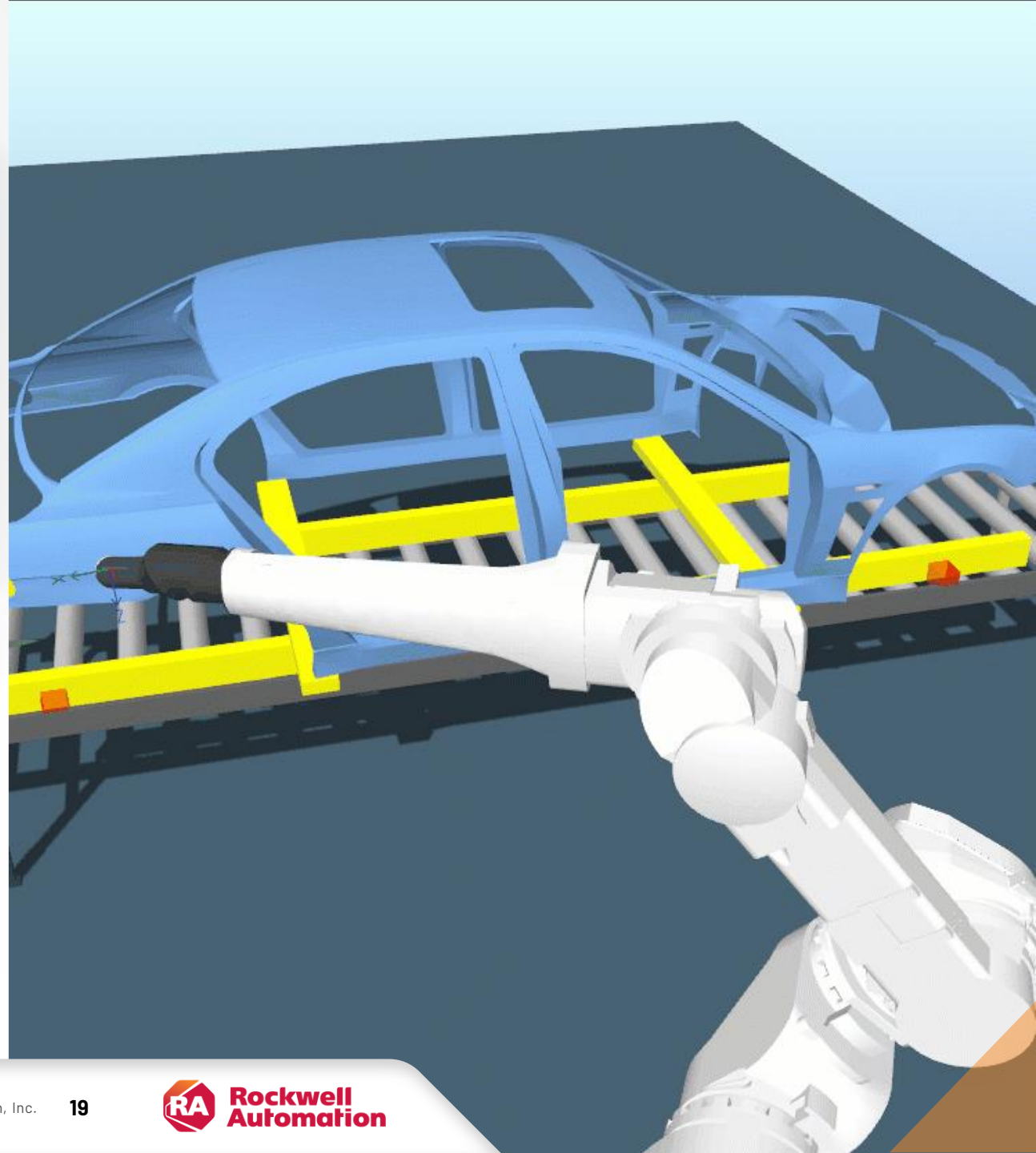
Mesh Painting

Customizable Vertex Painting

Get and set colours...

Represent more than just paint!



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Tanks and Pipes V2 Update

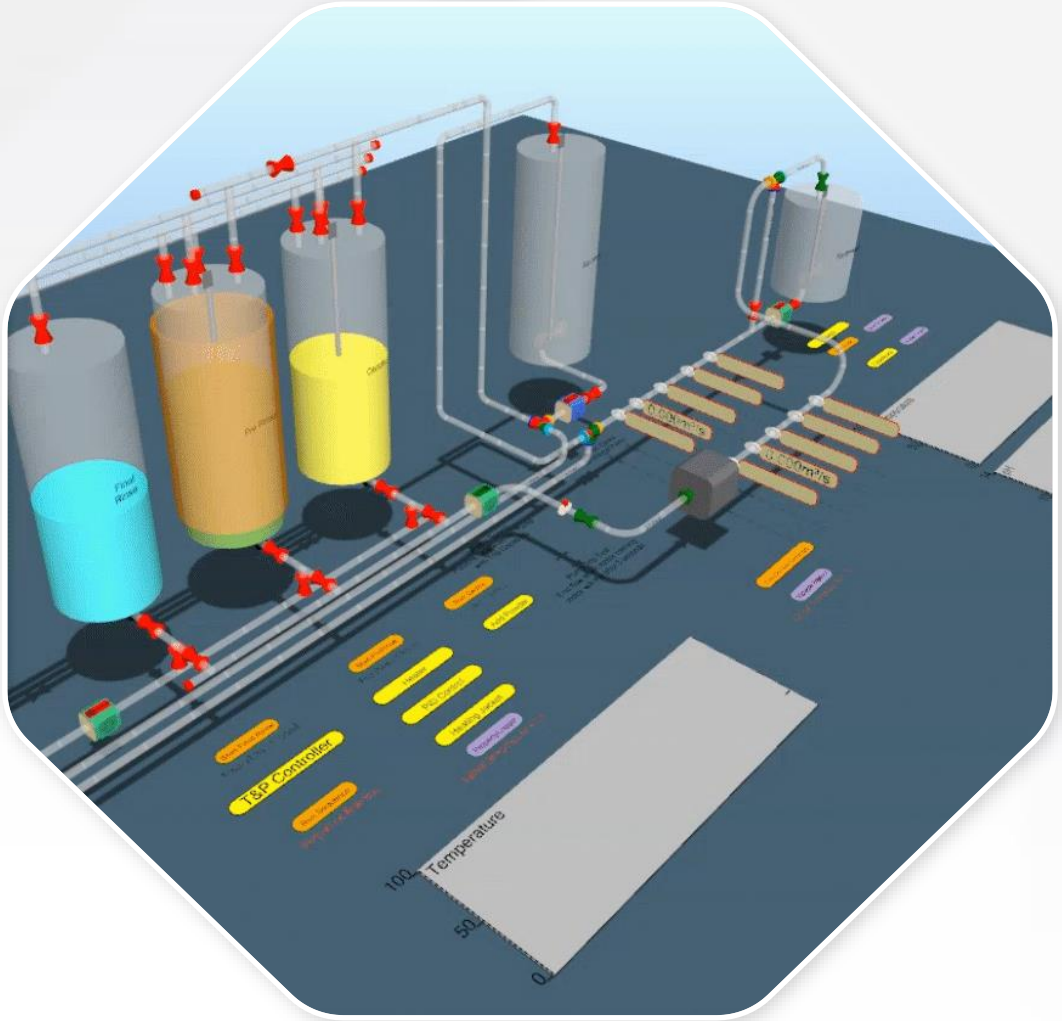
Increased Complexity of Process Modelling

Flexible framework for modelling custom liquid properties

Generate the right signals to the controls system

Prebuilt example models such as jackets, heat exchangers, etc.

Define custom processes using QuickLogic, function editor, C#



Controls Testing and Operator Training Workflows

Device fault simulation inbuilt to pumps, valves, and sensors

Define scenarios for testing controls or training operators

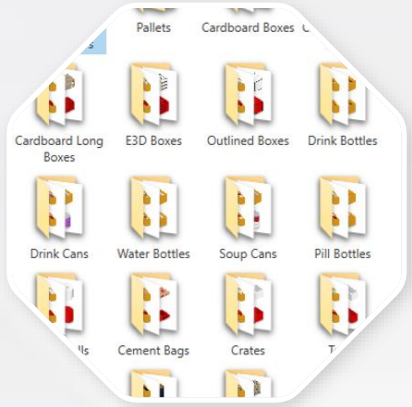
Rich and customizable data collection and analytics

New components, properties, and configurable procedures

AMR Updates

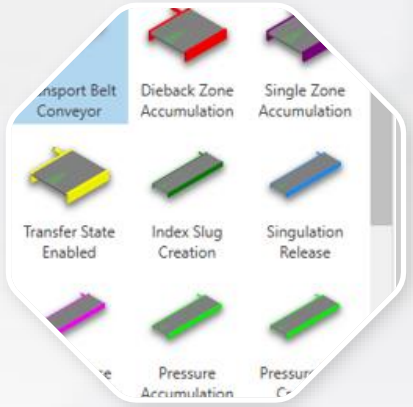
- Additional customization options for route planning
- Support for a wider range of AMR applications
- Scripting API for C# control as well as QuickLogic
- Lift and safety cage support
- Improved path planning and performance
- Otto skinned AMRs

Loads of Loads and Conveyors!



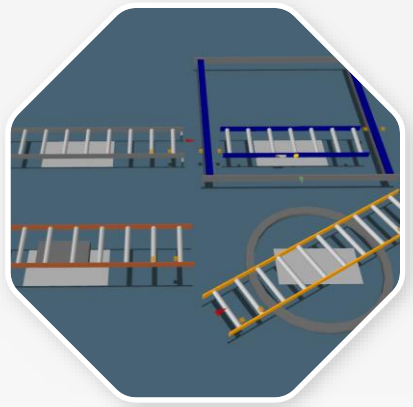
Loads Catalog

- Over 400 new loads
- New skids, load creators and deleters, including controlled, gapping, and distance variants



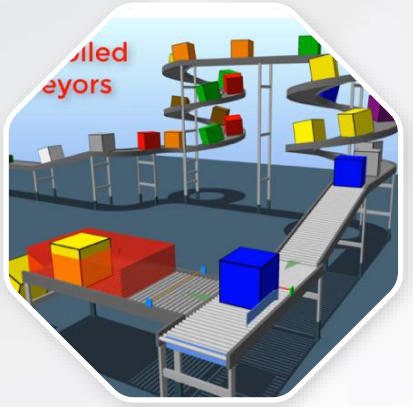
Smart Conveyors

- New Protocols, including pressure accumulation and pressure slugging
- New Properties
- New Catalog Items



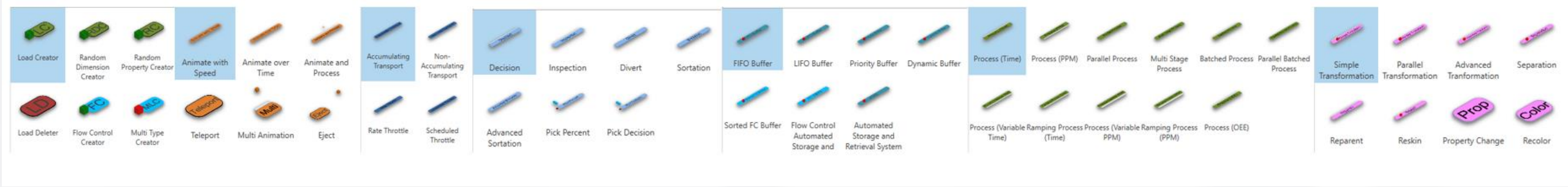
CT Conveyor Examples

- Override core conveyor motors with CITM aspects
- New joint sensors, controllers, encoders
- Ideal for lifts and turntables



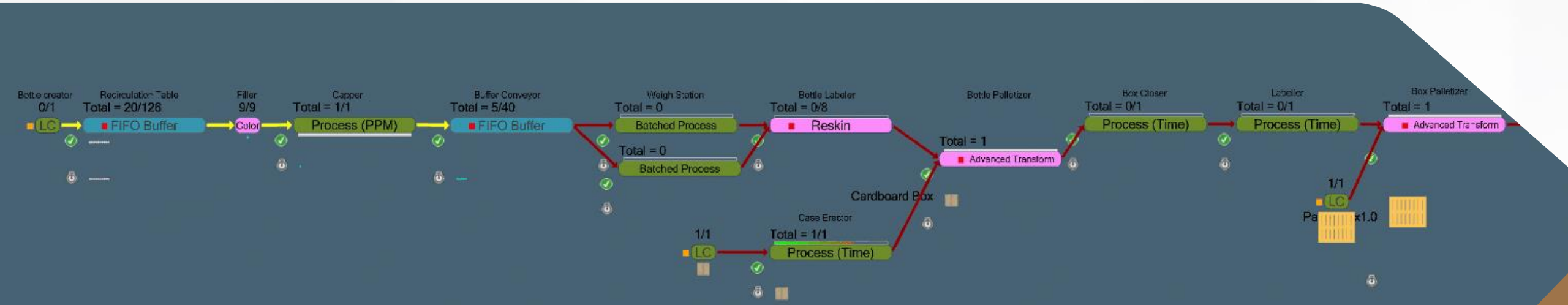
Uncontrolled Conveyors

- Conveyors with no scripts
- QuickLogic based sensors and transfers
- Ideal for learning E3D or creating custom protocols

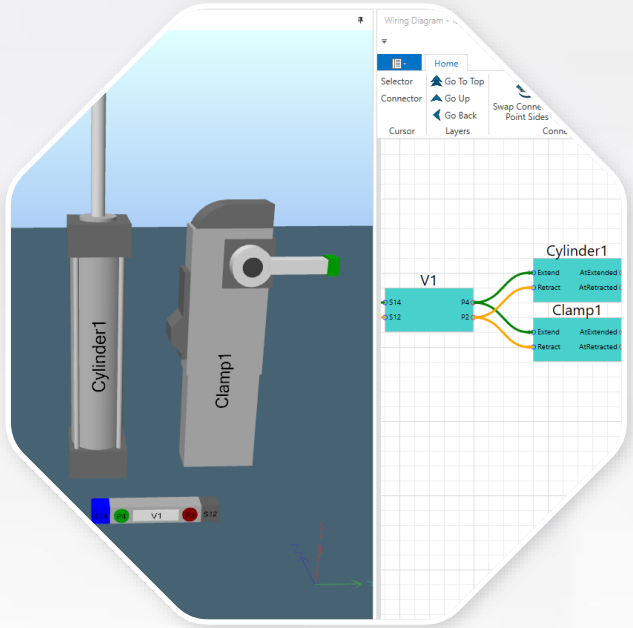


Multi Colour Black Boxes

- 50 + New Black Box configurations for common applications
- Use of Arrow Framework to show product moving
- New widgets, procedures, and performance enhancements



Other Catalog Additions and Utilities



Actuators and Valves Catalog

PowerFlex Drive PTP Mode

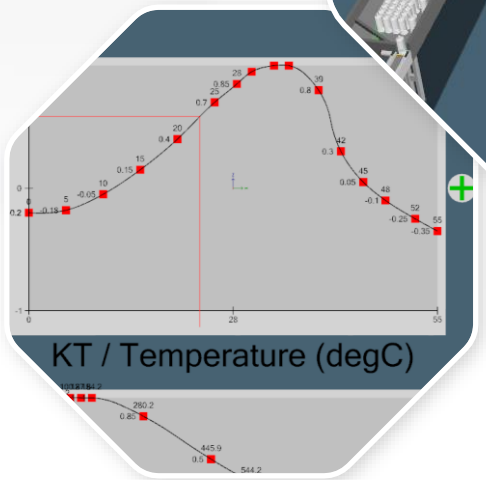
Advanced Motor Controllers

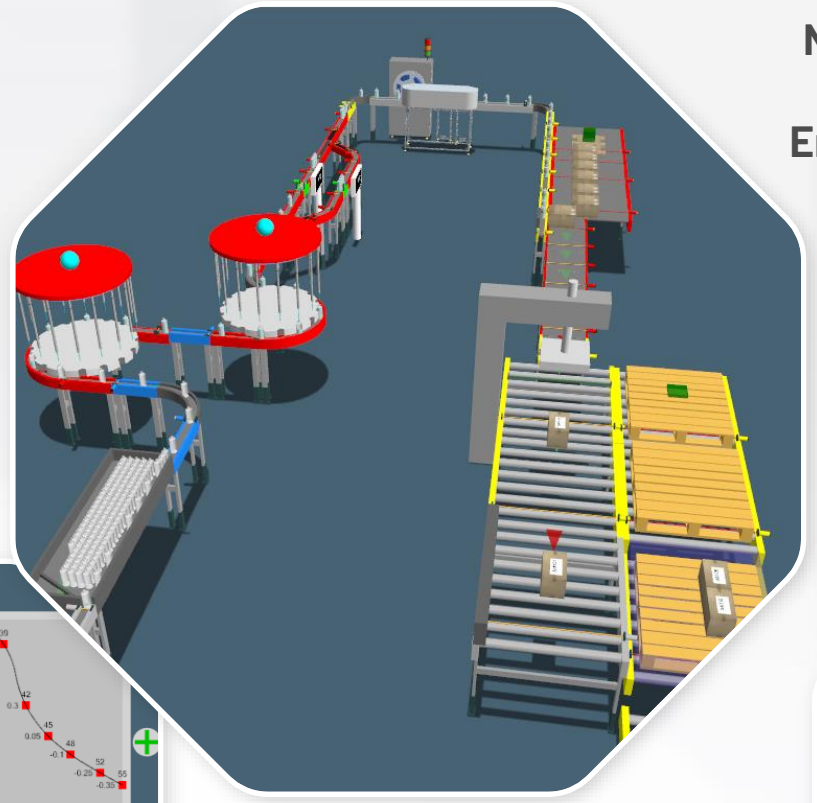
Polling and Counting Encoders

Joint Sensor Aspect

Function Plot

- Cams
- Accel curves
- Distributions
- Processes





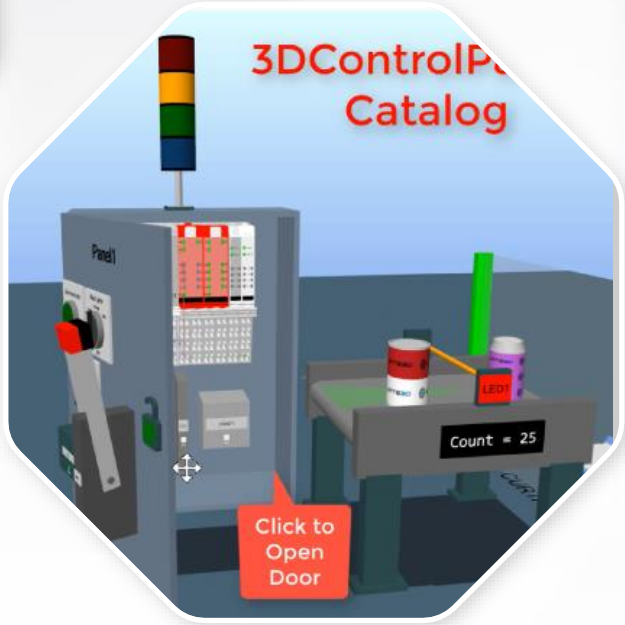
3D Control Panels

Multi View Wiring Diagram

New Simple Flow Control Variants

End of Line Packaging Components

-Rinsers, Fillers, Cappers
- Recirculation tables
- Labellers, Weigh Stations
- Case Erectors
- Bulk Palletizers



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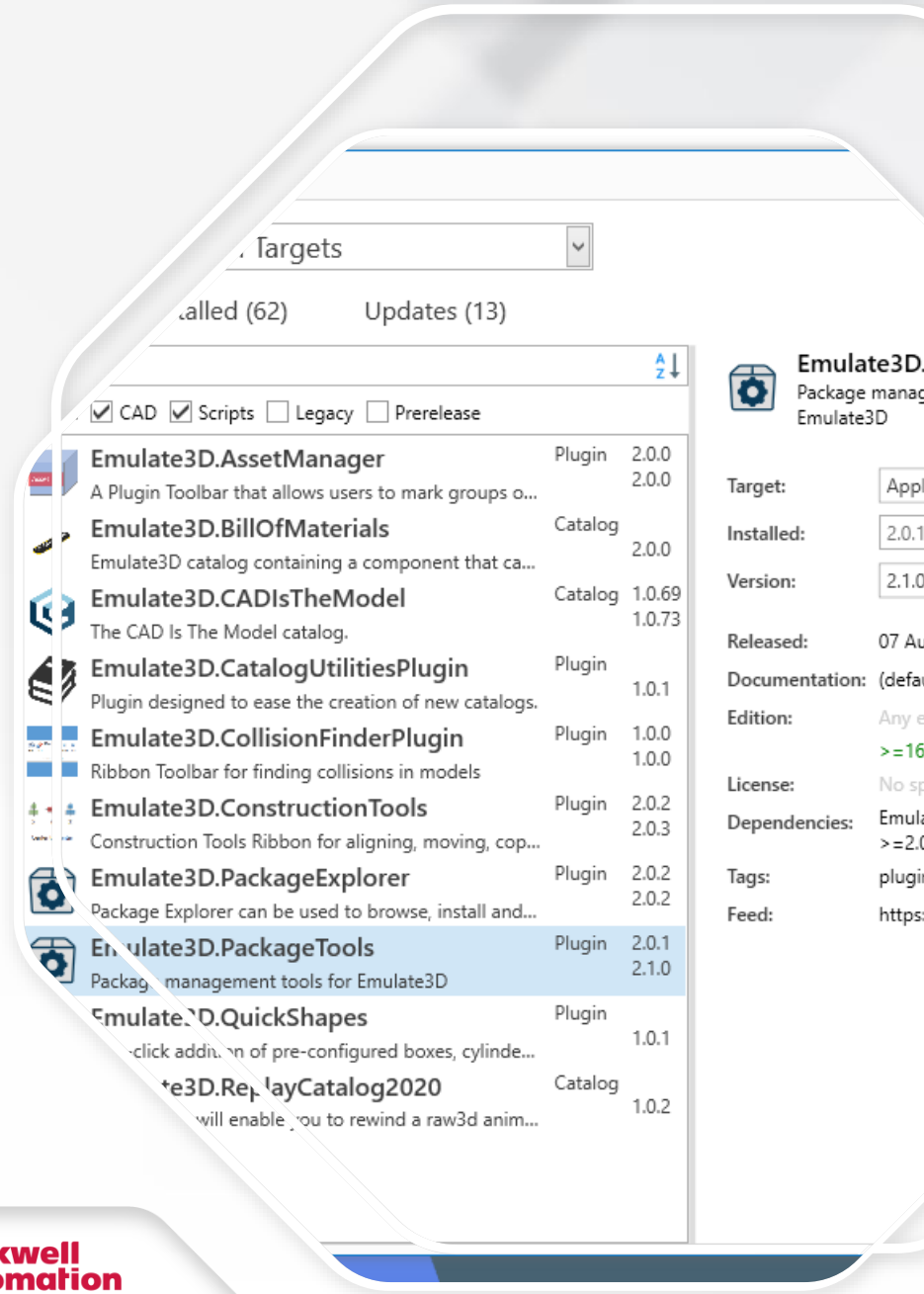
Catalog Encryption

- Encrypted catalogs and scripts can now have an embedded runtime encrypter license, which will allow any user to use the package.
- Allows us to deploy large packages with better version compatibility.
- We can also distribute read-only versions of some scripts which were previously .dlls, as reference code.
- There will be a gradual rollout of new encrypted source versions of all eligible DLL scripts via the Package Manager.



Documentation Overhaul

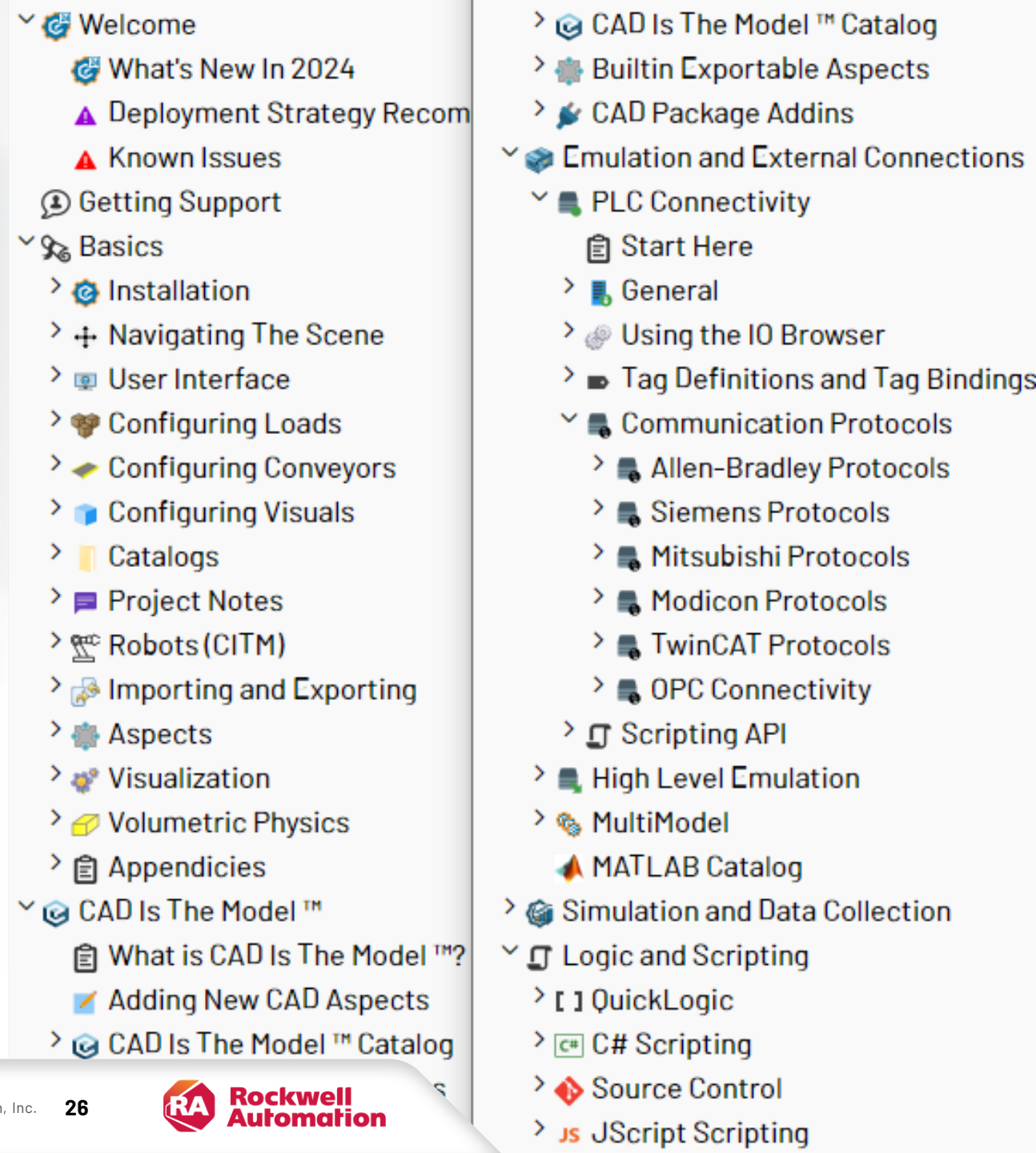
Full Review, Update, Expansion, and Reorganisation of the manual page

Continues trend of recent updates with Training Paths, Package Manuals and Videos

Future:

Dissect the Knowledgebase

Similar refresh of Webstore tutorials, move to same page



FactoryTalk Hub Updates

Twin Studio™

Available today on demand directly through your browser

- **Emulate3D™ Ultimate with Studio 5000 Logix Designer®, FactoryTalk® Logix Echo, FactoryTalk® ME Location Station and View Designer**
  - Emulate3D™
  - 3 VM Sizes (Graphics G4 Instances)
- **Arena®**
  - Arena® 16.20
  - 3 VM Sizes
- **Studio 5000 Logix Designer® with FactoryTalk® Logix Echo**
  - v20, v21, v24, v28 to v35 Logix Designer®
  - v2 Logix Echo (ControlLogix v33 to v35)

Now available in APAC

- Current Servers (US East, EMEA, APAC)
- Coming Soon (US West)

- **Upcoming**
  Echo Snapshot Support
  … and more coming

FactoryTalk Hub Updates

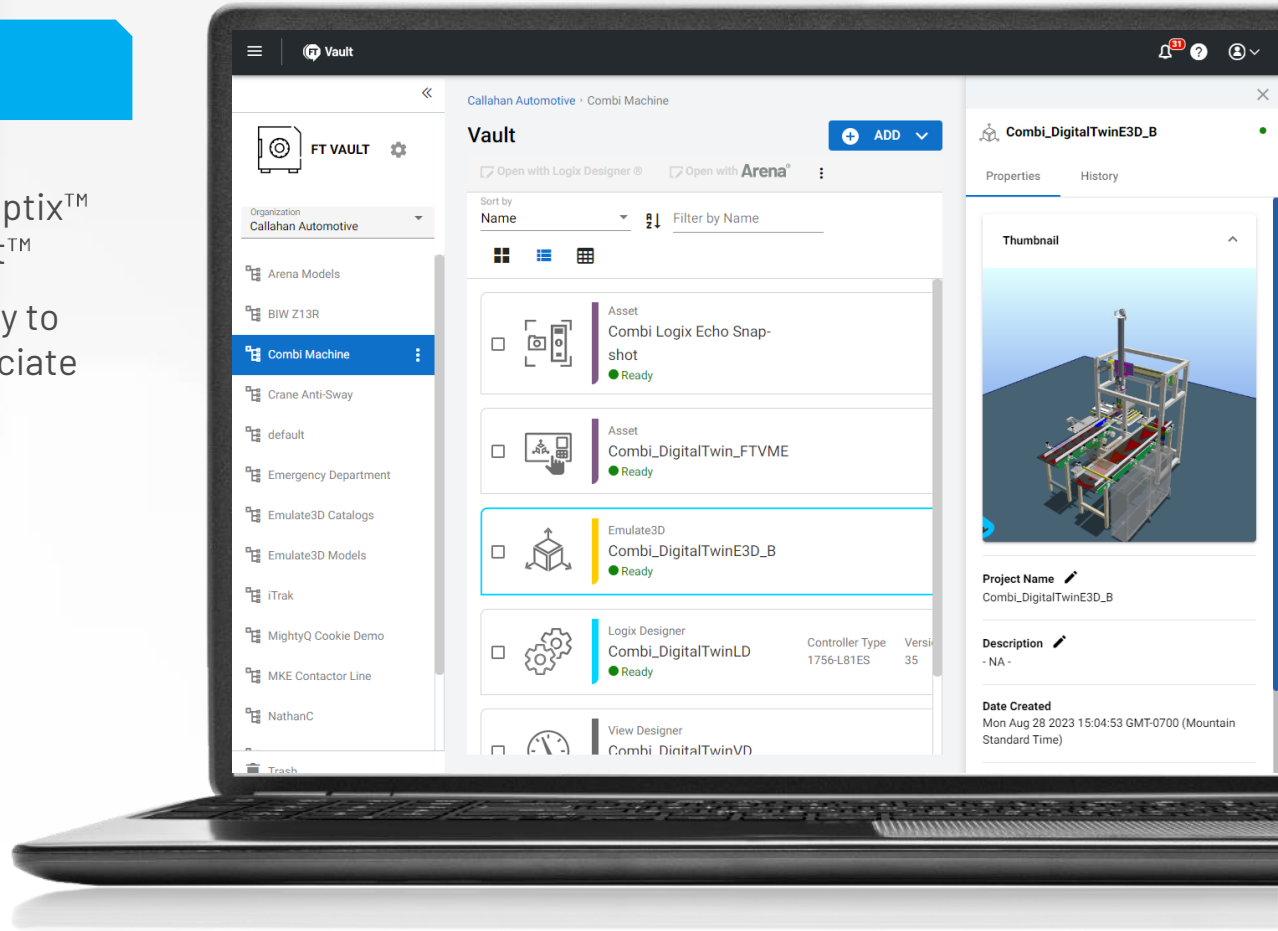
FT Vault™ Design better together with a secure, cloud, centralized file storage platform

Now Released

- **Any File Storage** with version control (Word, Excel, CAD, Other Controllers, E3D, Arena)
- **Launch Arena®, Emulate3D™, and Logix Designer®** directly from Vault
- **Safety Analysis** Initial Safety Validation & Verification analysis card
- **Design Studio™ Integration** Save converted Design Studio™ projects directly to Vault™
- **View/Compare** Logic Routines directly from Vault™
- **Emulate3D Thumbnails** See associated thumbnail of E3D project

Upcoming

- **Optix™ Integration** Save Optix™ projects directly into Vault™
- **Hierarchy Structure** Ability to create a hierarchy to associate solutions



Rockwell Automation

Any Questions?

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