# Basics of Visual Components

Visual Components | Version: February 23, 2022
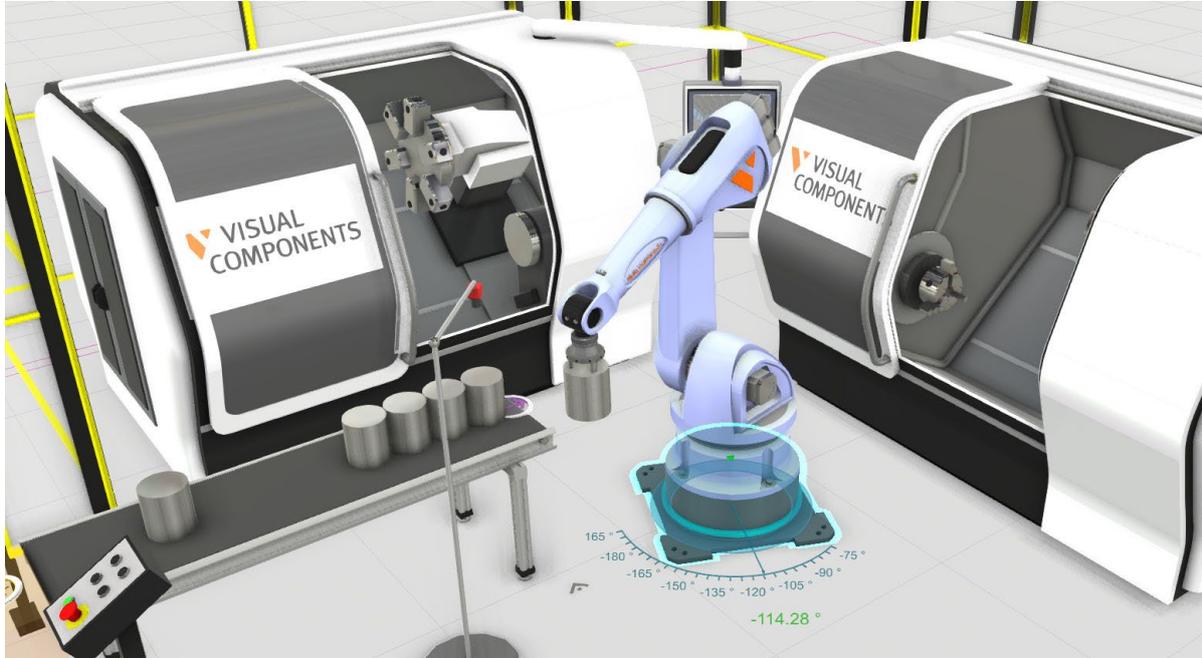
This guide is designed to assist new users in becoming familiar with a Visual Components product And the best way to utilize this guide is to first install your software, and then complete the steps outlined here. And this document is a companion to a video of the same name in the Visual Components Academy, so you may refer to both if necessary.

This document includes the following topics:

- Software installation and Customer registration.
- Accessing the eCatalog and the basics of navigating within the 3D world.
- Manipulation and interaction with components in the 3D world.
- Running simulations.
- Creating images and animations.
- Creating 2D drawings and statistics charts.

Support
support@visualcomponents.com
Forum
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Contents

1. Getting Started

1.1. Installation and Setup

1. Begin by visiting the Downloads page to download and run the installer for your Visual Components product. If necessary, refer to the Installation and Licensing User Guide for more detailed installation instructions.

2. Use the Wizard to complete installation, and once completed, click **Finish**.
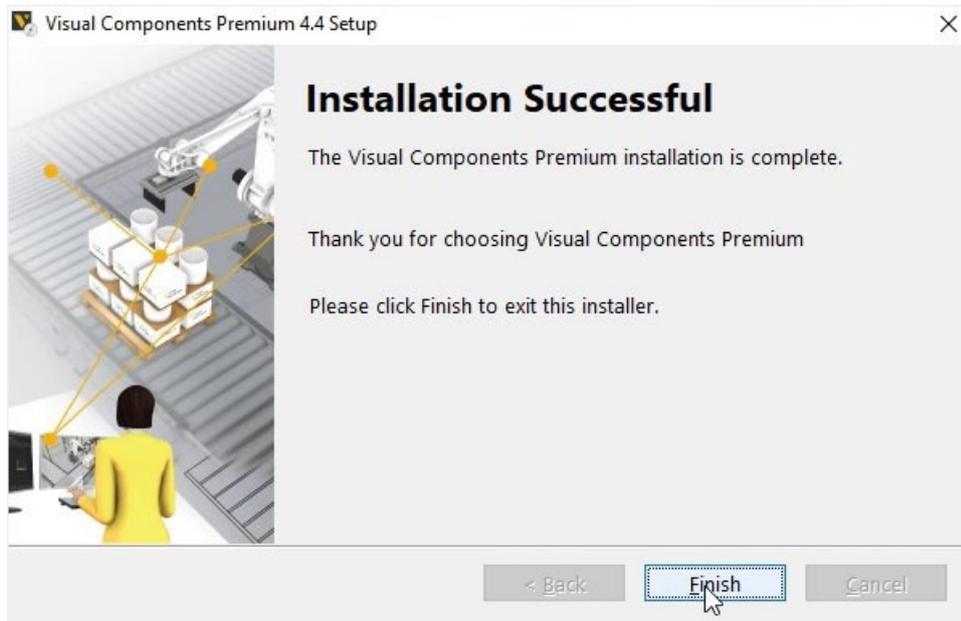

3. Start your Visual Components product and use the **activation guide** to license the software.
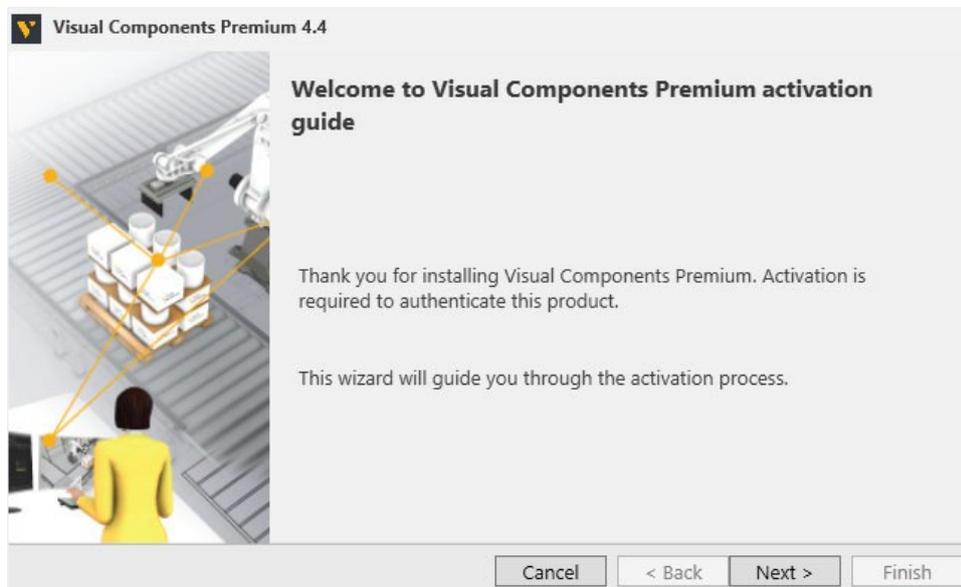
4. Following product activation, use **Registration** to create a licensing account to manage your software licenses and request Customer Support online.
**NOTE!** The password you create must be at least eight characters in length, and include the following:

- At least one lower case letter.

- At least one upper case letter.

- At least one special character.

- At least one number.

5. Then start your Visual Components product.

1.2. User Interface

The user interface of a Visual Components product consists of several elements.
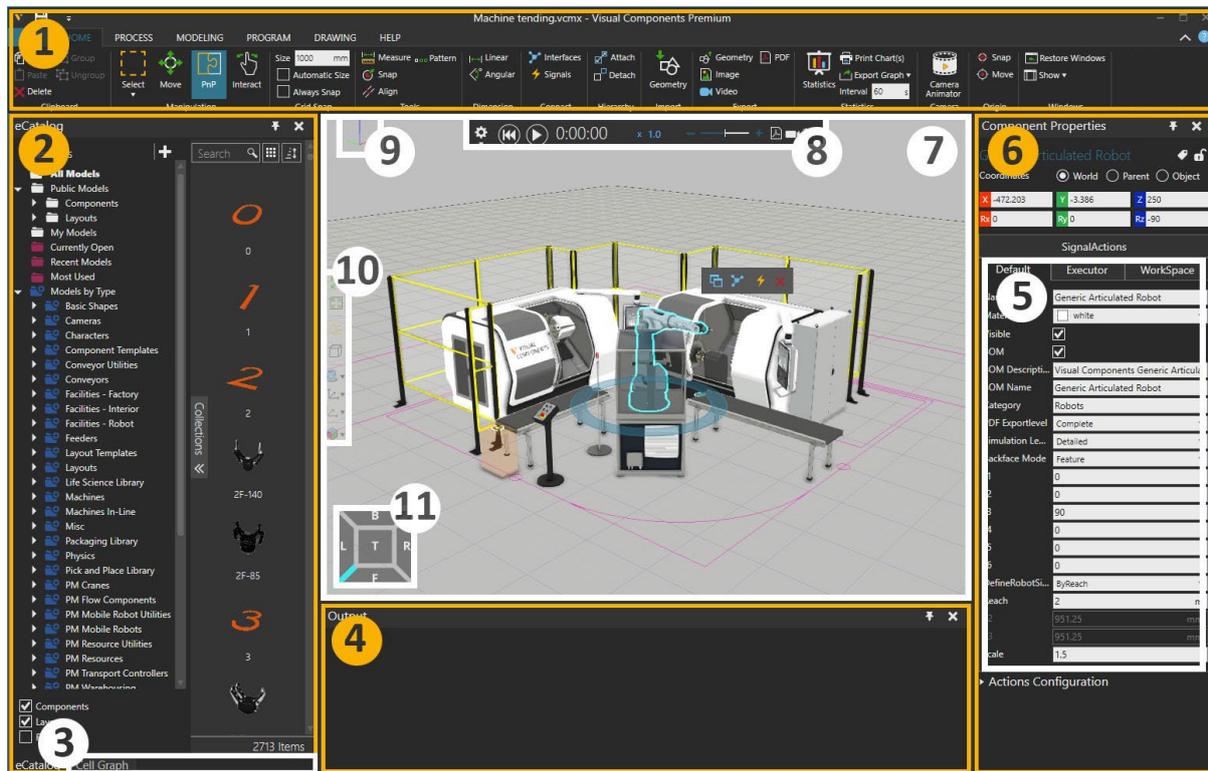
1. Menu tabs: where a selection of tools and controls are available.

2. eCatalog: manage sources of component files and load those components in the 3D world.

3. Cell Graph panel: provides an outline of the current layout in 3D world and options for selecting and editing listed items.

4. Output panel: prints feedback on events, commands, and other actions.

5. Properties Tabs.

6. Properties Panel: edit the properties of a selected object.

7. 3D world: build layouts in the 3D world using components.

8. Simulation Controls: available from the top of the 3D world, allowing you to start, stop, reset, record, and customize a simulation.

9. Floating Origin: represents the X, Y, and Z axes of the world coordinate system.

10. 3D world toolbar: control the visuals of the viewport.

11. View Selector: represents six standard views joined together to form an interactive navigation control.

1.3. Quick tips on restarting and configuring the User Interface

Should you ever need to start a project from the beginning, select the **File** tab, click **Clear All**, and then click **Don't Save**.
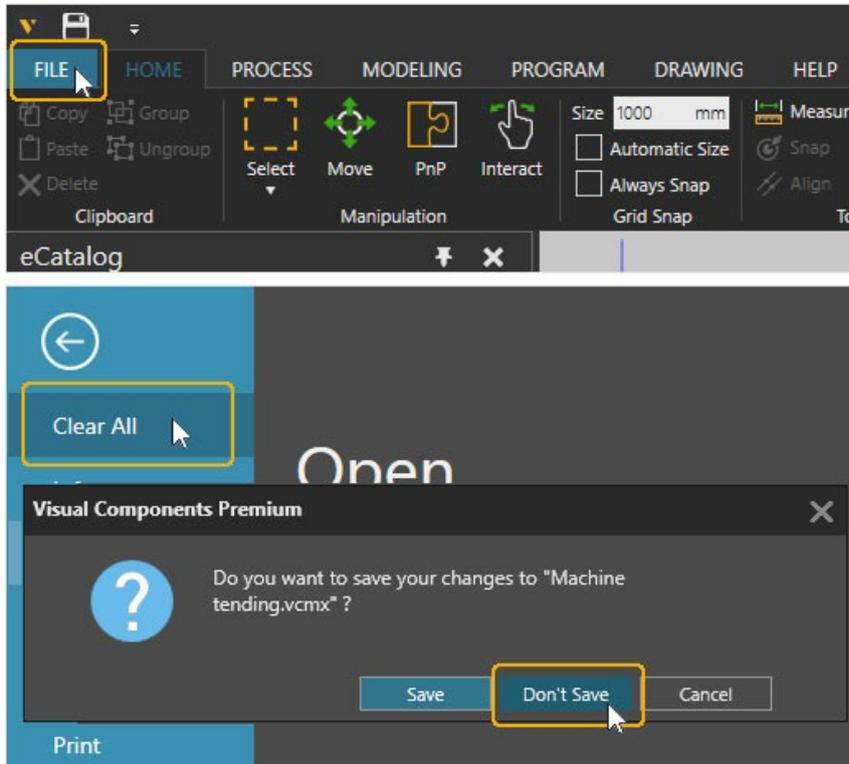

Or, if you find that the **eCatalog** and **Cell Graph** windows that appear on the left in the **Home** tab, move out of their standard position. From the **Windows** group on the right side of the ribbon, click **Restore Windows**.
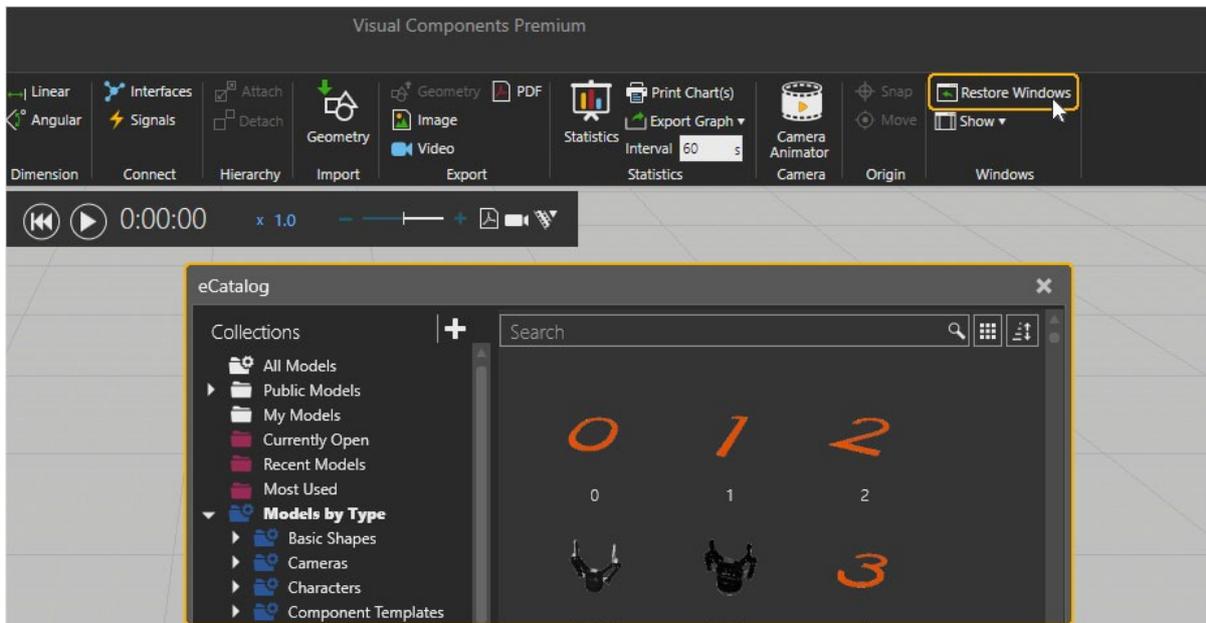
1.4. Help

1. Click the **Help** tab, which displays commands on the ribbon to access offline and online help material.
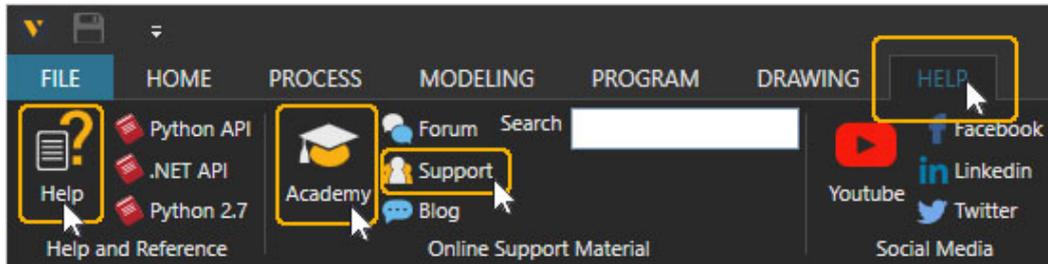

2. Do any of the following:

- To access the Help file, press F1, or in **Help and Reference** group on the left, click **Help**.

    1. It is recommended to review the *Getting Started > How It Works section*.

    2. Refer to the *User Interface* section as needed.

    3. The *Tasks* section contains mini-tutorials or how-to articles.

- To access online lessons and courses through the Visual Components Academy click **Academy**. It is recommended to complete the *Getting Started* course and subscribe to the Academy to receive notifications via email.

- To access online support or submit a support ticket at support.visualcomponents.com in **Online Support Material,** click **Support**.

    1. You can log in using the licensing account you created during registration.

    2. You can use the same licensing account to manage licenses online in the Customer Portal at license.visualcomponents.net.

    3. **NOTE!** If you do not already have a valid maintenance agreement, you can still submit a support ticket by emailing support@visualcomponents.com.

- To ask questions, find answers, and discuss Visual Components products, in the **Online Support Material** group, click **Forum** to open a web browser and visit the Visual Components Forum at forum.visualcomponents.com. It is recommended to register an account to upload and download attachments and create and reply to Forum threads.

1.5. eCatalog

1. Click the **Home** tab, which displays a view for building a layout and running simulations in the 3D world.
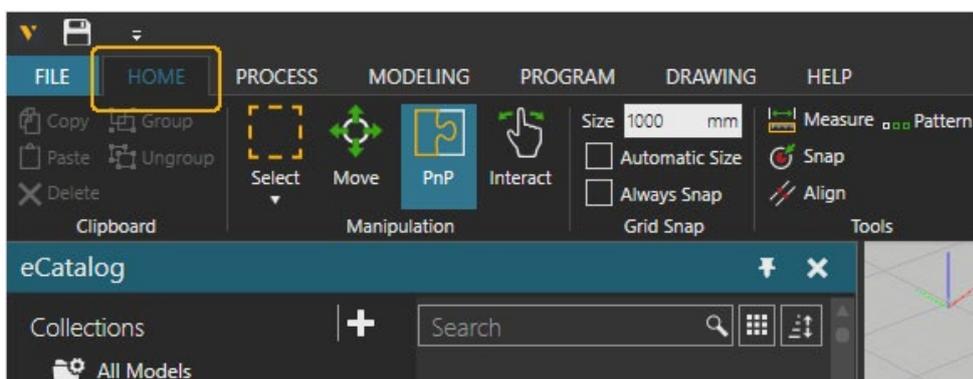
2. In the **eCatalog** panel **Collections** view, you can do the following:

- Expand **Models by Type**, a smart collection that uses metadata to group items first by type and then by manufacturer.

- Then scroll down and expand **Models by Manufacturer,** which groups items first by manufacturer and then by type.

- Both smart collections are hard-coded and reference the **eCatalog** source in the *Models* folder in the Public Documents on your PC.
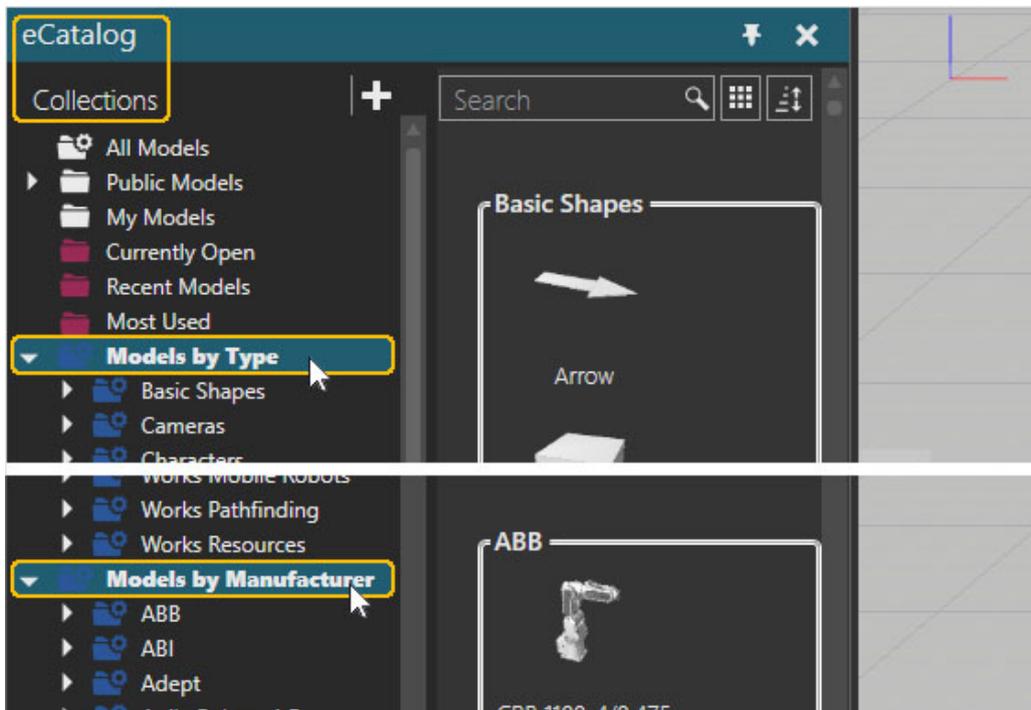
- Your **eCatalog** content is linked to a *Models* folder in the Public Documents on your PC under the following example path:
  C:\Users\Public\Documents\Visual Components\%version%\Models

- This directory contains a local copy of the Visual Components Web eCatalog. This directory is synchronized with the online library every time you start the application.

- **NOTE!** Your personal *My Models* folder is located on your PC under the following example path:
  C:\Users\%username%\Documents\Visual Components\%version%\My Models

2. Basic Controls

We will begin by selecting a single component from the eCatalog while learning the basic controls. And later, we can try a saved layout, which you can use to run simulations.
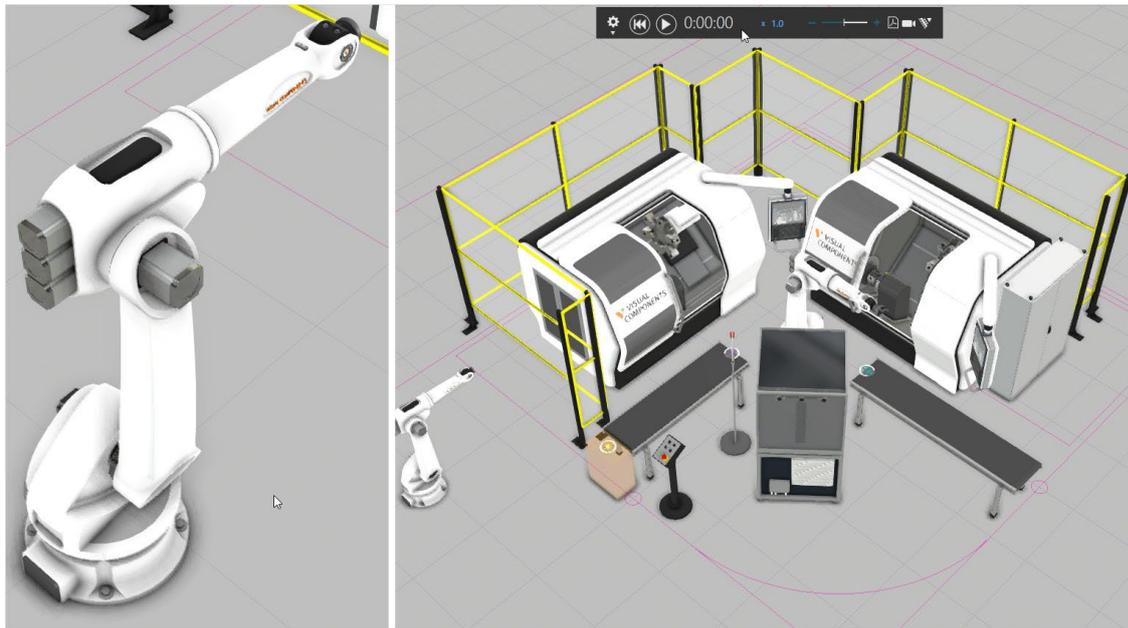

2.1.   Basic Controls

Generally, you would use a mouse and keyboard with a Visual Components product.

1. To load an example component from the **eCatalog** into the 3D world, click the **Home** tab, and from the **eCatalog** panel, **Collections** view, expand **Models by Type**. And then, for example, in the **Robots category,** select **Visual Components**.
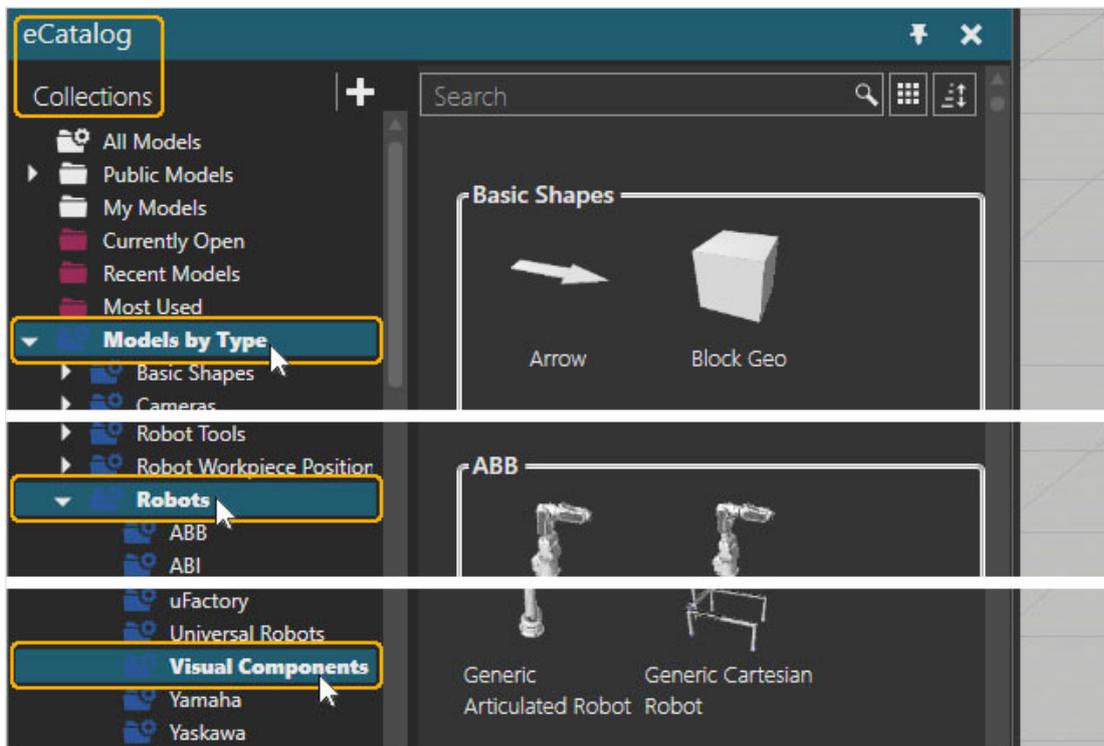
2. Then from **Visual Components**, double-click on the **Generic Articulated Robot** to load it into the 3D world.
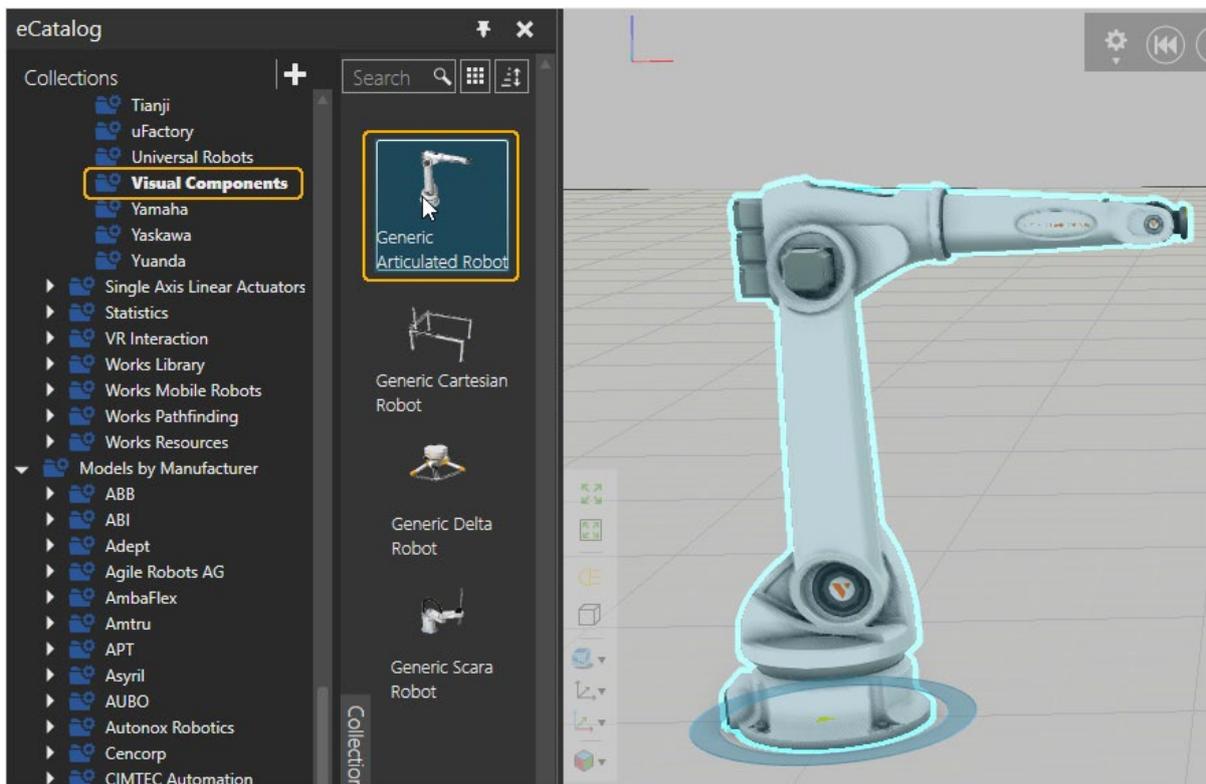

3. Or drag-and-drop the **Generic Articulated Robot** and use your mouse cursor to specify where in the 3D world you would like to place the component.
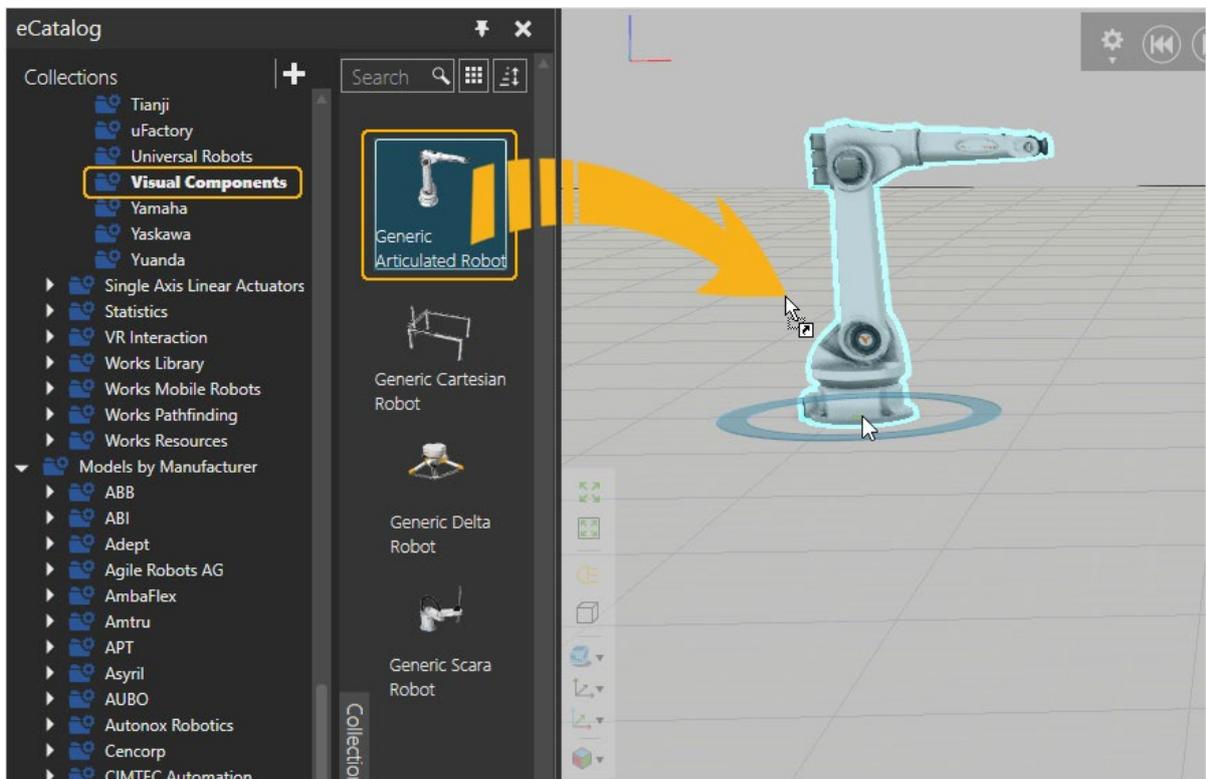
4. To fill your view with the selected robot, from the 3D world toolbar on the left, click **Fill Selected.**


5. Or, if your 3D world view includes multiple components, from the 3D world toolbar on the left, click **All (Ctrl+F).**
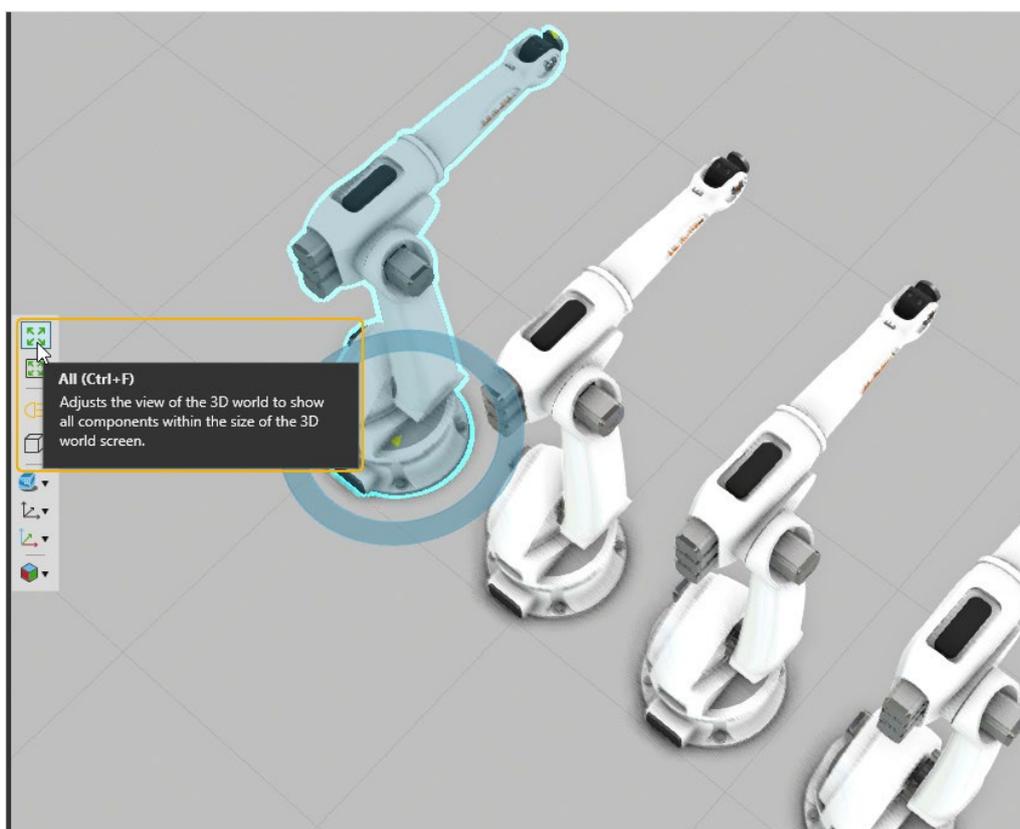
6. Use the following mouse and keyboard controls to interact with your view in the 3D world:

- **To rotate the camera:**
  Hold down your right mouse button (RMB) and try moving your mouse in all directions.
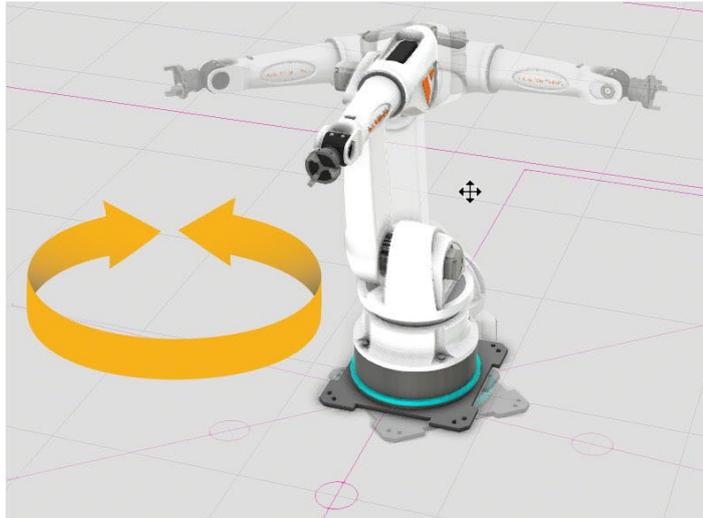

- **To pan the camera:**
 Hold down your left and right mouse buttons (LMB+RMB) and try moving your mouse in all directions.
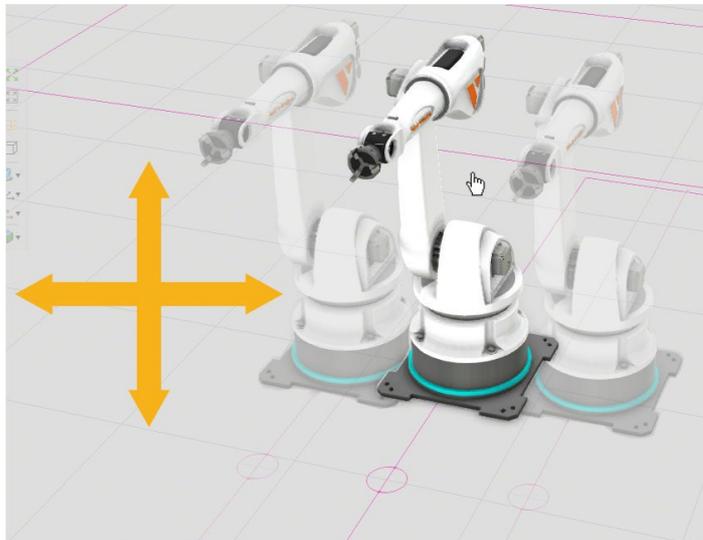
- **To zoom the camera:**
  Rotate your mouse wheel.

 Or holding SHIFT, with your right mouse button (SHIFT+RMB), drag your mouse back and forth.
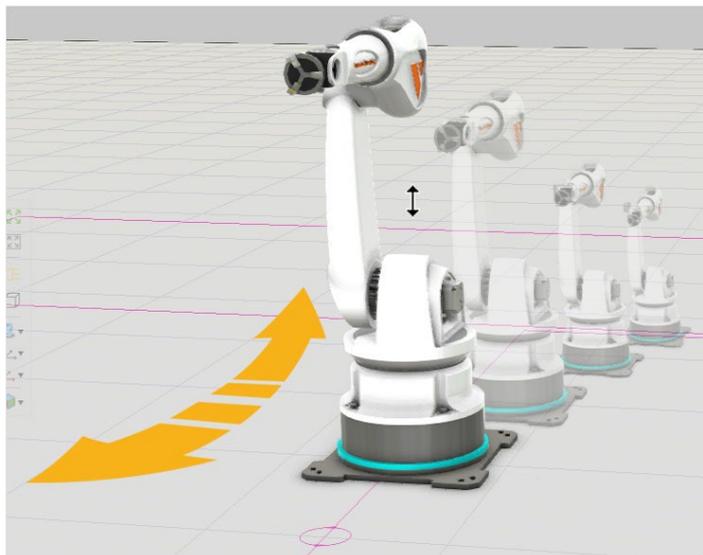
7. To set center on an object, such as a robot tool, holding CTRL, right-click on the component. Or right-click on the component and select **Center in 3D View**.


2.2. View Selector

A **Floating Origin** and **View Selector** indicates your point of view in the 3D world.

1. The **Floating Origin** in the upper left corner of your 3D world view represents the X, Y, and Z axes of the world coordinate system.

2. The **View Selector** in the lower-left corner of your 3D world view, represents six standard views joined together to form an interactive navigation control.

- **NOTE!** The **View Selector** highlights a standard view if it resembles your current view.
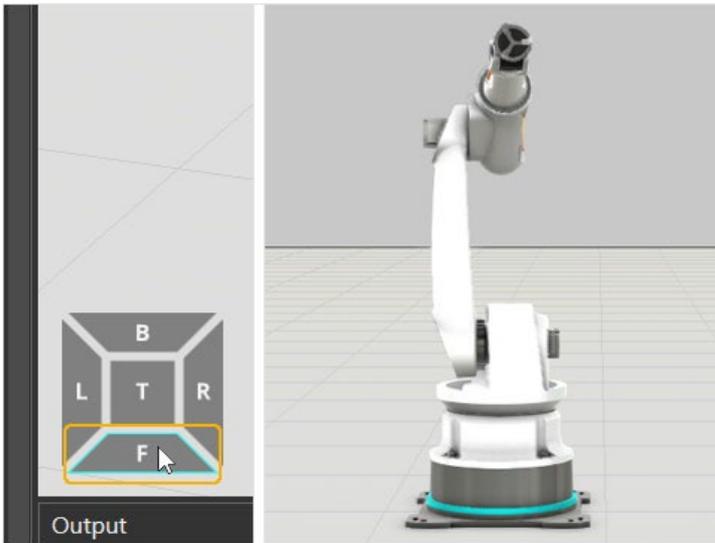
- **Top** and **Down** views share the same square: one-click for **Top** and double-click for **Down**. In **Top** view, each click will rotate the camera 45 degrees.
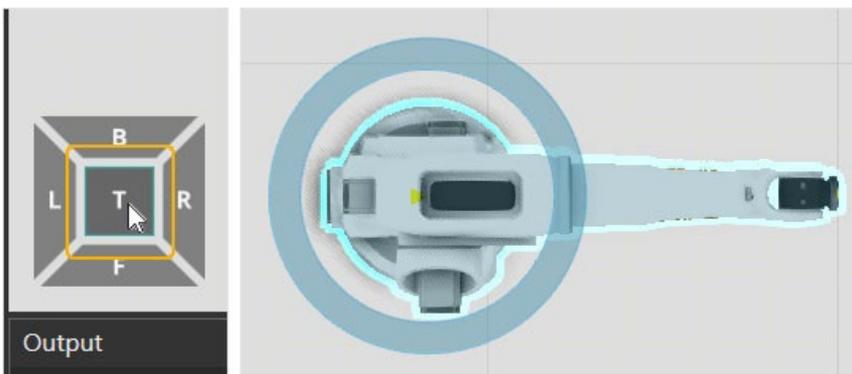
- A standard view's inner and outer edges can be used to select a view adjacent to two sides.

- The corners of a standard view can be used to select a view adjacent to three sides.
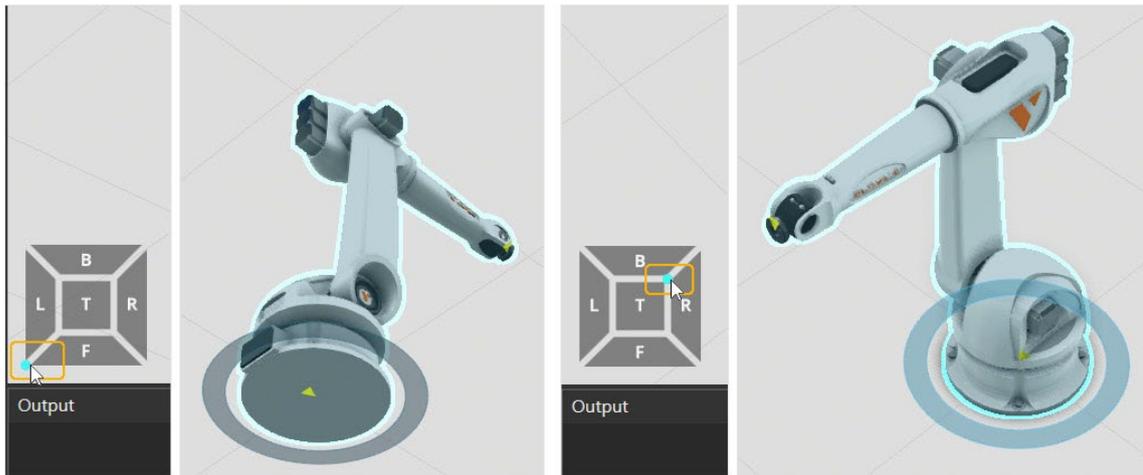
2.3.   Controlling Layouts

Before continuing, you may want to clear your 3D world view of any components. As we noted in section 1.3 above, to start from the beginning, select the **File** tab, click **Clear All**, and then click **Don't Save**.

1. To load an example layout from the **eCatalog** into the 3D world, click the **Home** tab, and under **Models by Type**, select **Layouts**.
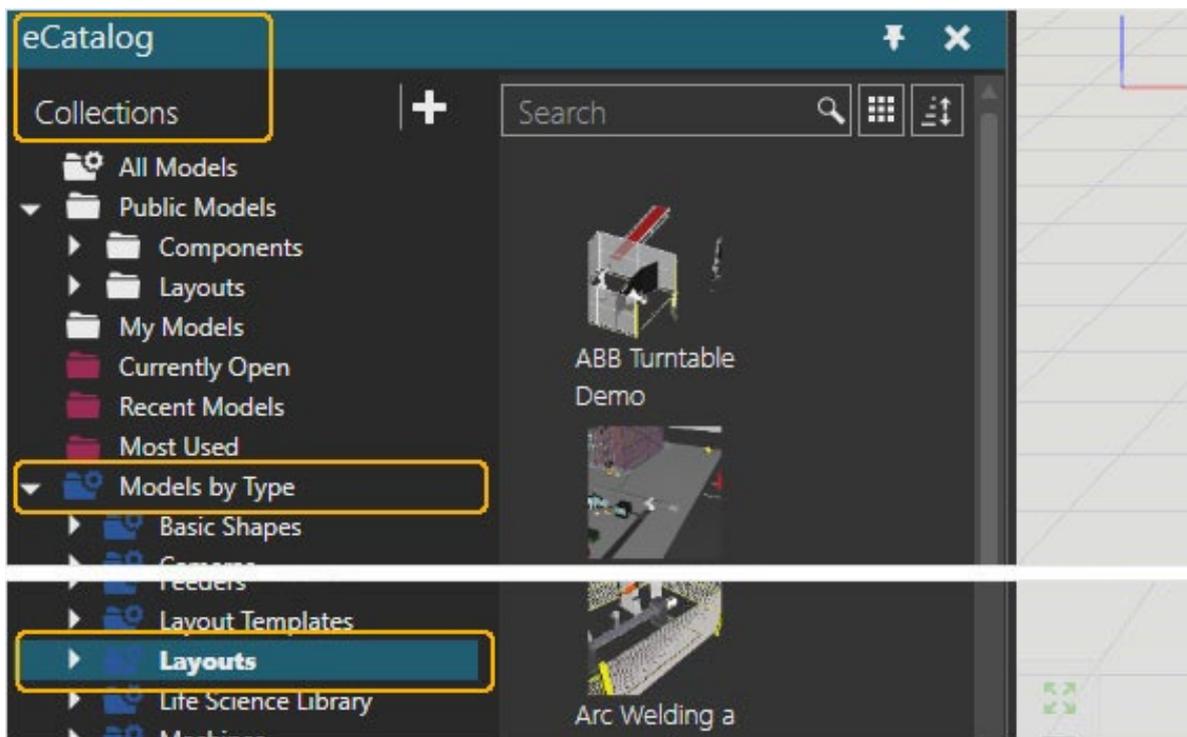
2. With **Layouts** selected, search by typing *machine*, and select the **Machine Tending** layout. Then double-click on the layout icon to load it into the 3D world.
**NOTE!** You can also drag-and-drop a layout; however, you cannot use your cursor to specify its location in the 3D world, as the layout's default location is predefined.
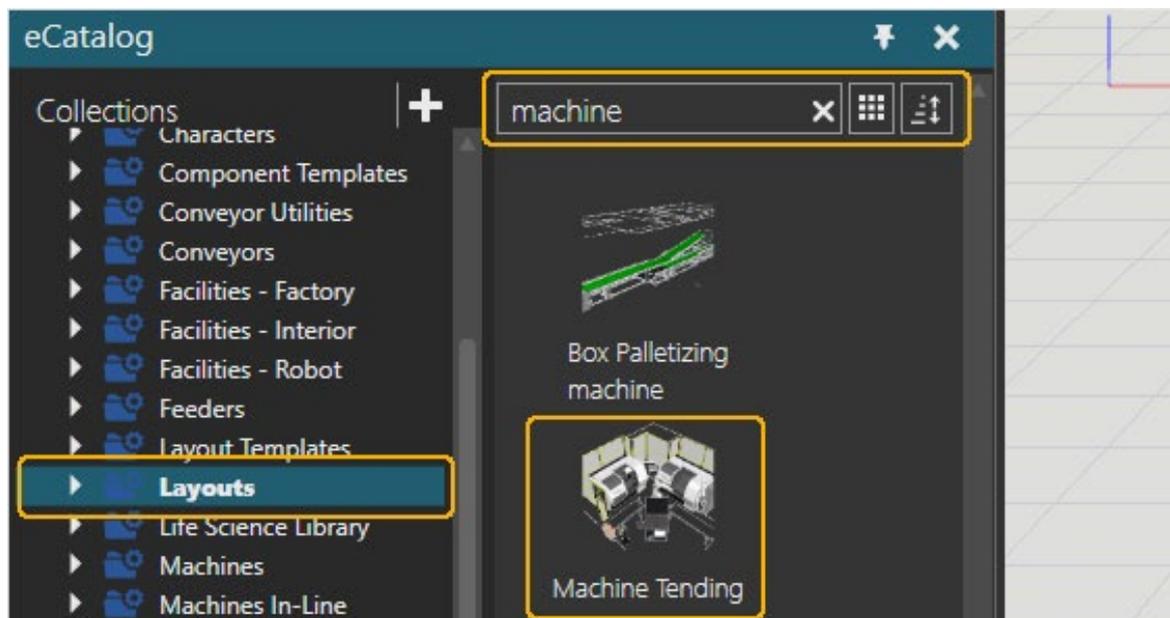

**3.** You should now have the **Machine Tending** layout loaded into the 3D world.
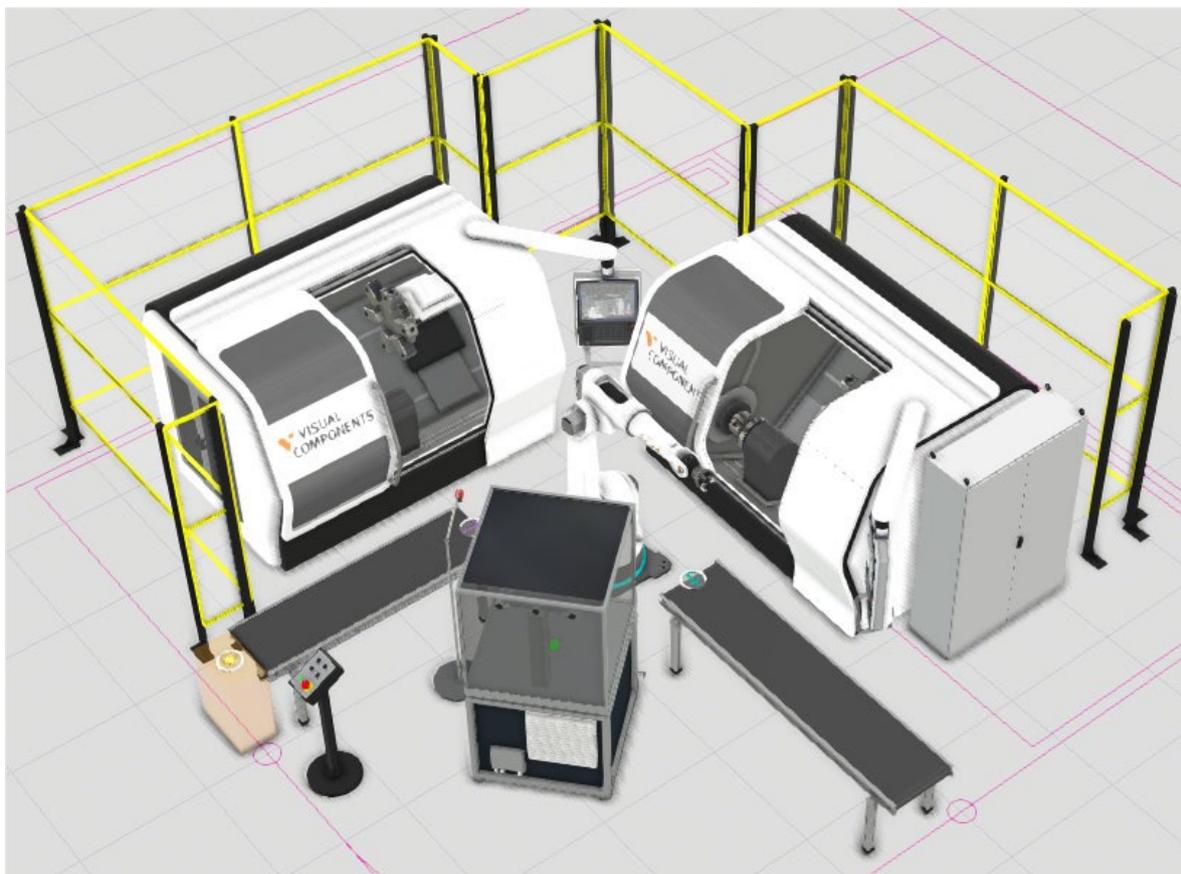
4. **NOTE!** At this point, you can choose either the **Select**, **PnP** (Plug and Play), or **Interact** tools from the **Manipulation** Group in the **Home** tab. In this example, we will use the **PnP** tool.
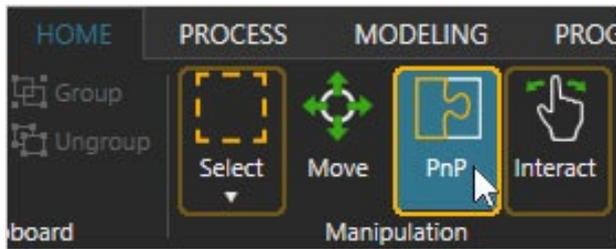

5. In the 3D world, left-click select the robot in the center of the layout. The selection is highlighted, and its attributes are displayed in the **Component Properties** panel over on the right.
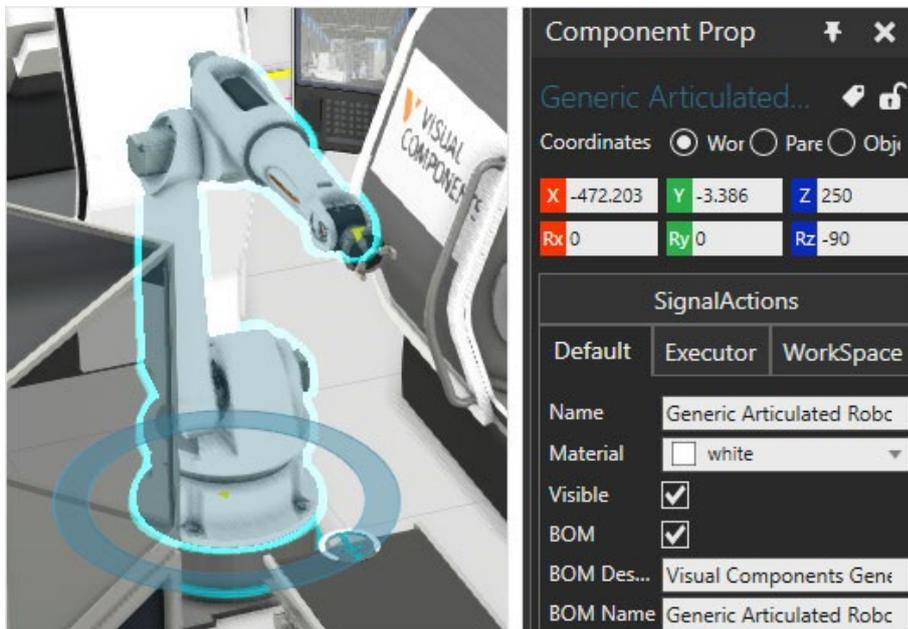

6. With the robot selected, you can now try adding another machine to the current selection. Holding your CTRL key, left-click on another machine to add it to the selection.

7. You will now have two components selected. To remove the second machine from the selection, holding your CTRL key, left-click on it once more.
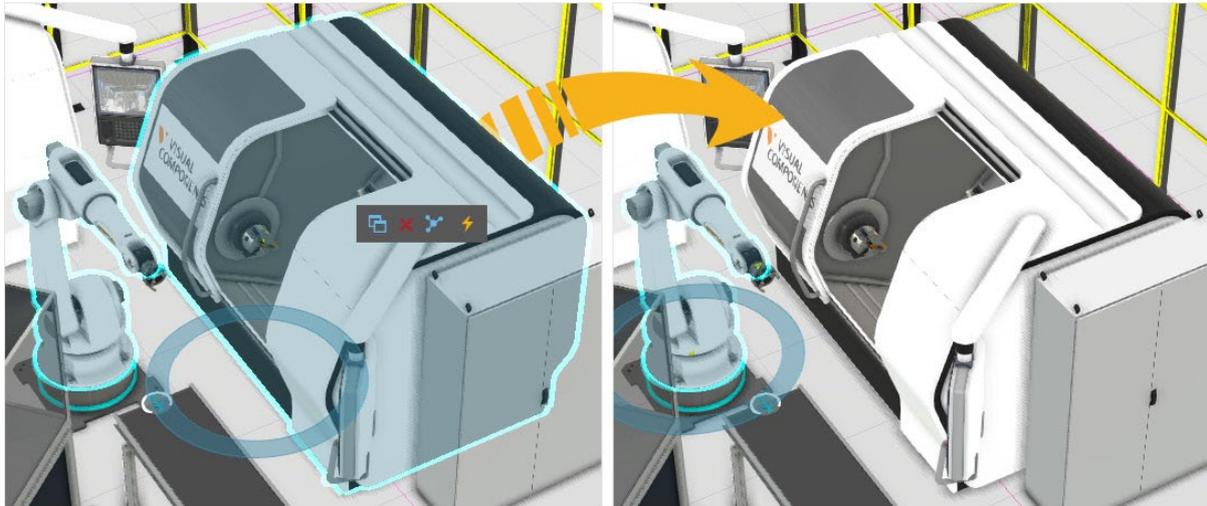
8. **NOTE!** If selected objects have common properties, you can edit them if their values are not unique. For example, in the **Component Properties** panel on the right, **Name** is a default property with a unique value.
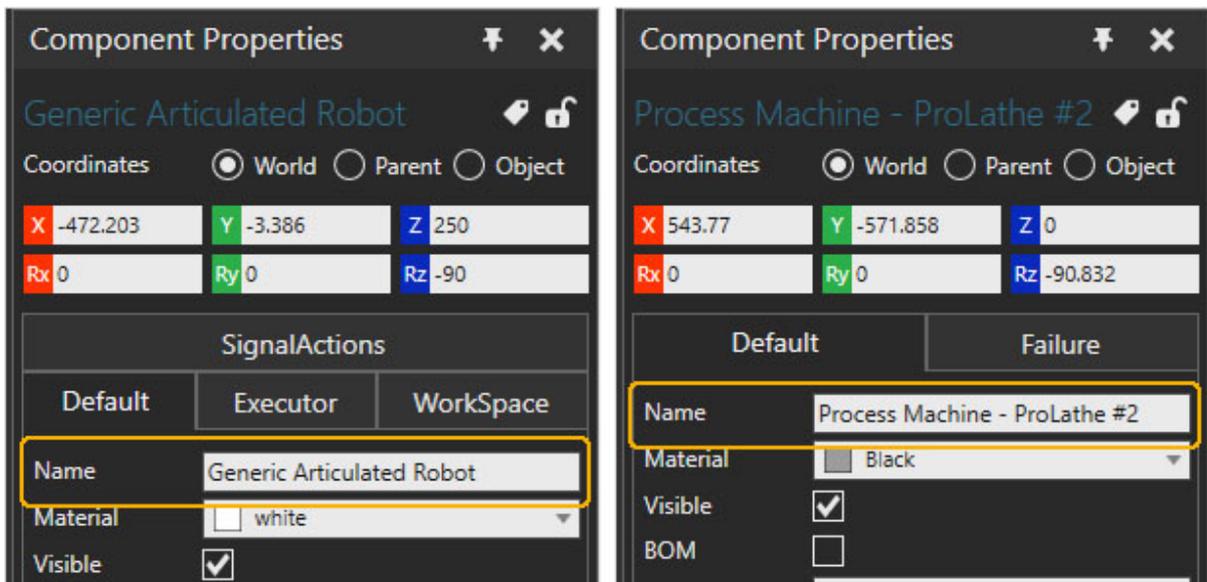
3. Manipulation Controls

The **Manipulation** group on the ribbon contains different modes for manipulating objects. Depending on the context of the scene you are in, you may have tools for either selecting, moving, connecting, or interacting with components.

3.1.   Manipulation group

The **Manipulation** group with up to three individual tools appears in the **Home**, **Process**, **Modeling** and, **Program** tabs.
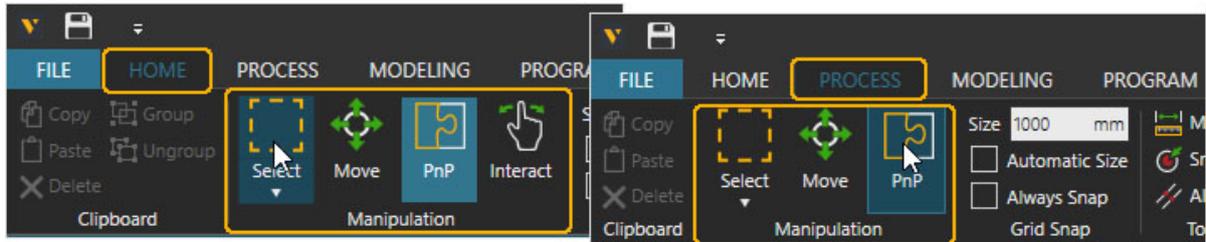

3.2.   Selection

The **Select** tool only selects objects in the current context, for example, components in the 3D world.

1. On the **Home** tab, in the **Manipulation** group, click **Select**. We will choose the Feeder component from the **Machine Tending** layout in this example.
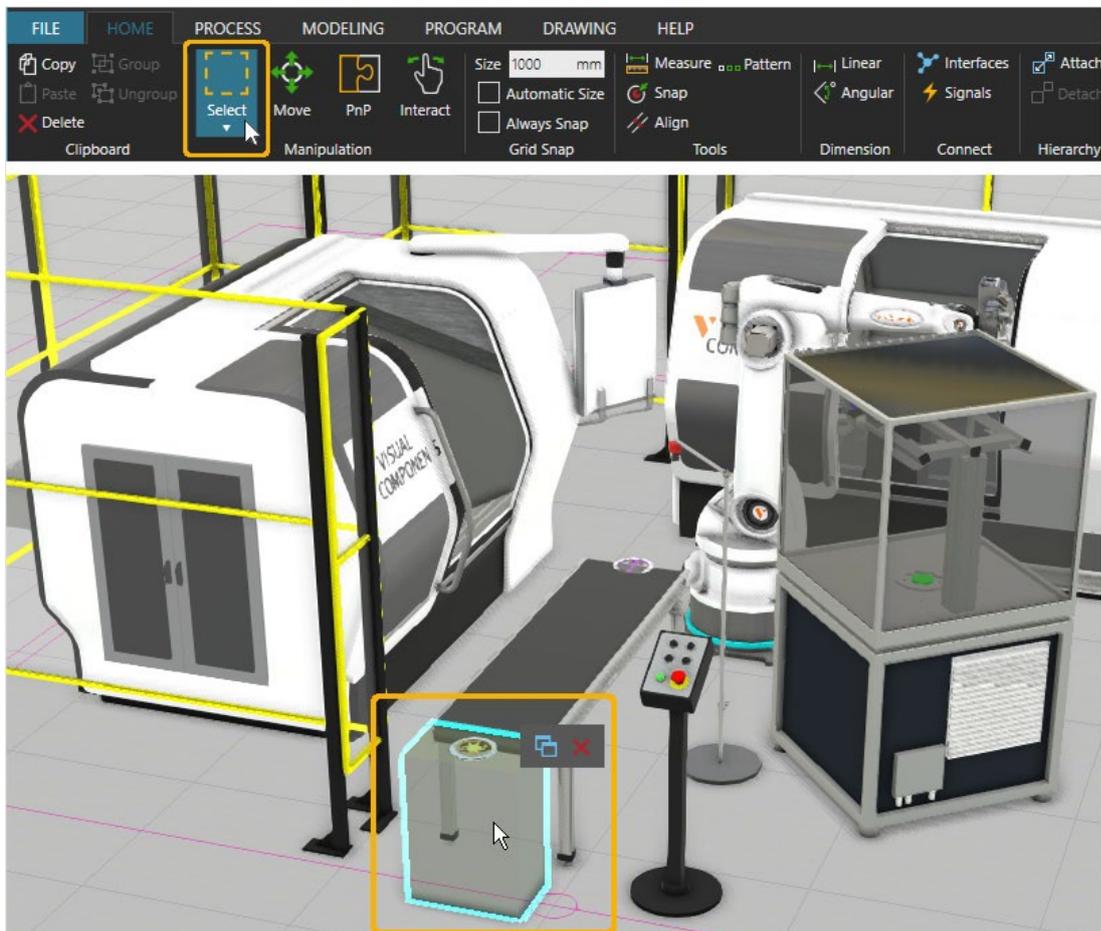
2. To select the Feeder from the layout in the 3D world, drag your cursor to make an area selection around it.
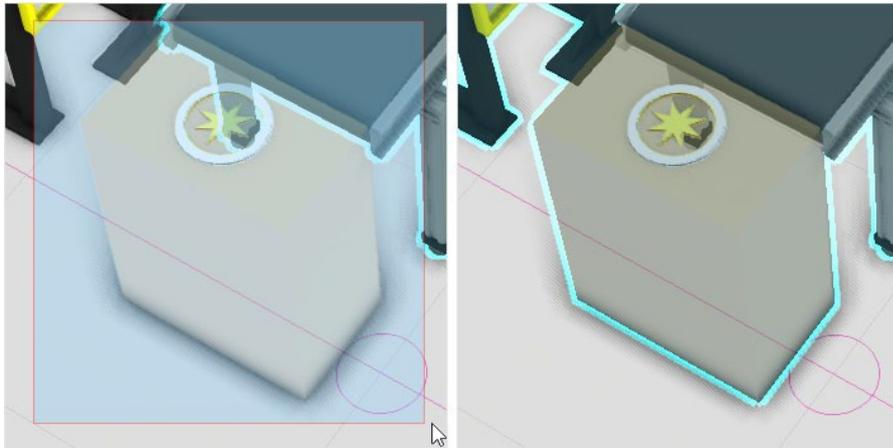

3. Then, click the floor to remove the selection.
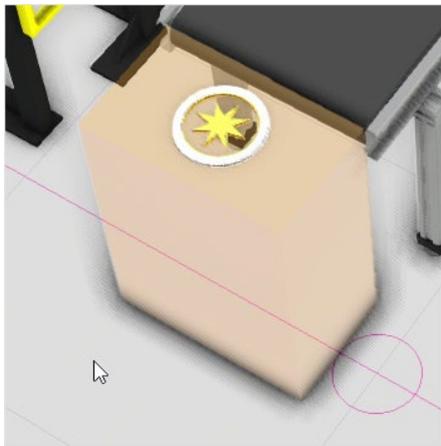
3.3. Movement

1. The **Move** tool displays an all-in-one tool for moving selected components.
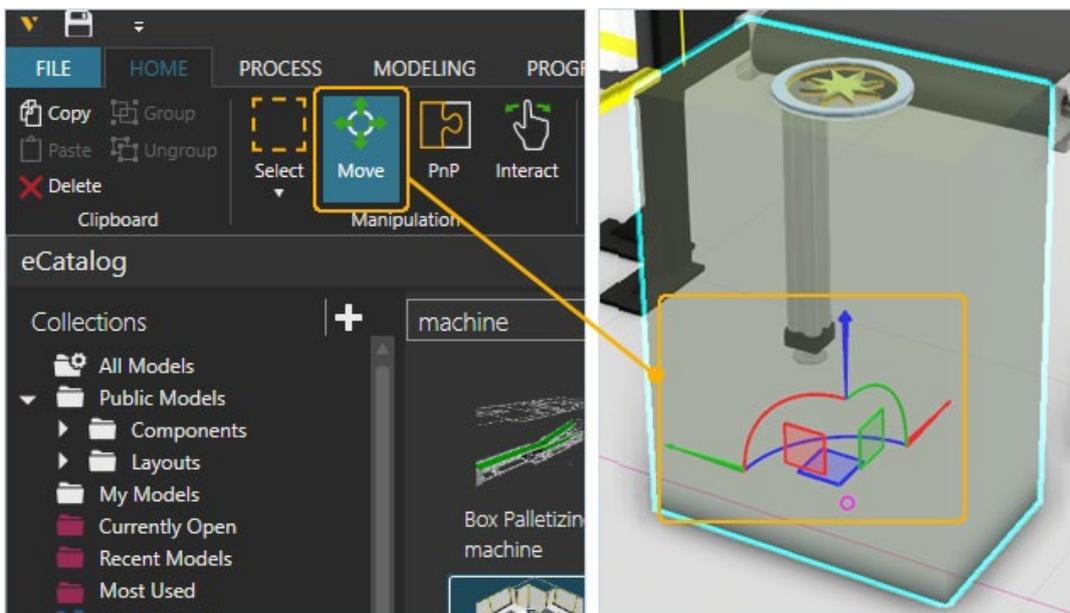
2. The arrows are for moving a selection along a single axis.
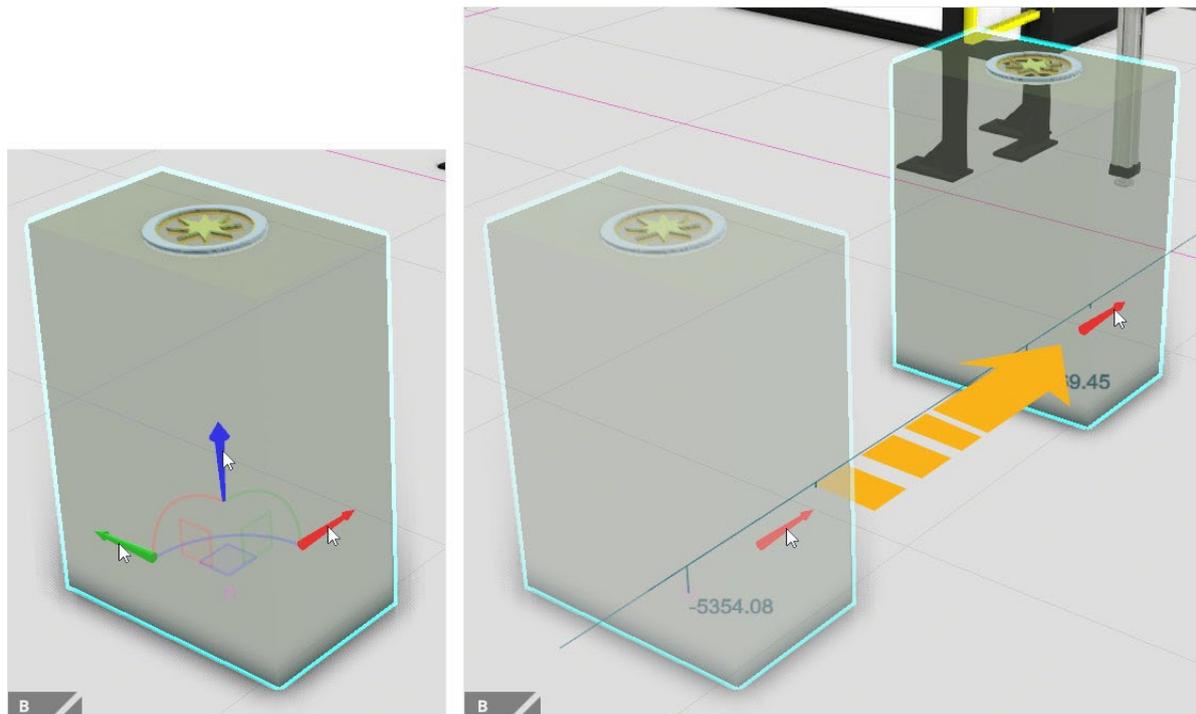


**3.** The squares are for moving a selection in a plane formed by two axes.
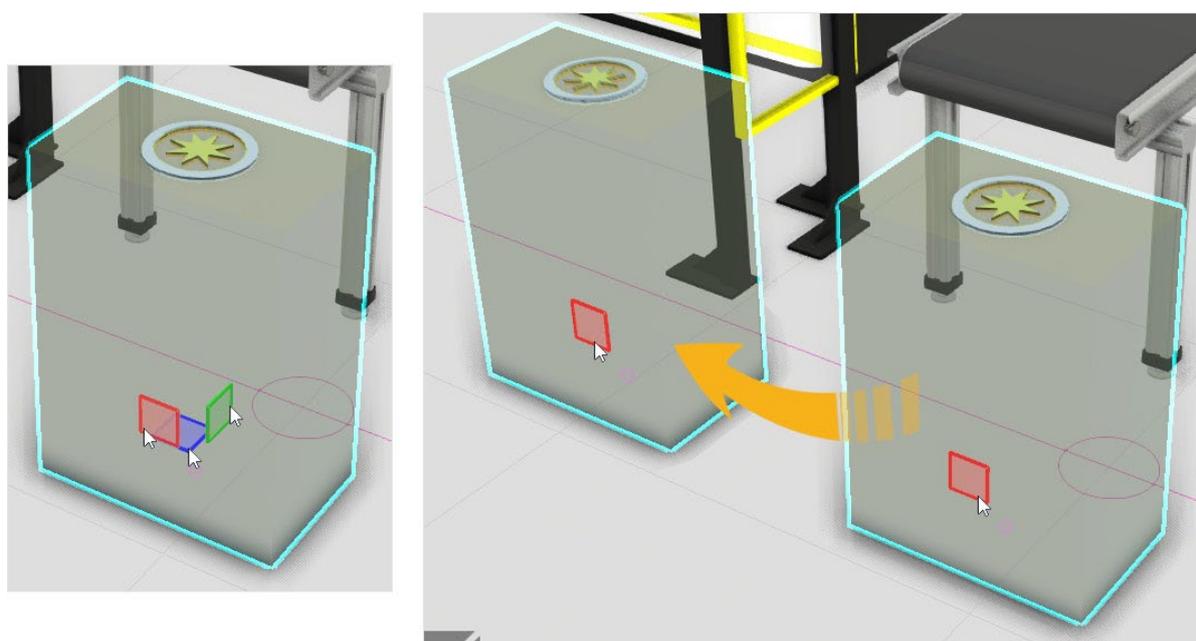
4. The arcs are for rotating a selection around an axis.
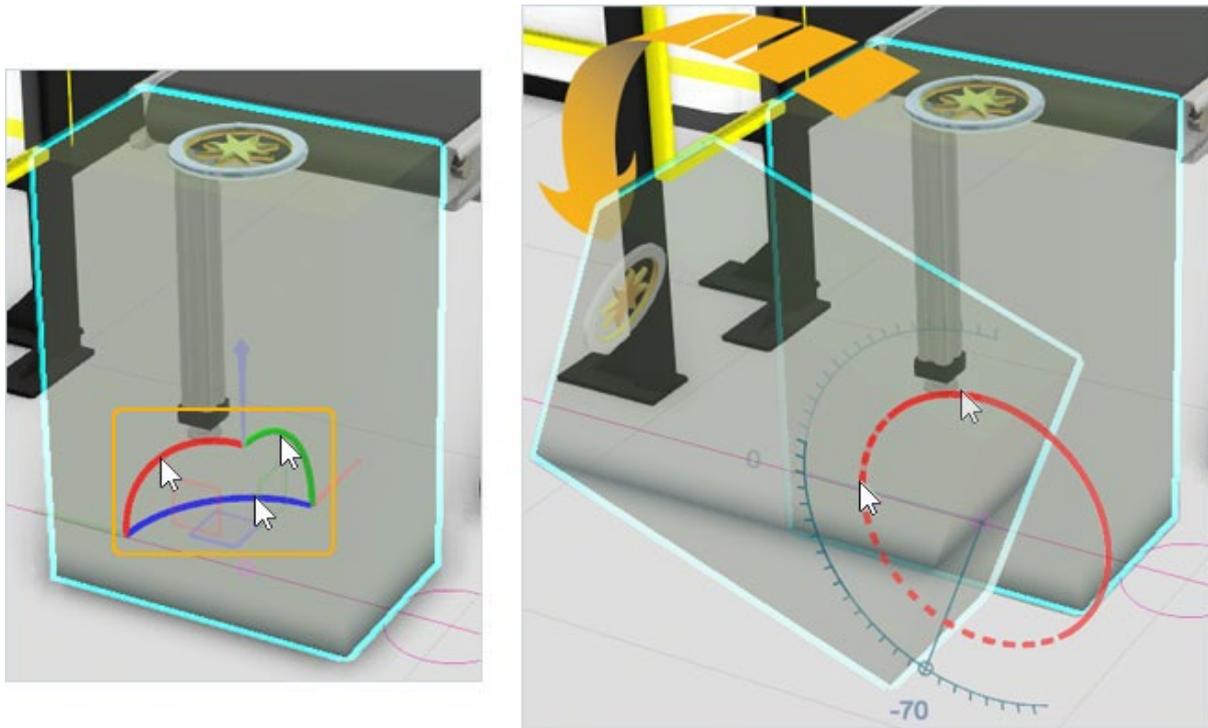
**5.** The ring (also known as torus or origin) can directly move a selection to your desired location.
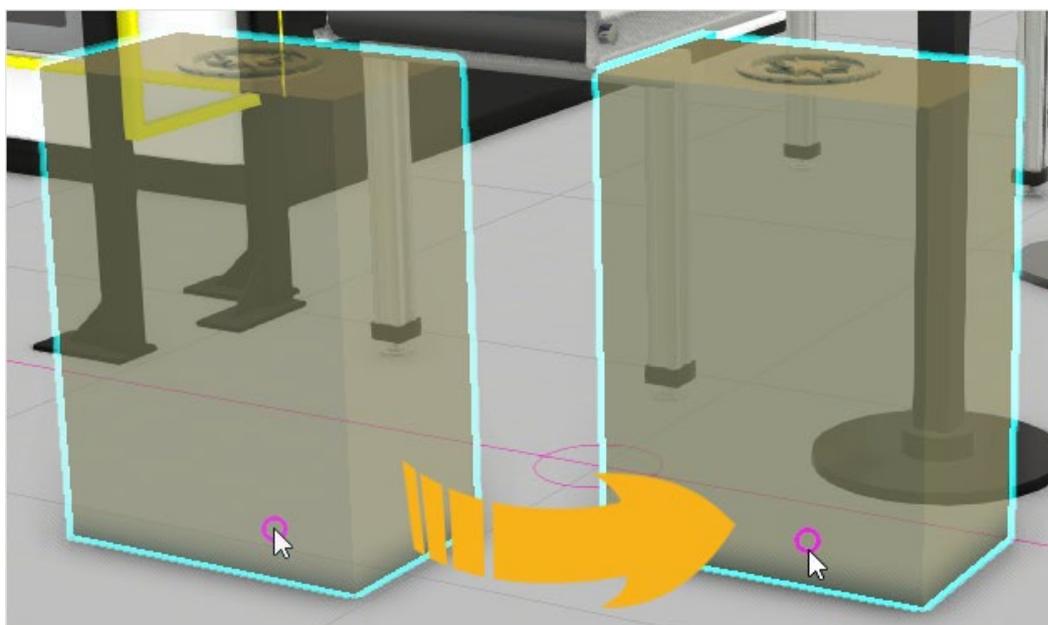
**6.** The ring can also be used for snapping a selection to an object in the 3D world.
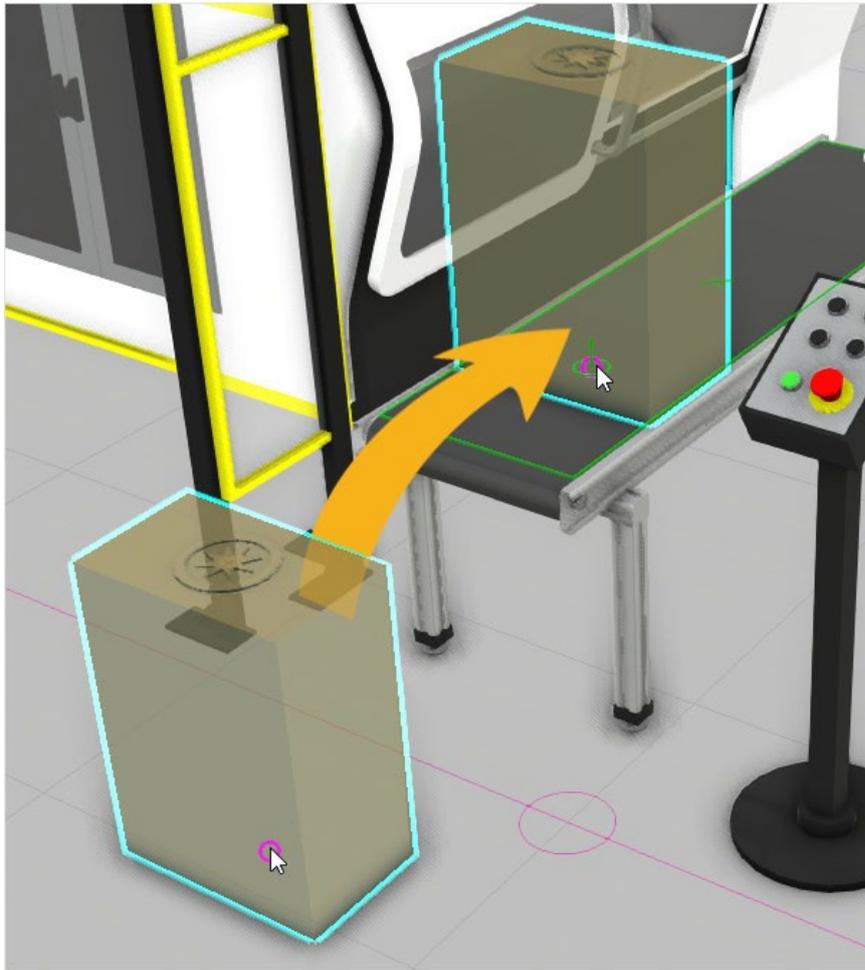
7. Select the **Cell Graph** panel from the lower-left corner of the application window. Then above from the **Machines** category, double left-click on **Process Machine - ProLathe** to select the component in the 3D world.
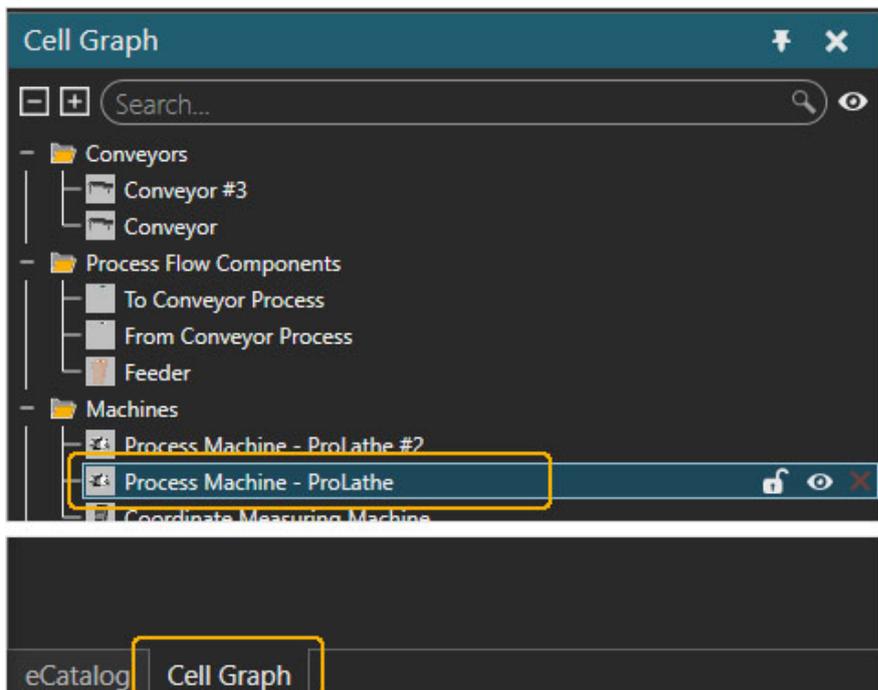
8. With the **Process Machine - ProLathe** from the **Machine Tending** layout selected, from the **Home** tab in the **Manipulation** group, select the **Move** tool, which will appear at the origin of the currently selected component.
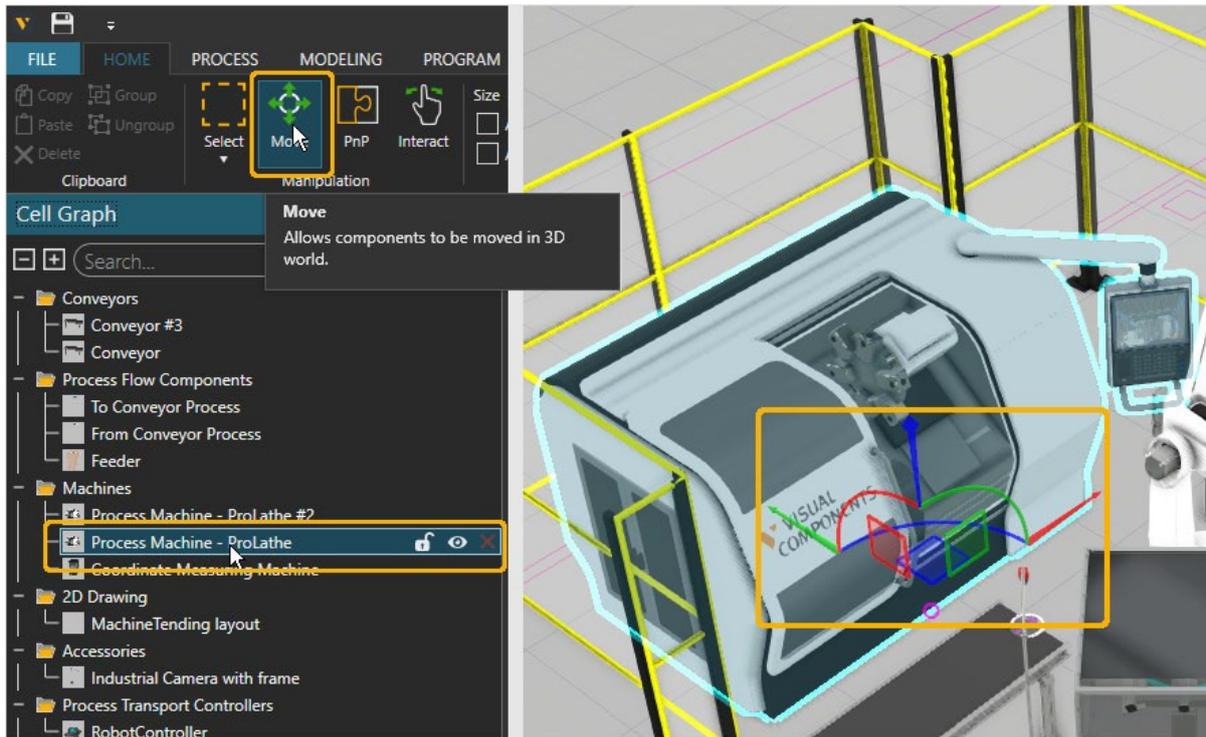

9. Then in the 3D world, drag the blue square to move the machine along its XY plane.
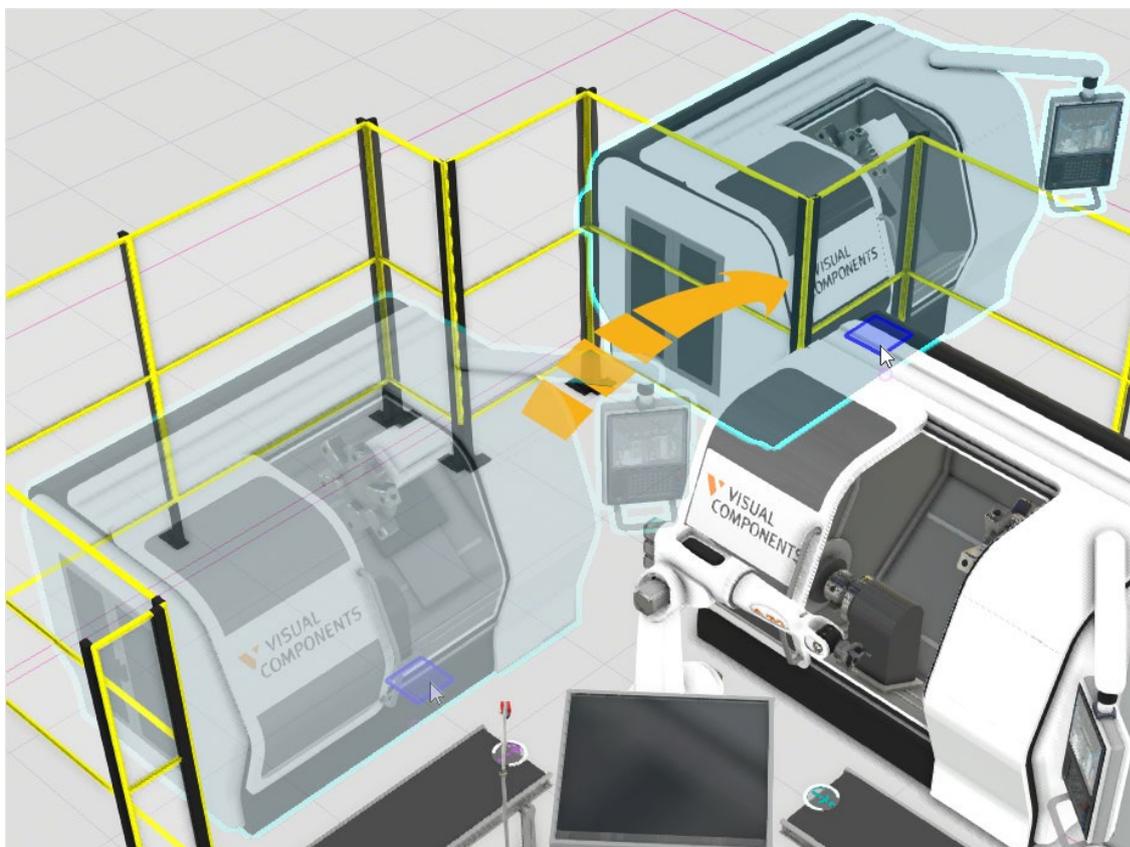
10. Then press CTRL + Z to undo the last action, returning the machine to its original location.

3.4. Plug and Play

The **PnP** (Plug and Play) tool is used to plug components into one another, creating a physical connection, and the plugs are known as interfaces.
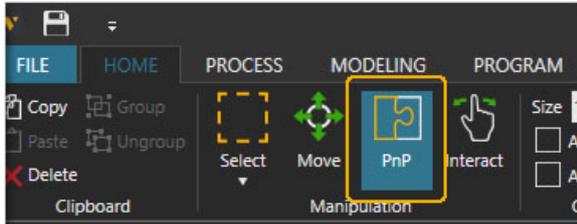
Compatible components will snap together at their connected interfaces. A selected component shows its interfaces as yellow or green arrows. Yellow indicates an available connection, while green indicates an active connection.
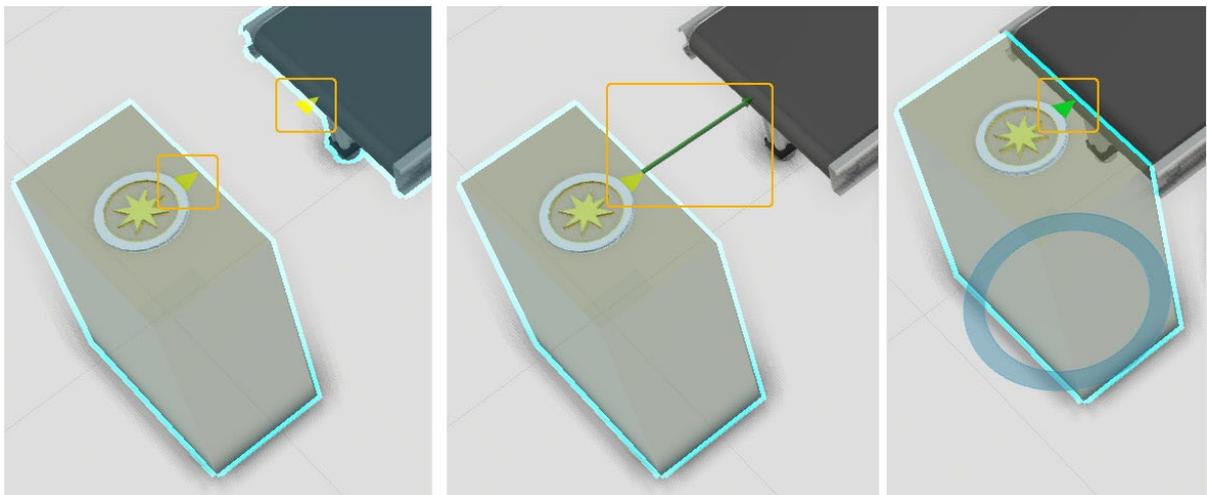
1. In the 3D world, from the **Cell Graph** in the lower-left corner, select the **Feeder**.
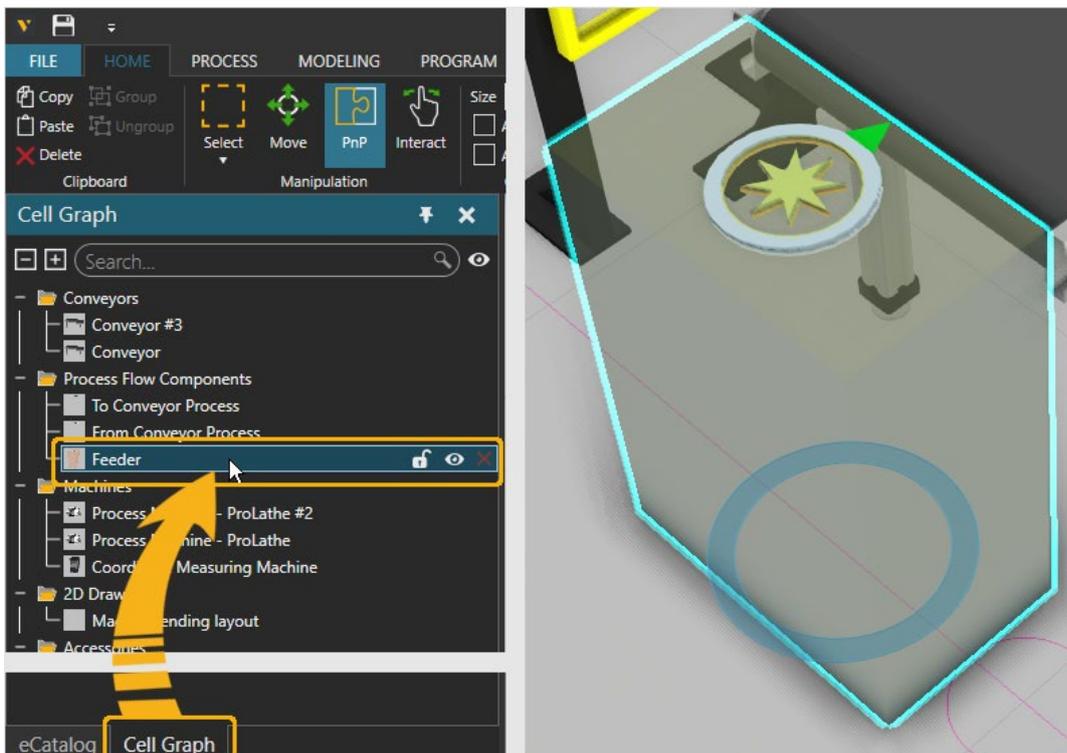
2. From the **Manipulation** group on the **Home** tab, select the **PnP** tool, which displays a ring around the feeder that you can use to rotate the component in its place. Generally, this ring is used to help connect interfaces and deal with angle and distance tolerances for establishing connections.
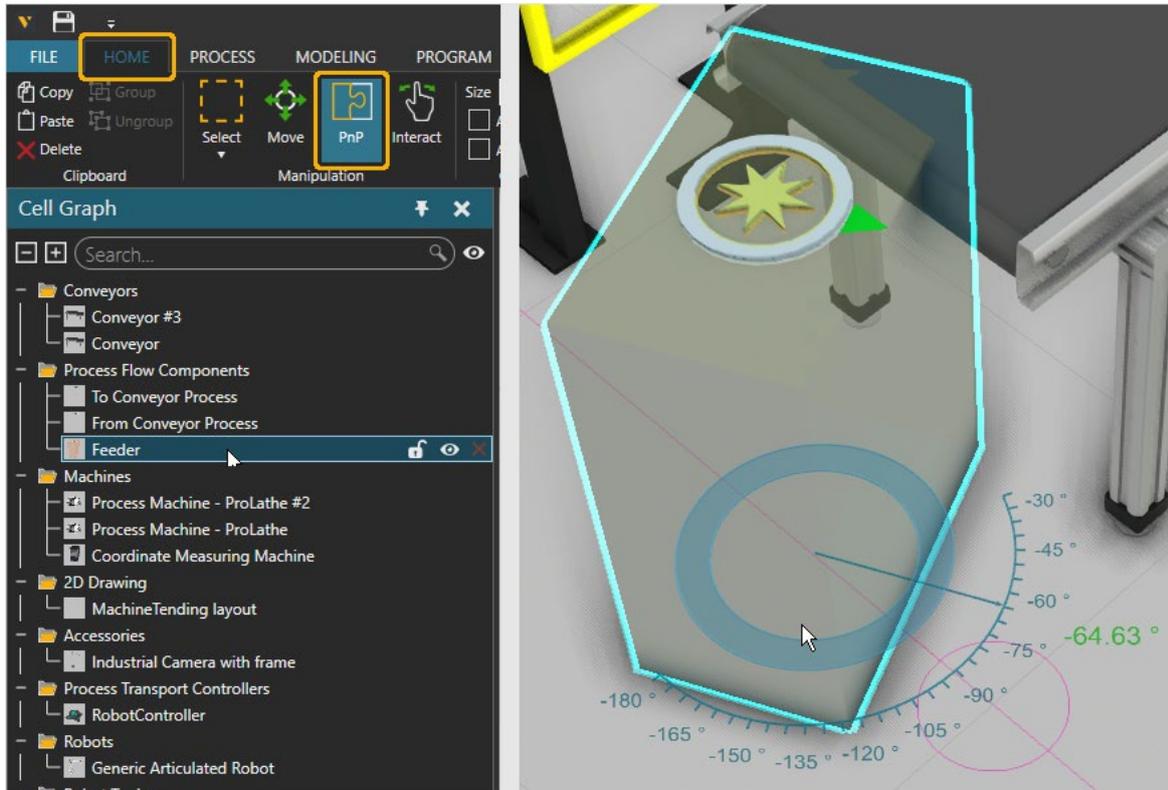
3. In the 3D world, drag the feeder away from its adjacent conveyor to unplug those components. The **PnP** tool allows you to move a selected component freely.
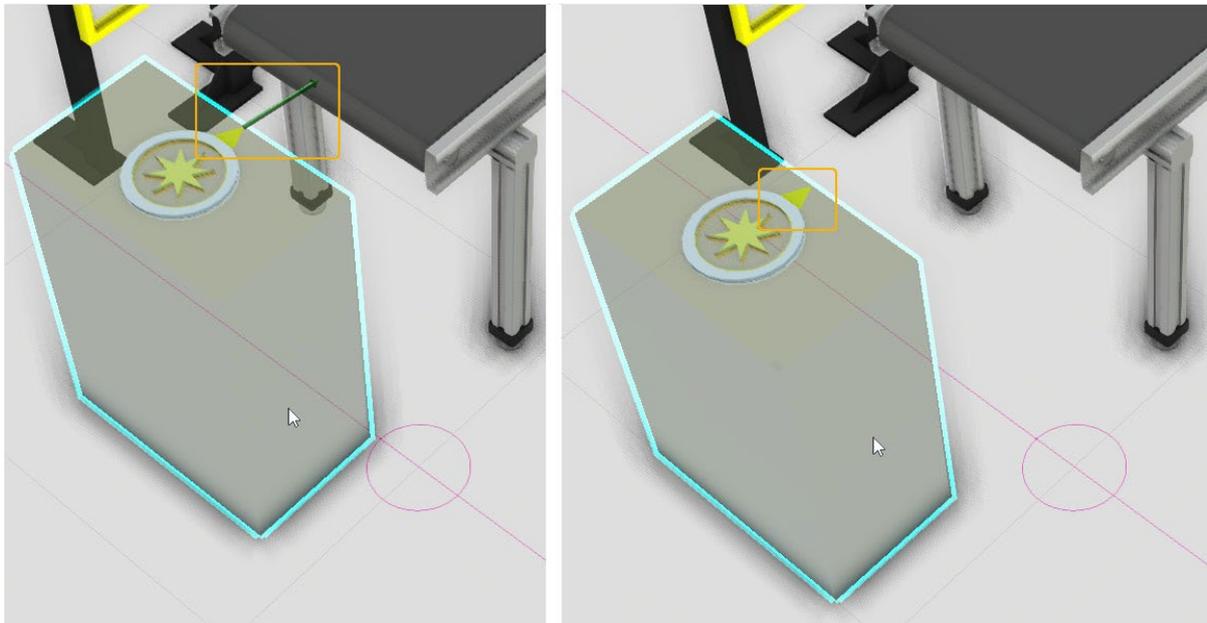
4. Then drag the feeder back toward the conveyor until a green arrow points from the feeder that snaps to the conveyor.
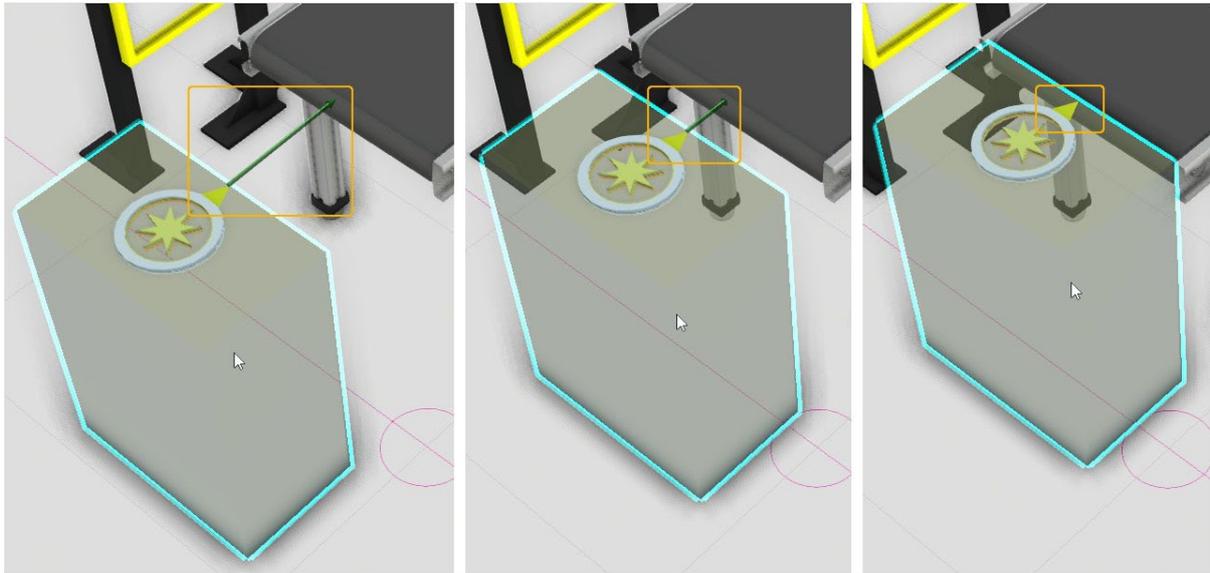
3.5. Interaction

The **Interact** tool is used to jog or move interactive parts of components. For example, you can interact with the joints of a robot.

1. Select the robot in the 3D world, and from the **Manipulation** group on the **Home** tab, click **Interact**. The pointer will change to a hand icon when you hover over an interactive element in the 3D world.

2. Then using the **Interact** tool, place your cursor over the robot's joints and try manipulating them.
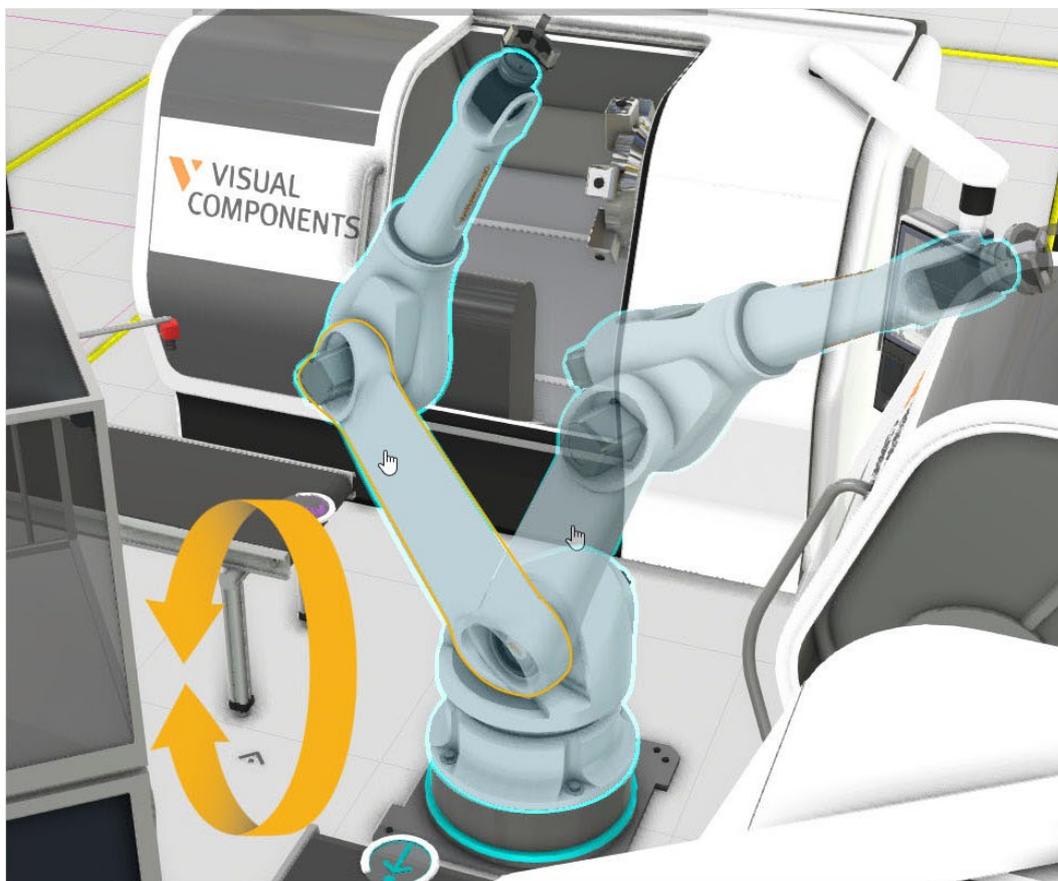
3. You can also try manipulating other components in the layout, such as the door of a **Process Machine - ProLathe**.
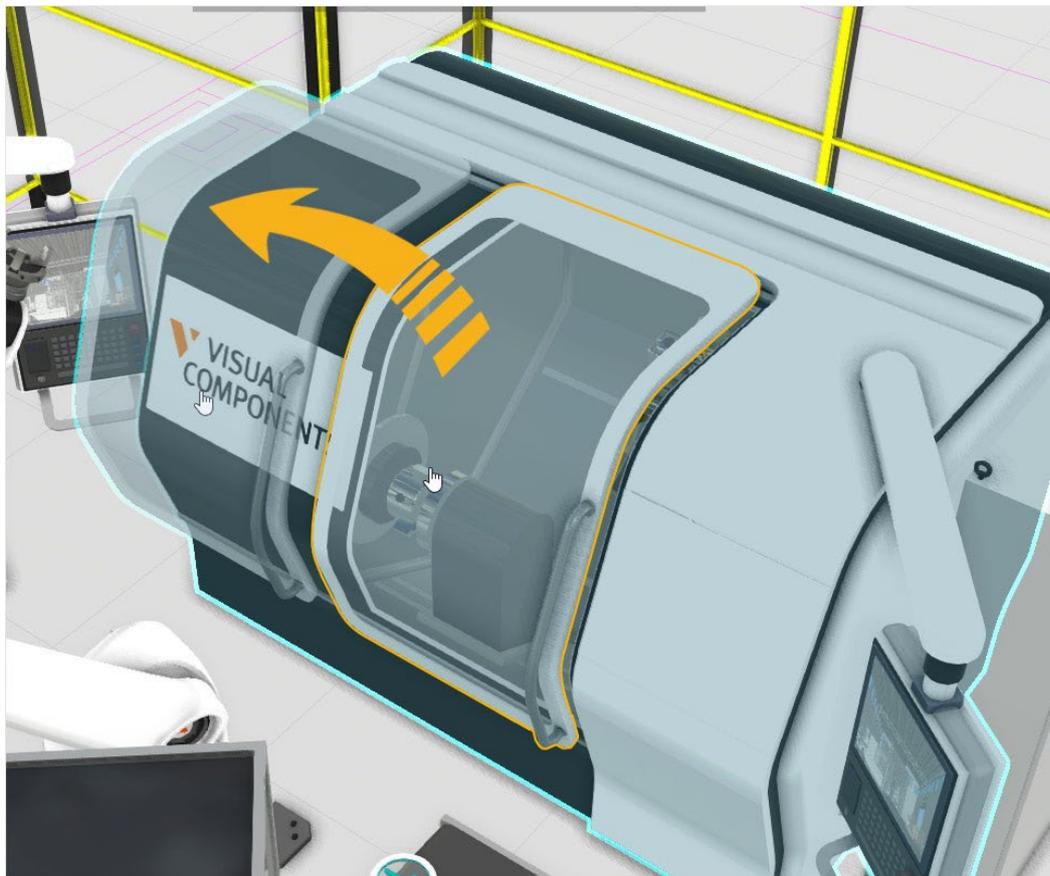
4. Or try manipulating some of the other elements of a **Process Machine - ProLathe**.
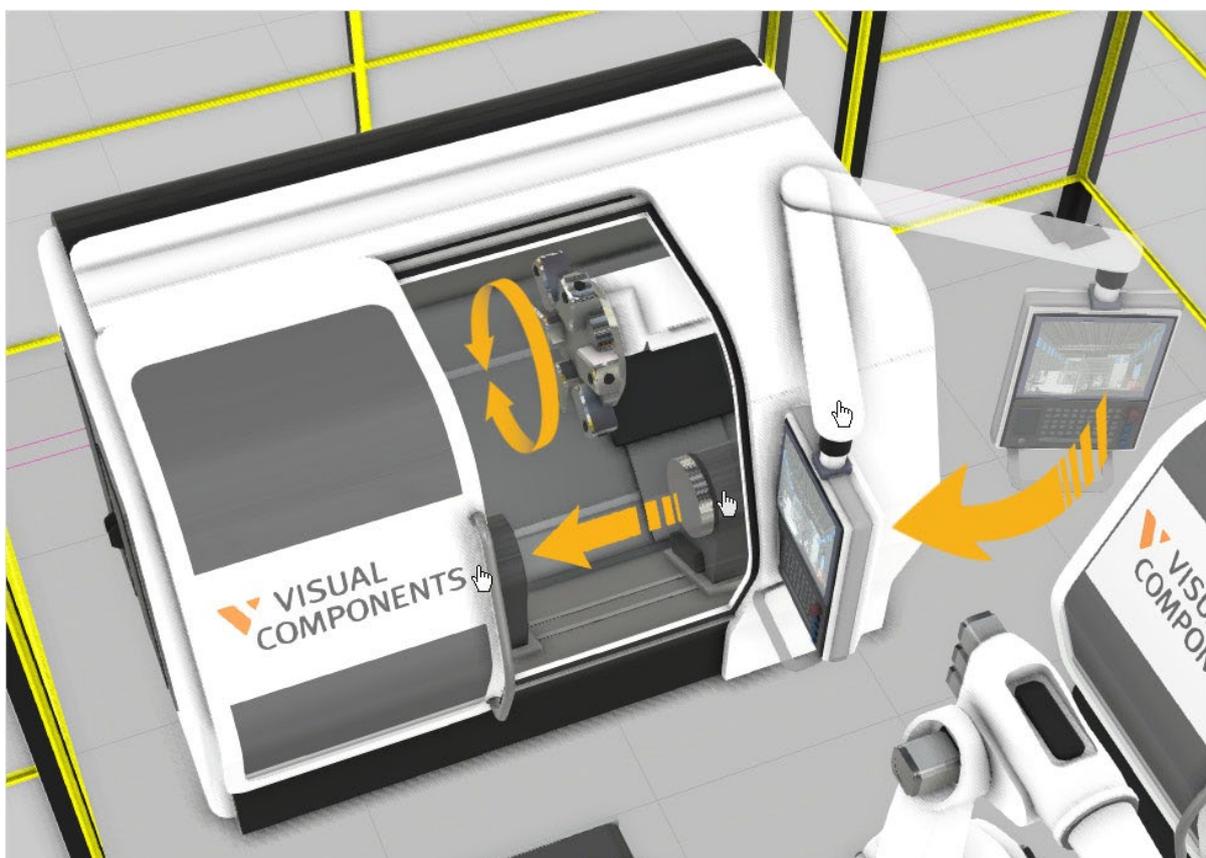
4. Simulation Controls

The Simulation controls for running and recording simulations are at the top of the 3D world.

- The **Play** button can start and stop a simulation.
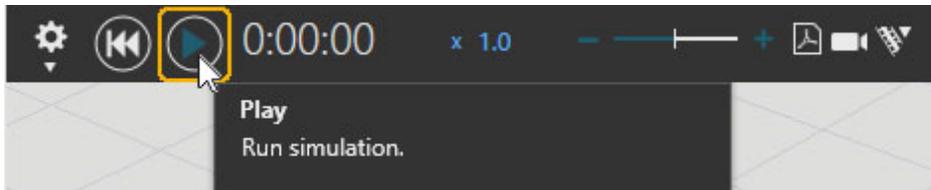
- The **Reset** button returns a simulation to its initial state and a zero time.

- The **Speed** factor and slider manage how quickly you run a simulation.

1. From the Simulation controls, click **Reset**, which returns all components to their initial state. For example, the robot's joints are returned to their initial values.

2. Then, on the Simulation controls, click **Play**. During a simulation, components like the Feeder create dynamic components that only exist in the simulation. The components generated by the feeder move to the adjacent conveyor because the feeder and conveyor are connected and have paths for containing and moving other components. This is known as a flow.
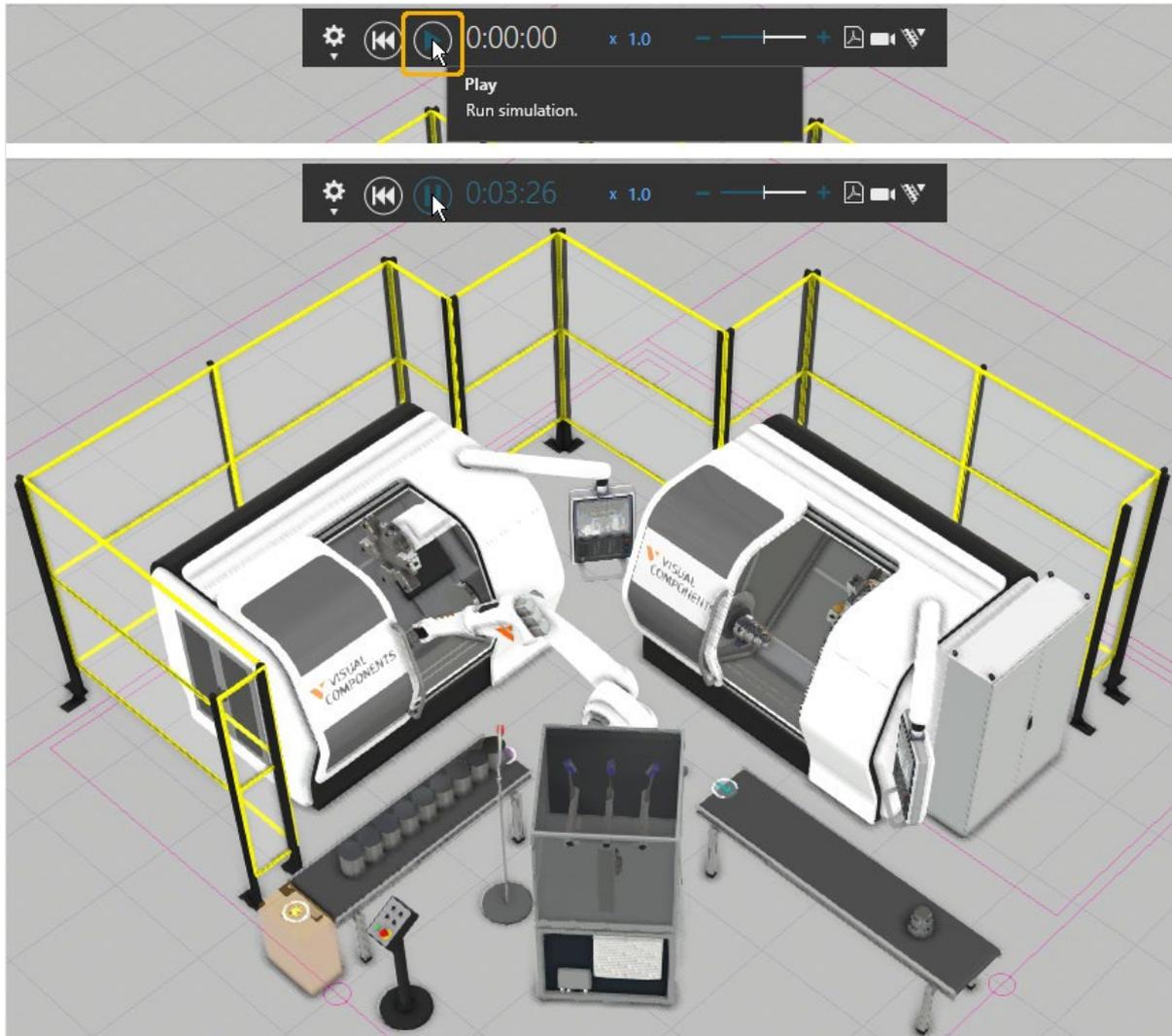
3. On the Simulation controls, use the slider to speed up or slow down the simulation. Or double-click the slider to reset the speed factor to *x 1.0*.
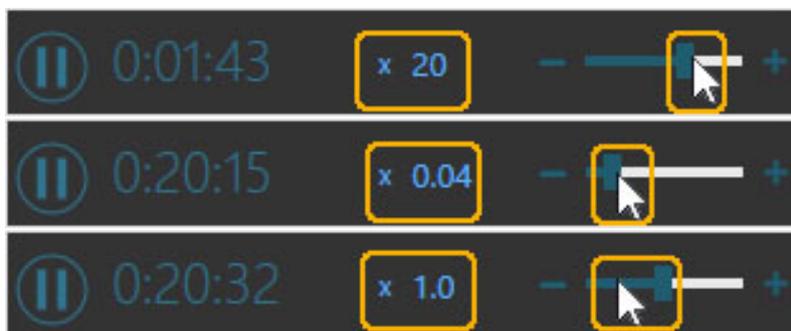
4. From the Simulation controls, click **Reset**. The components generated by the feeder disappear, whereas other components like the robot remain static and are returned to their initial states, as they were when the **Machine Tending** layout first was loaded into the 3D world.
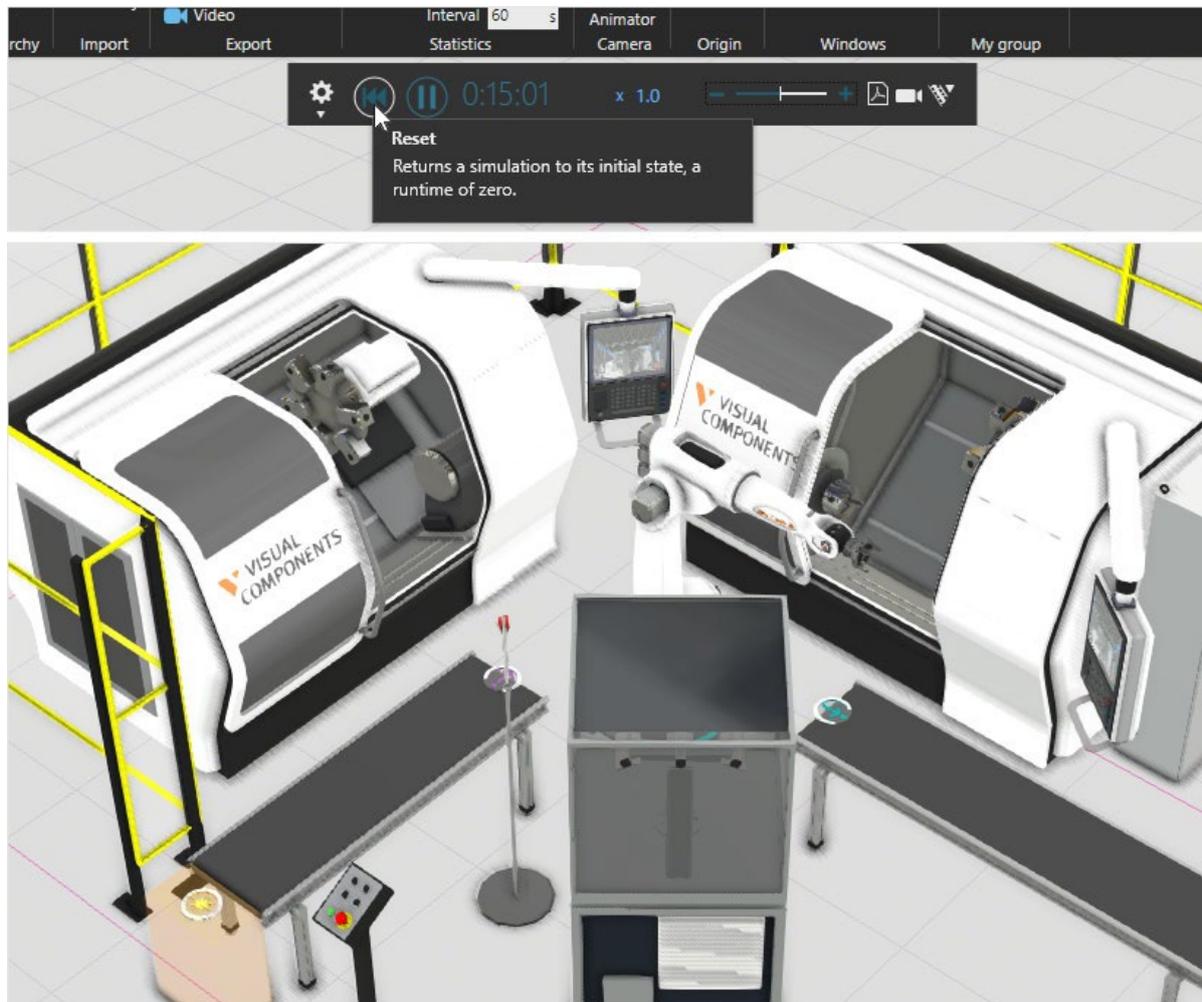
5. Recording Controls

5.1.   Images

The Export Image command allows you to capture images of the 3D world.

1. To capture an image, you will need to set up a view to appear in your exported image. If, for example, your **Machine Tending** layout view is not centered, use the **All (Ctrl+F)** option from the 3D world toolbar on the left.
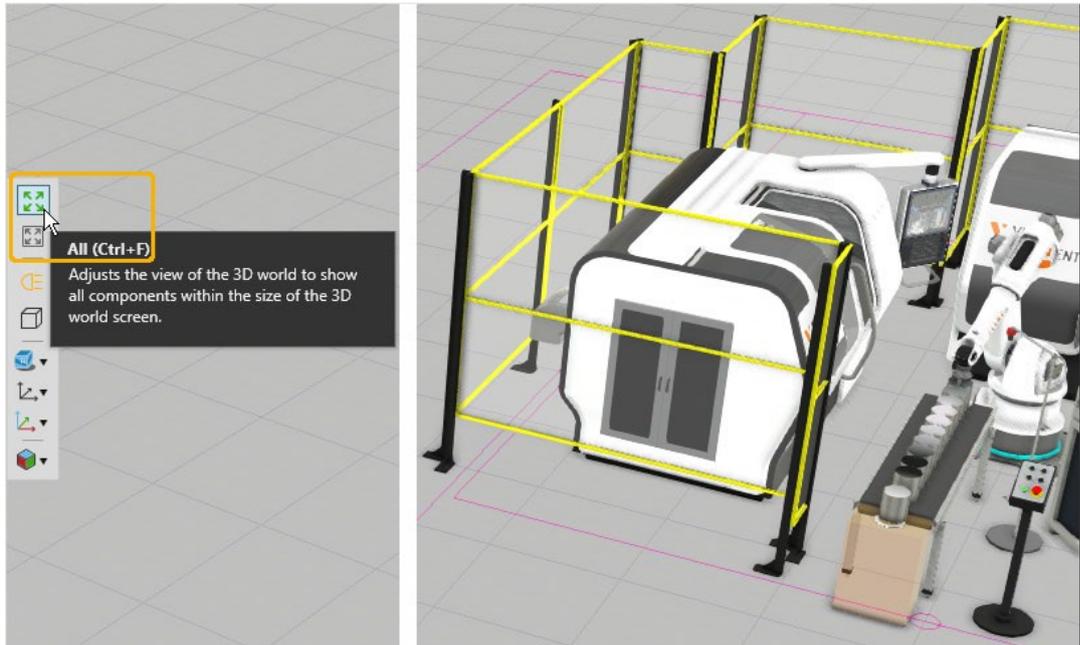
2. When centered in your view, the layout will appear small. To enlarge it, place your mouse cursor over the robot in the center of the layout, and then use your mouse wheel to zoom in until the layout fills your view of the 3D world.
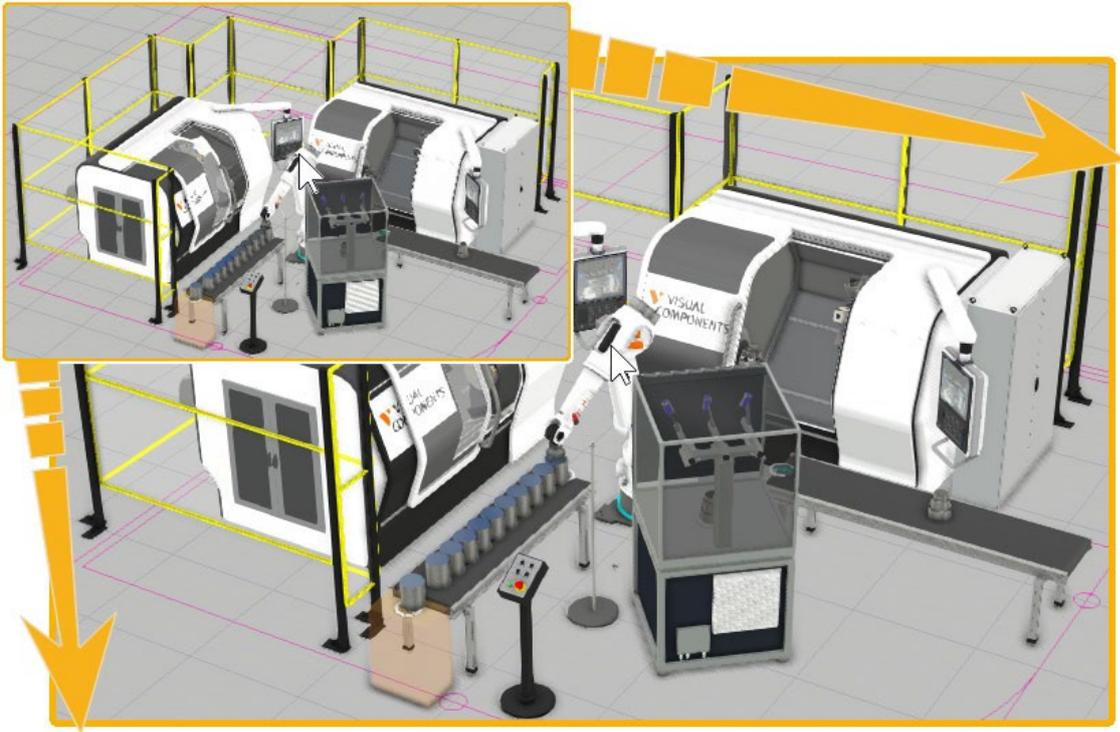
3. Then from the **Home** tab, in the **Export** group, click **Image** to display a red boundary in the 3D world. Anything inside this red boundary will be captured in the image, except for user interface elements. Then from the **Export Image** panel on the right, select a **Resolution** of *1920 x 1080,* **File Format** *PNG*, and **Render mode** *Realistic shaded*.
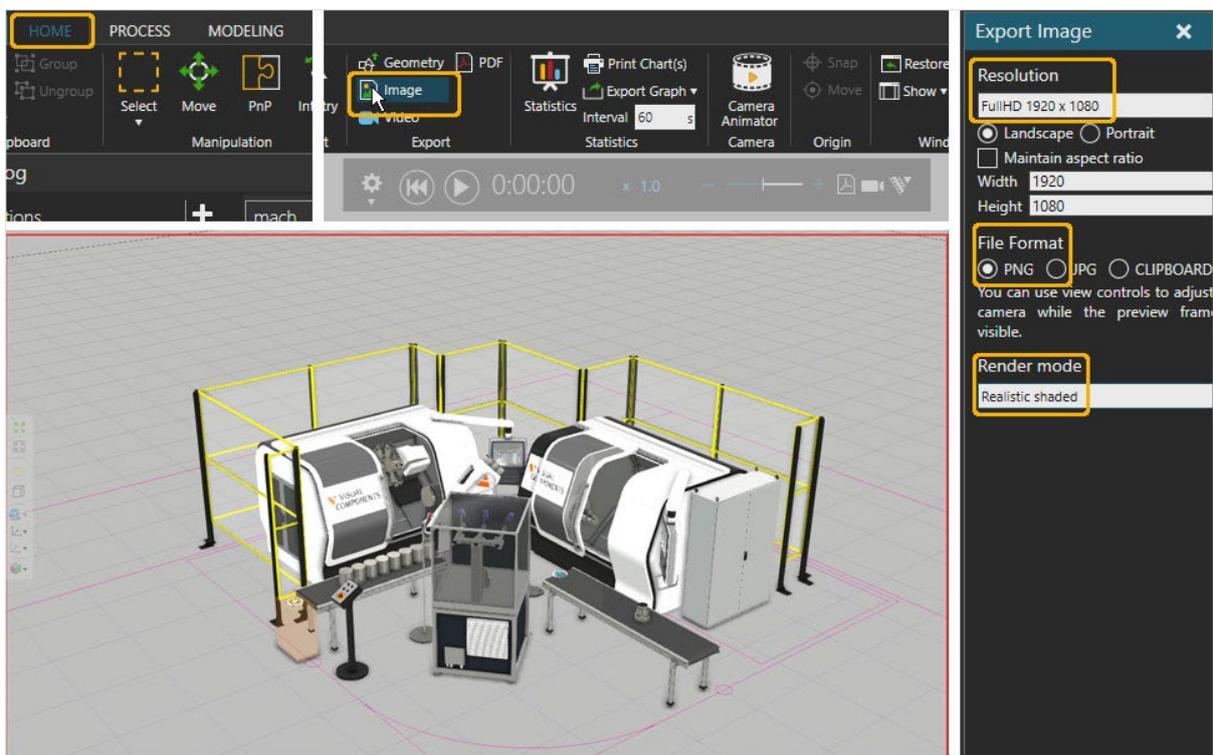
4. You may want to modify the view angle before exporting your image. Refer to the <u>mouse and keyboard controls section</u> above for quick tips on manipulating your view.
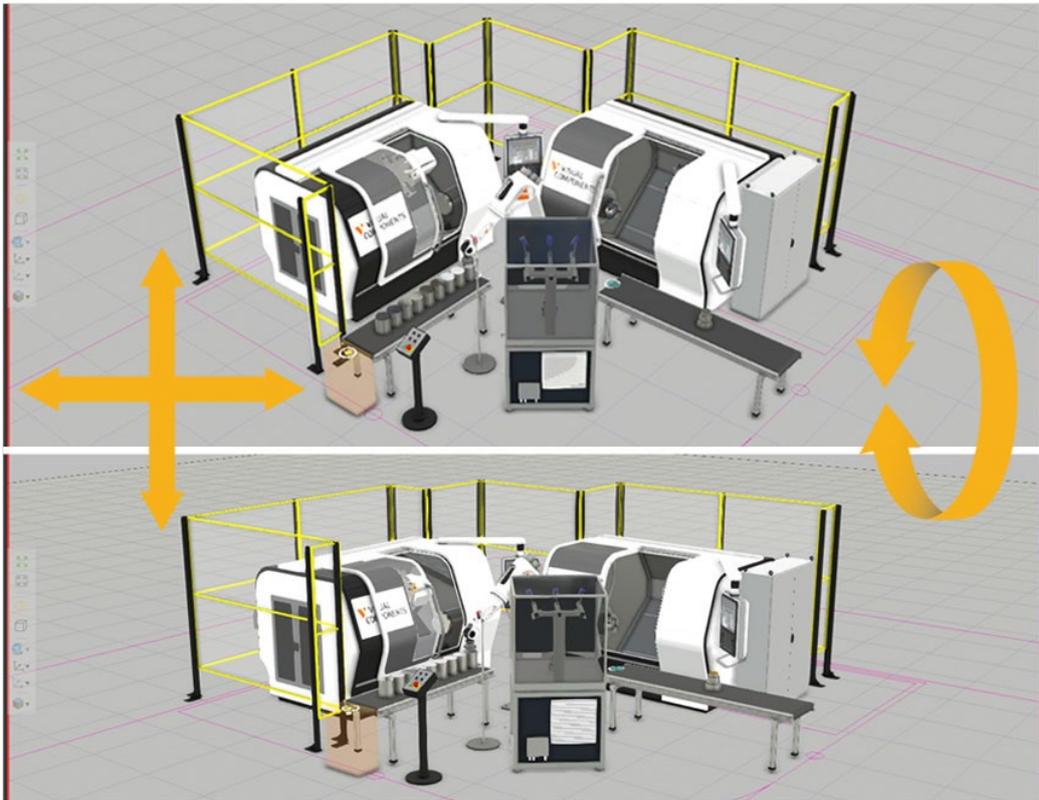
5. Then once you have your view ready, from the lower right corner of the **Export Image** panel, click **Export** and save the image.
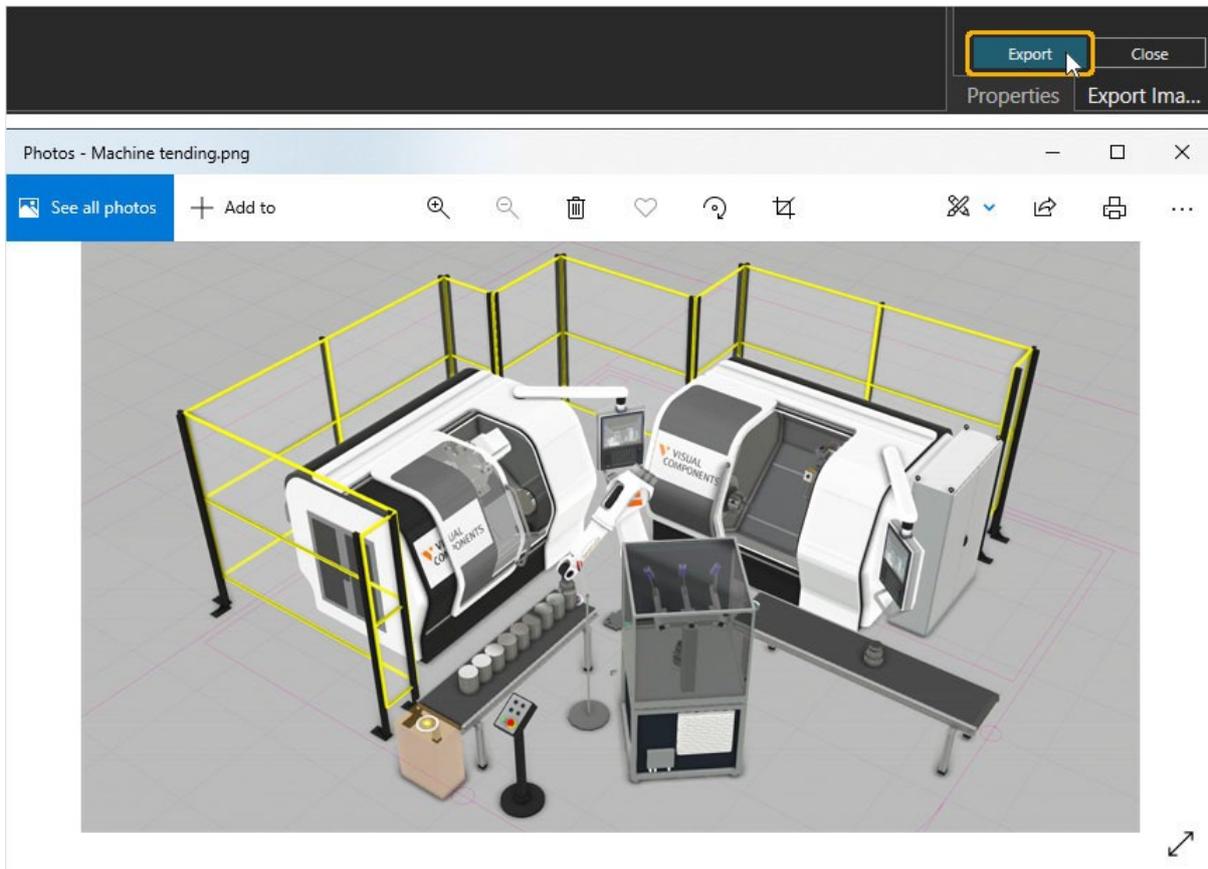
5.2. Animations

The **Export to Animation** command allows you to record a simulation as an animation that can be played through the Visual Components Experience, an app for viewing 3D content and experiencing virtual reality (VR).

NOTE! Visit the Visual Components Experience page for a detailed User Guide and links to download the mobile and desktop versions of the Visual Components Experience app.

1. To begin, from the Simulation controls, click **Reset**. And then, from the right side of the Simulation controls, click **Export to Animation**.
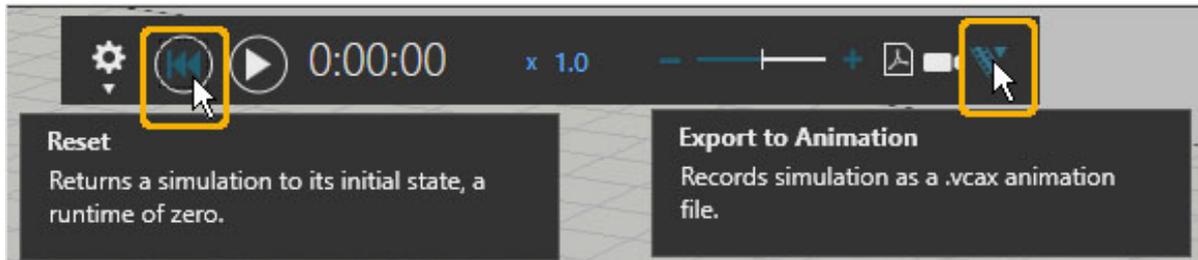

2. In the **Export to Animation** task pane, click **Start Recording**, then select the location on your PC where you will save the animation file, and click **Save**.
    NOTE! The *.vcax* file is by default saved in the *My Animations* folder on your PC, example path below:
    C:\Users\%username%\Documents\Visual Components\%version%\My Animations
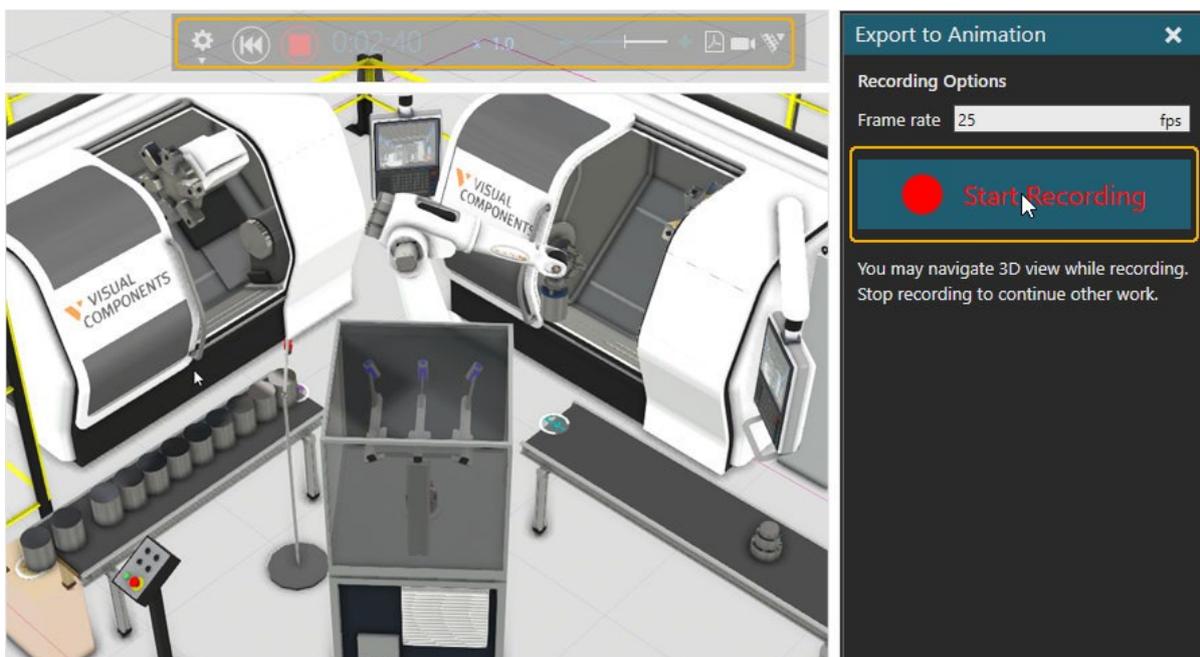
3. Then when you are ready, click **Stop and save**. And then click **Close** from the lower right of the application window.
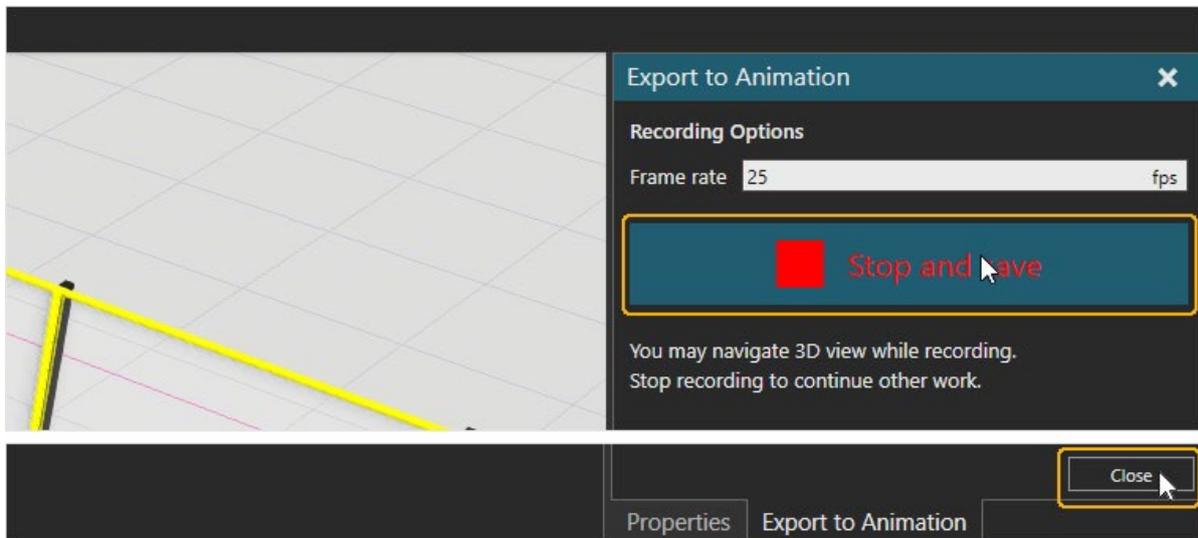

6. Drawing Controls

The **Drawing** tab allows you to create 2D drawings of the 3D world from the geometry of components, and contains lines, points, and edges. You also have the option to export and print drawings. Standard views create orthographic drawings. You have the option to select geometry and draw it using either perspective or orthographic projection.

1. With the **Machine Tending** layout loaded into the 3D world, click the **Drawing** tab.
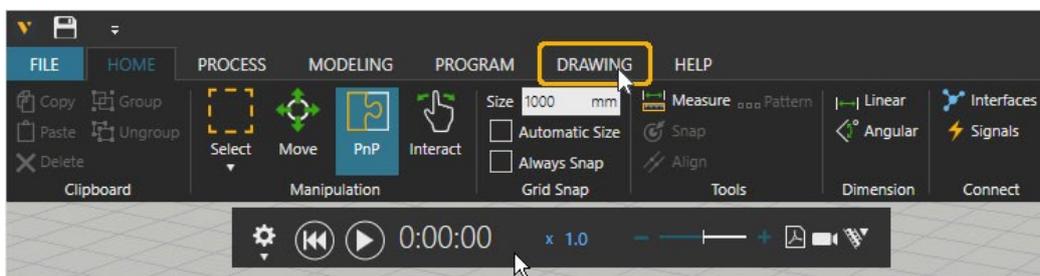
2. The **Drawing** tab displays layout drawings, including a parts list (BOM), dimensions, and annotations. A template is used to control the scale of drawings and form a print-ready file. In this example, the **Machine Tending** layout includes a drawing that you can clear to create another. So from **Drawing** Group, click **Clear**.
   NOTE! If your view does not refresh correctly, displaying an empty view, then left-click with your mouse in the view area.
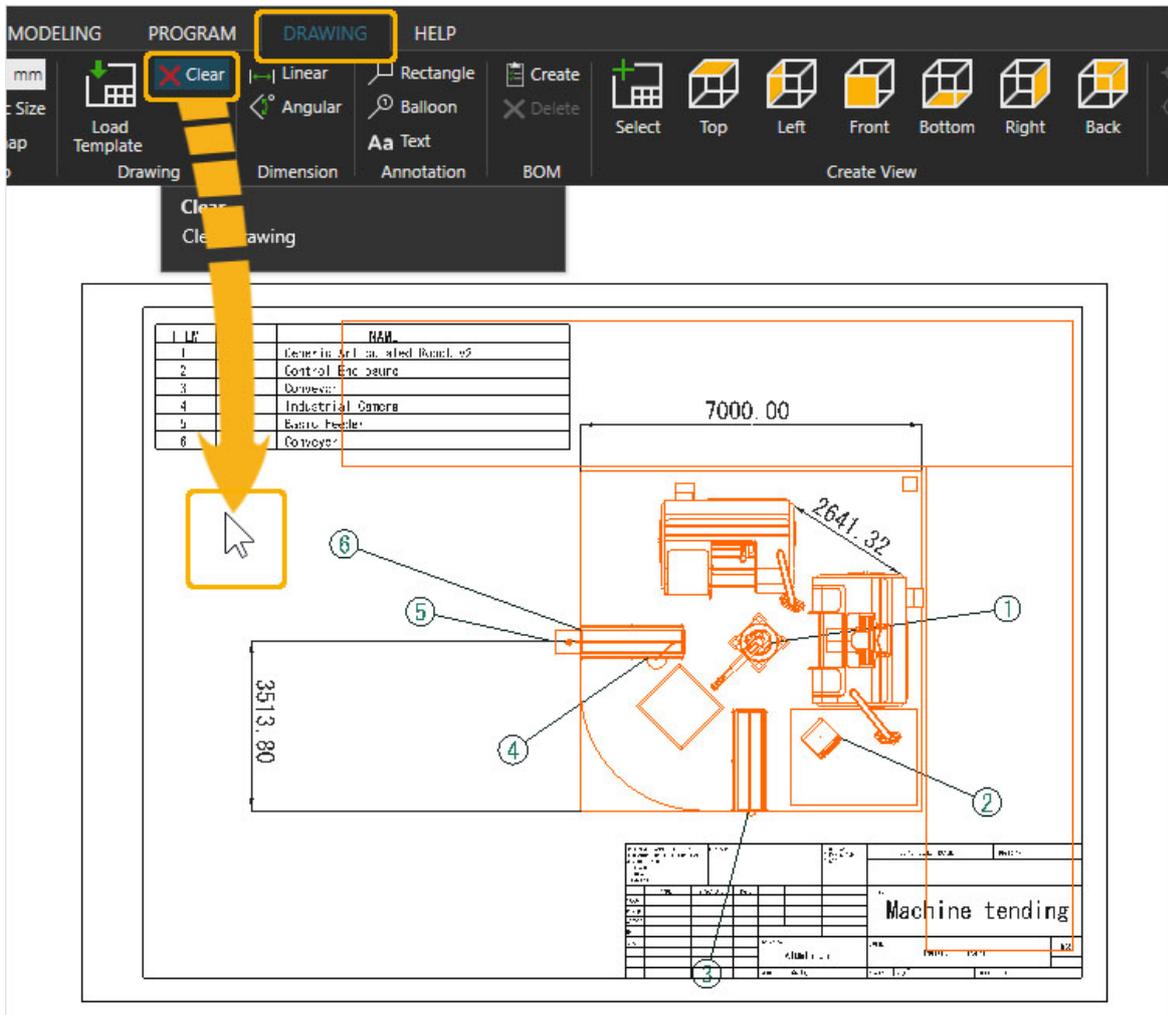
3. On the **Drawing** tab in the **Drawing** group, click **Load Template**. Then from the **Template Import** task pane on the right, set **Template** to *Drawing Template A3*, and from the lower right corner of the window, click **Import**.
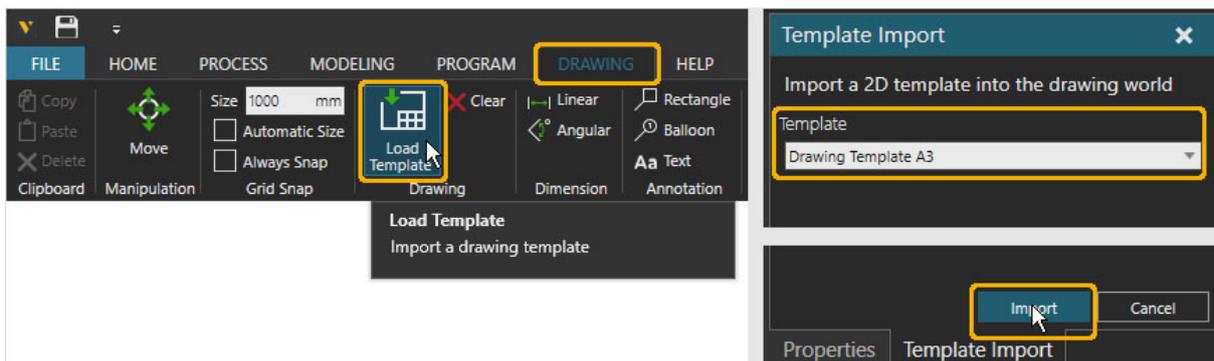
4. If, when importing the template, it does not fill your view, use the **All (Ctrl+F)** option from the 3D world toolbar on the left.

All (Ctrl+F)

Adjusts the view of the 3D world to show all components within the size of the 3D world screen.

ITEM	QTY	NAME

Title Of

Aluminium

PNT001 - Part

A3

1:100

5. Then to create a drawing from the **Create View** Group, click, for example, **Top**.
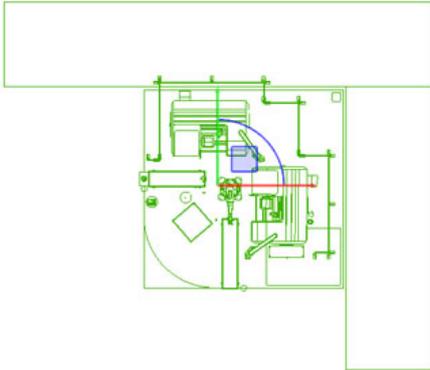
6. In this example, you may wish to increase the scale of the drawing. From the **Drawing Properties** panel on the right, edit the **Scale** value from *1:100* to *1:50* and click Enter.

Drawing Properties

DrawingView_Top

Coordinates: ● World ○ Parent ○ Object

| X | 210.039 | Y | 148.607 | Z | 0 |
| Rx | 0 | Ry | 0 | Rz | 0 |

Scale: 1:50

LayerName:
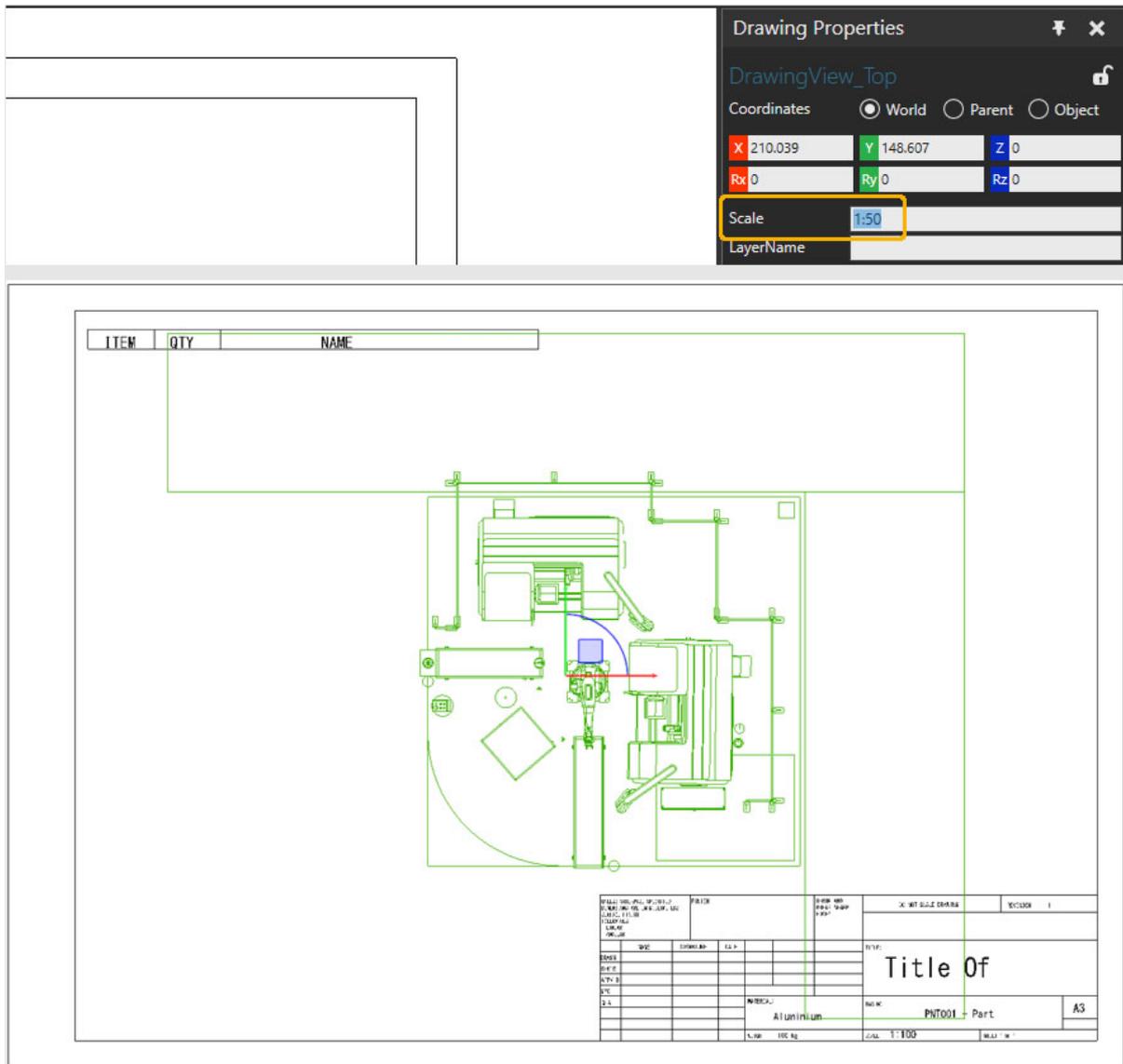
7. **NOTE!** To modify the scale of a drawing, you must first select it. If the **Drawing Properties** panel does not appear, first check that the drawing is selected as shown on the right in the image below.
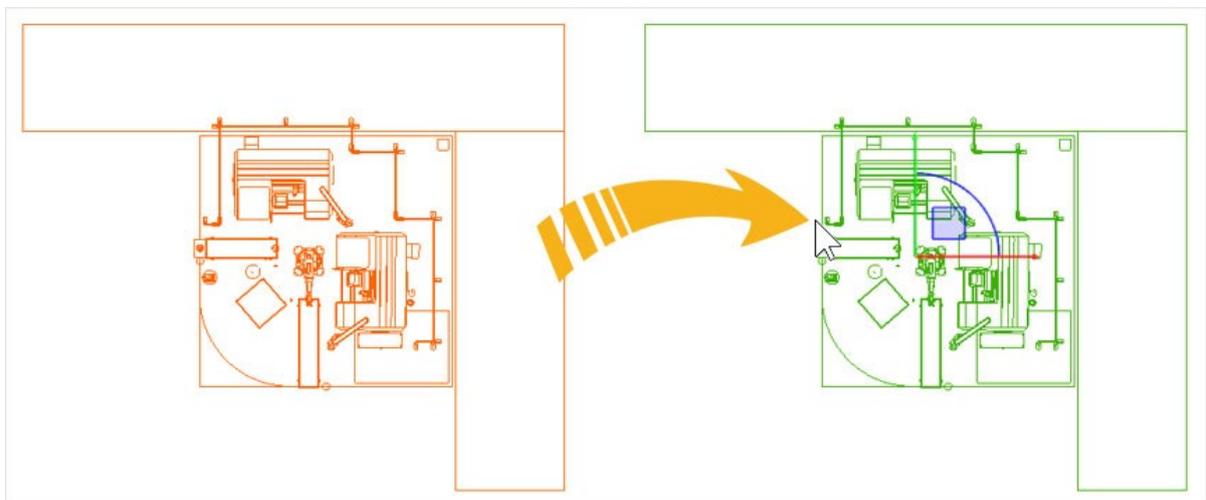

8. Then to give your drawing a title, first select the template. Place your mouse cursor over the lower-left corner of the template, and left-click on it until you see the floating origin

appear. And from the **Component Properties** panel on the right, add an example **Title** such as *Machine Tending*, and again edit the **Scale** value to *1:50*.
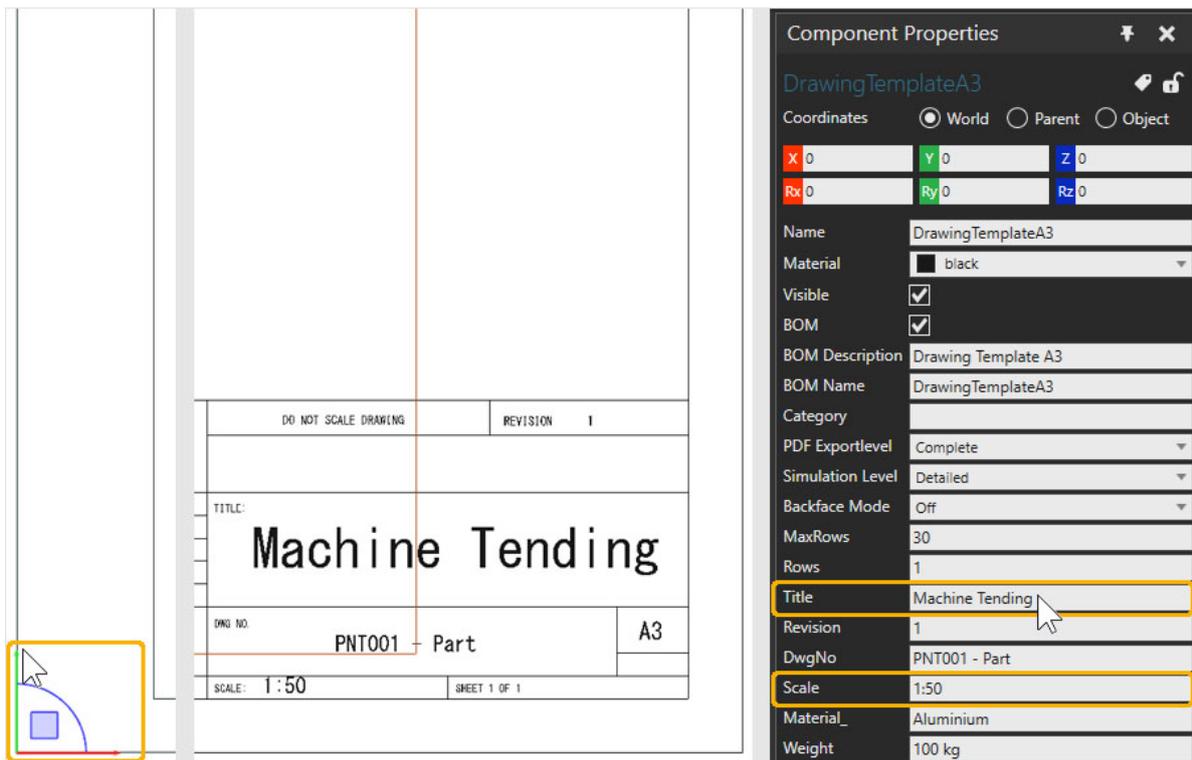
9. Then to complete your drawing from the **BOM** group above, click **Create**.

ITEM	QTY	NAME
1	1	Electric Cabinet
2	1	To Conveyor Process
3	1	Generic 3-Jaw Gripper
4	2	Conveyor
5	1	Generic Articulated Robot
6	1	Coordinate measuring machine
7	1	Cell Controller
8	1	Industrial Camera
9	1	From Conveyor Process
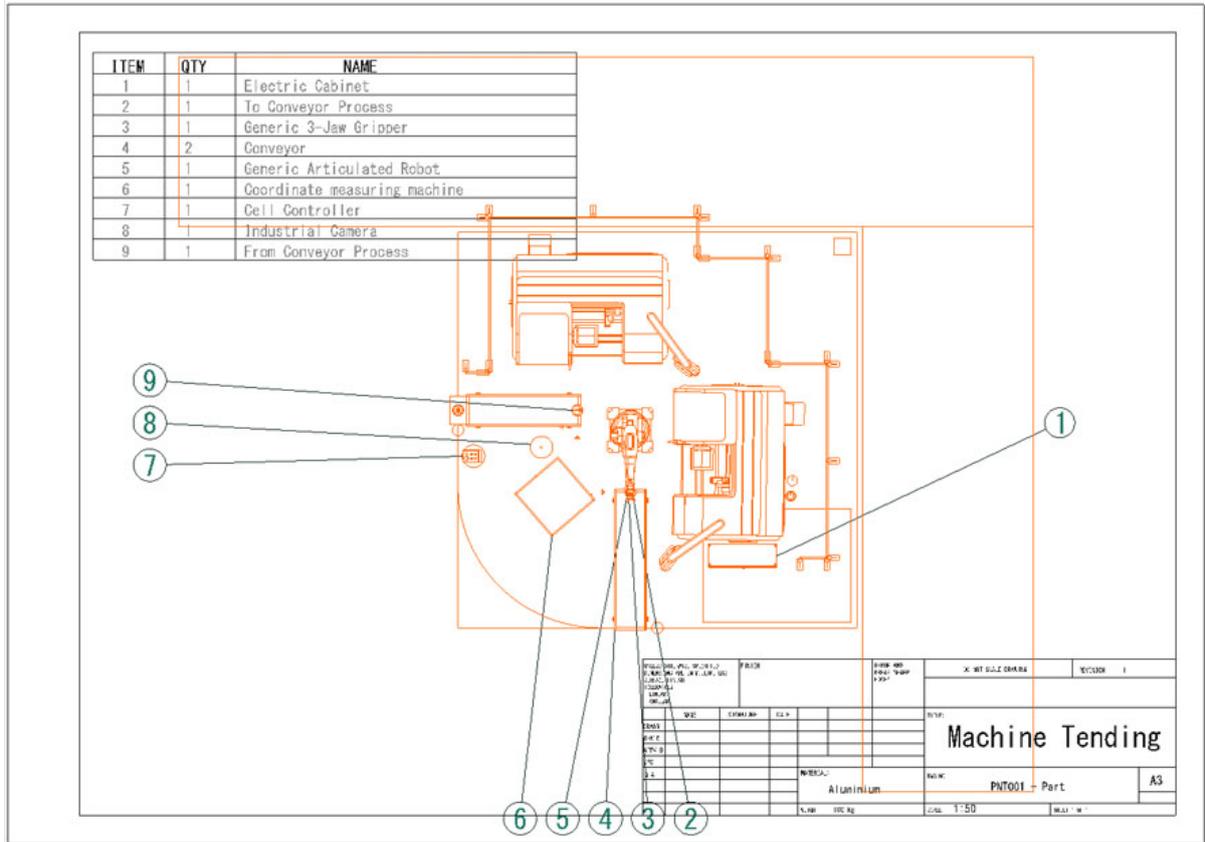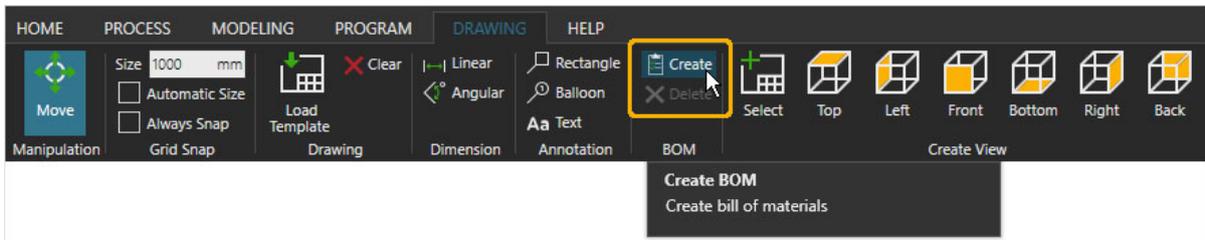
10. And finally, to print or create a PDF file of your drawing, from the **Drawing** tab, over on the right in the **Print** group, click **Drawing**.
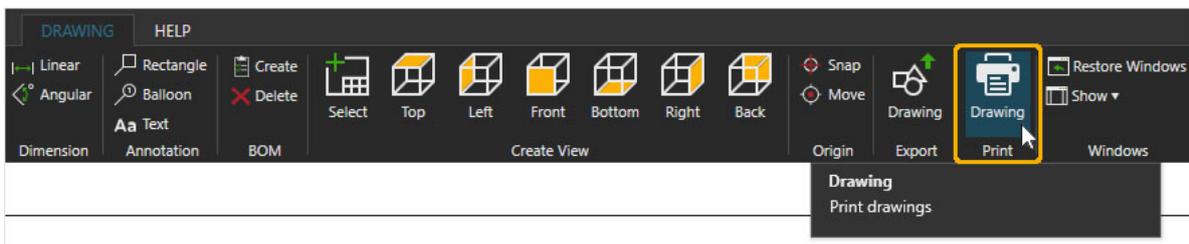
7. Statistics Dashboard

The Statistics dashboard allows you to report and visualize simulation data. For example, you can track how many parts enter and exit conveyors.

For more detailed information on generating statistics refer to the Using Statistics Templates lesson in the Visual Components Academy. Or from the Help File in *Tasks*, *Components* refer to *Reporting statistics*.

1. With the **Machine Tending** layout loaded into the 3D world, click the **Home** tab, and then from the **Statistics** group, click the **Statistics** button to launch the **Statistics** panel.
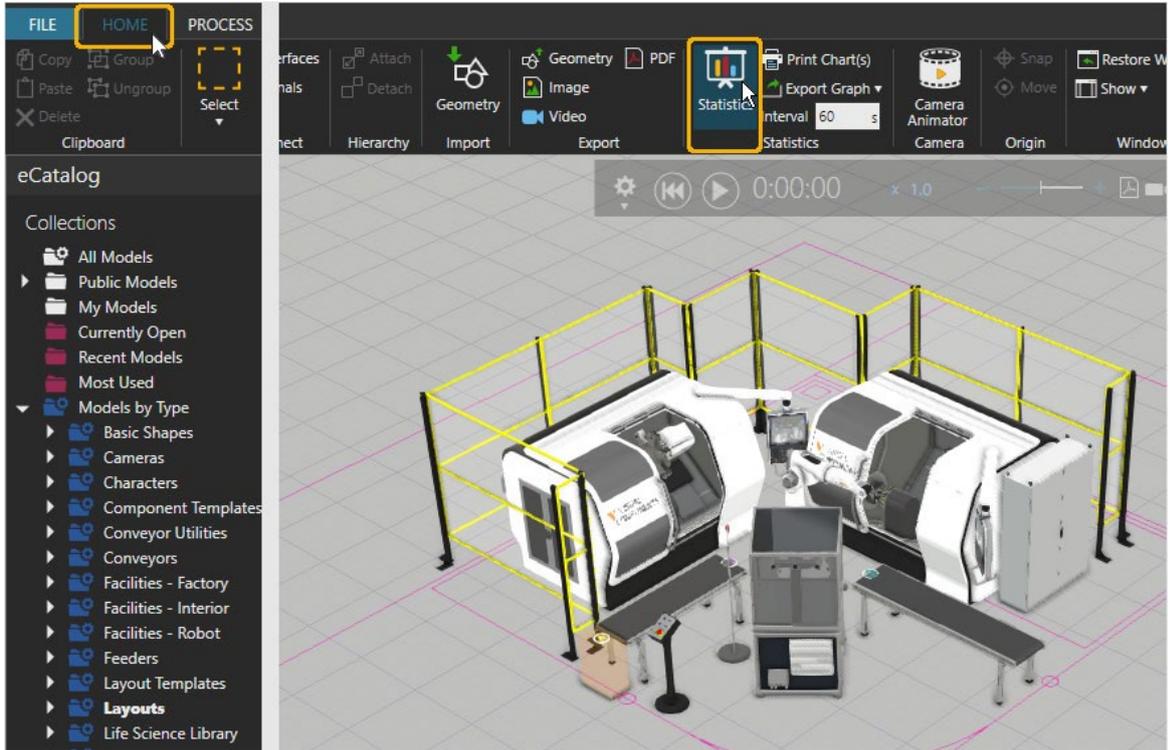

2. The **Machine Tending** layout already includes a **Statistics 1** tab in the **Statistics** panel in this example.
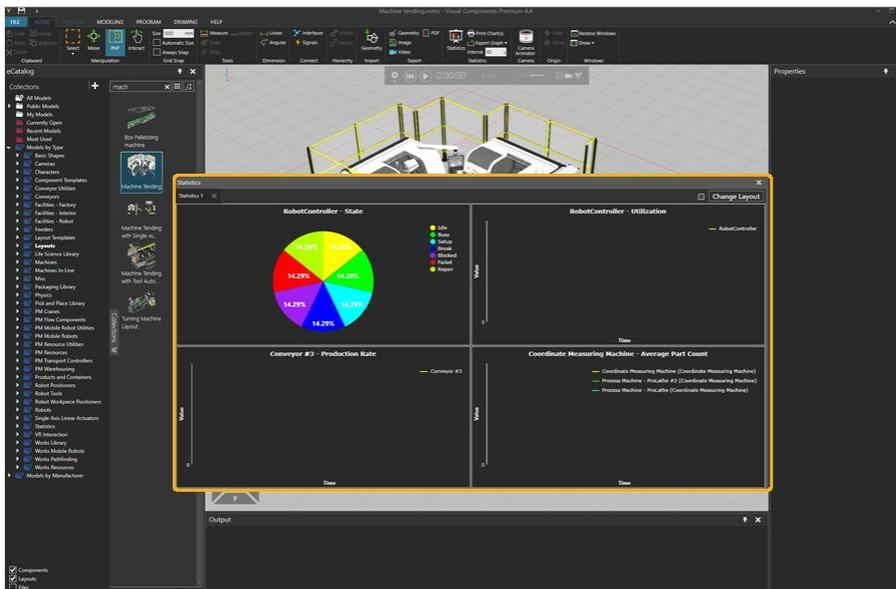
3. You can freely edit the size and position of the **Statistics** panel. So for illustrative purposes, we will reduce its size and place it over the layout in the 3D world.


4. We can retain the existing **Statistics 1** tab layout, and to create a new example, click the green **+ Add new tab** button.
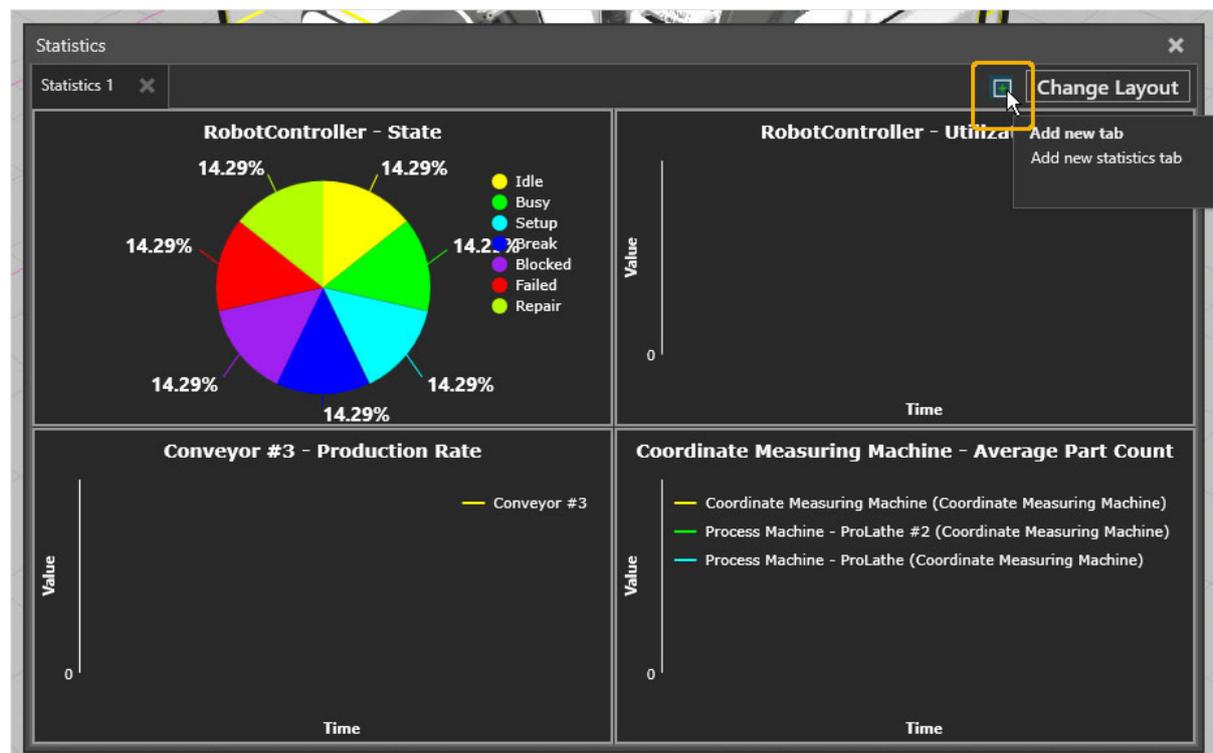
5. Then from **Choose Layout,** select **2-Column 1- Row**, and click **Create** to add a new tab.
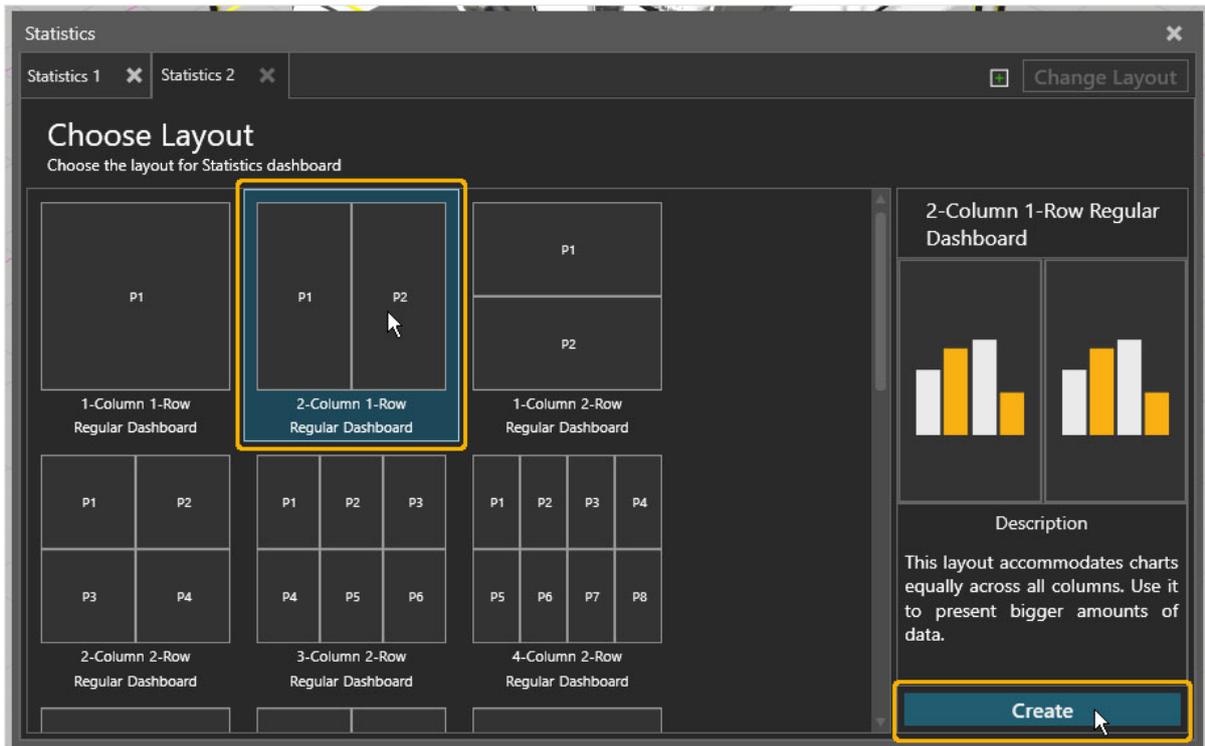
6. And then, to select components from the 3D world to include in your **Statistics 2** tab, click and drag the **Statistics** panel downwards.
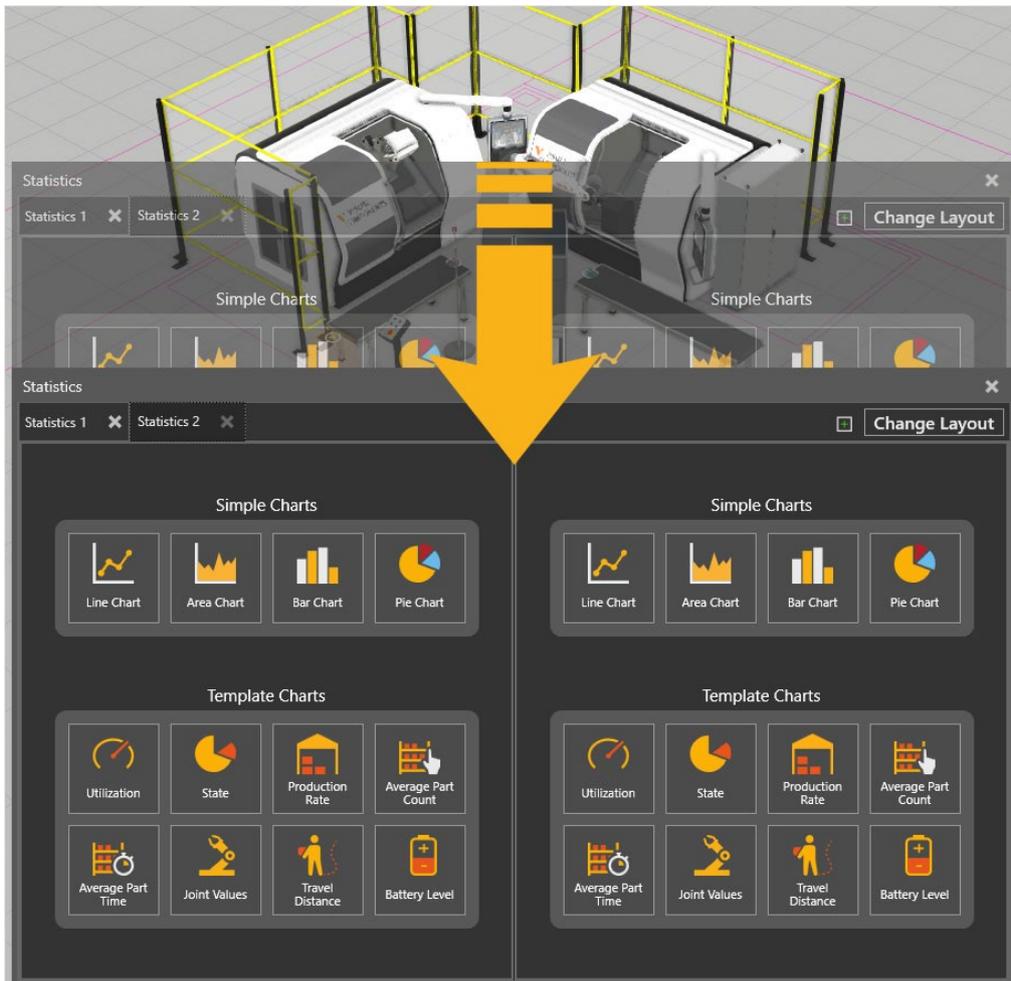
7. To create a chart displaying the utilization of the three machines included in the **Machine Tending** layout, hold your CTRL key, and left-click to select each of the three machines, and from the **Statistics** panel, select **Utilization**.
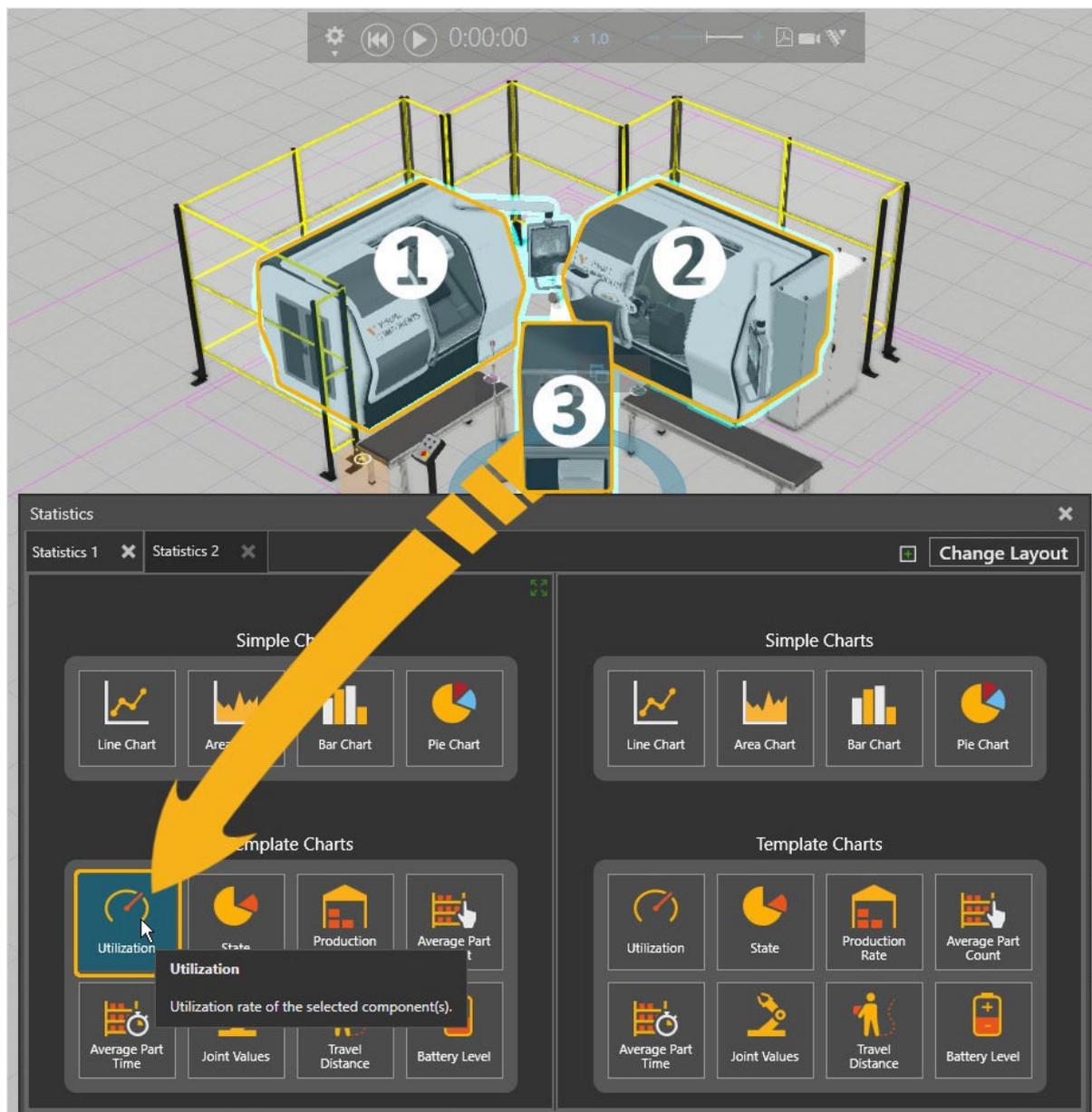
8. Then to view data on how many components are generated by the **Machine Tending** layout, left-click to select the output conveyer on the right side of the layout, and from the **Statistics** panel, select **Production Rate**.
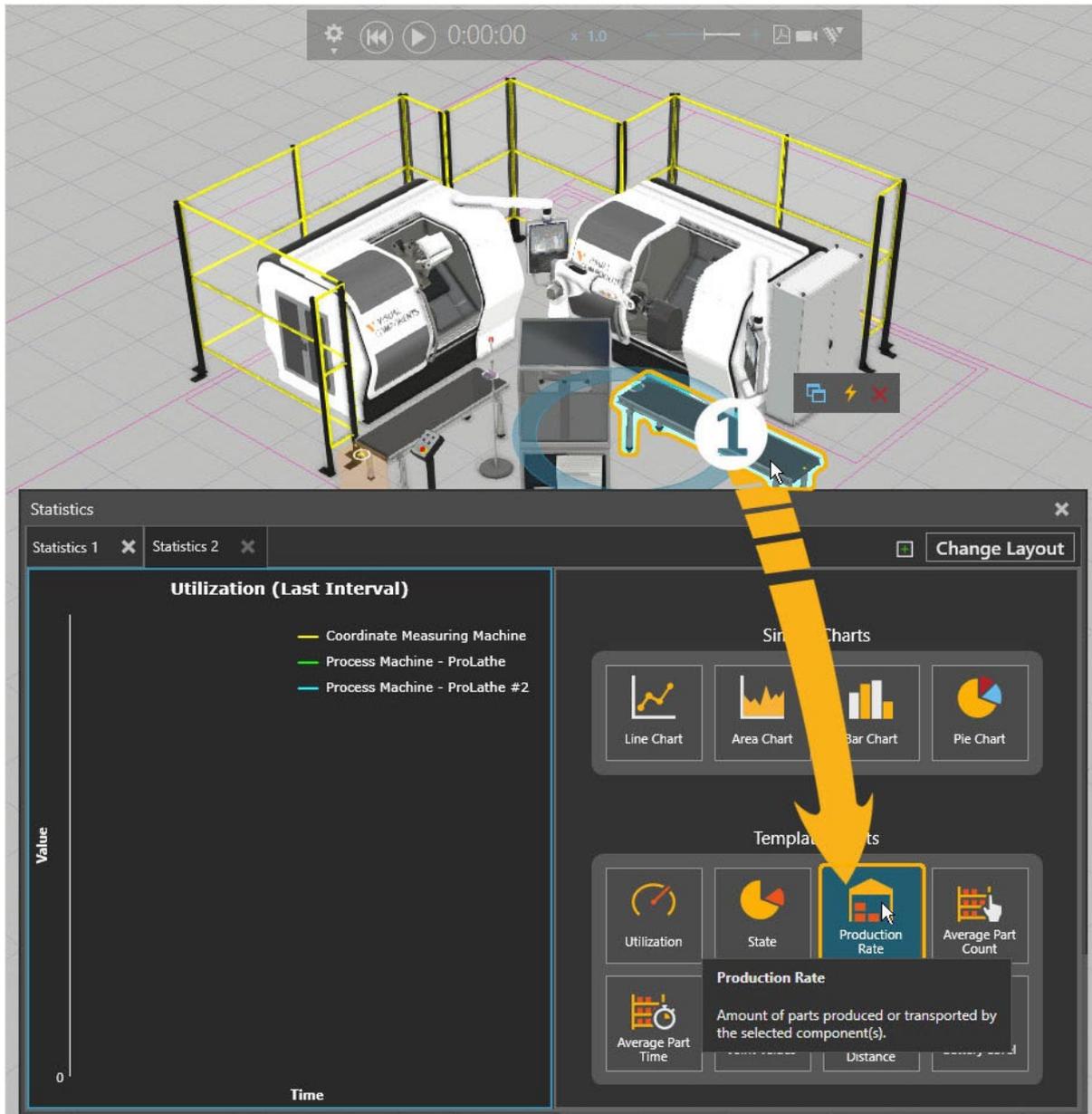
9. Before running the simulation, notice that from the simulation controls, the simulation time is set to *0:00:00*. However, we should still use the **Reset** option to ensure that all the components in the **Machine Tending** layout are set to their initial states.
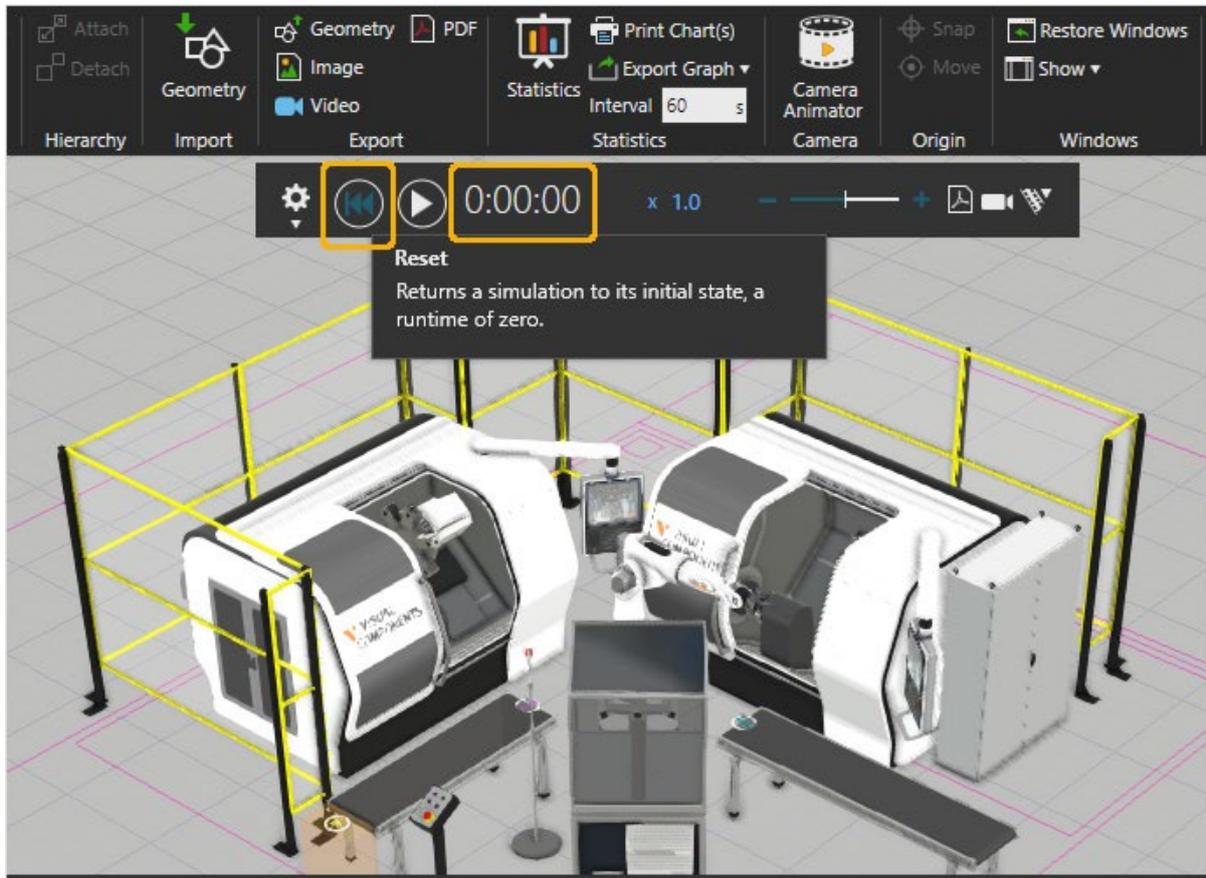
10. Then to start the simulation, from the simulation controls, click **Play** to record some statistics based on an **Interval** of *60* seconds as specified in the **Statistic** group in the ribbon above.
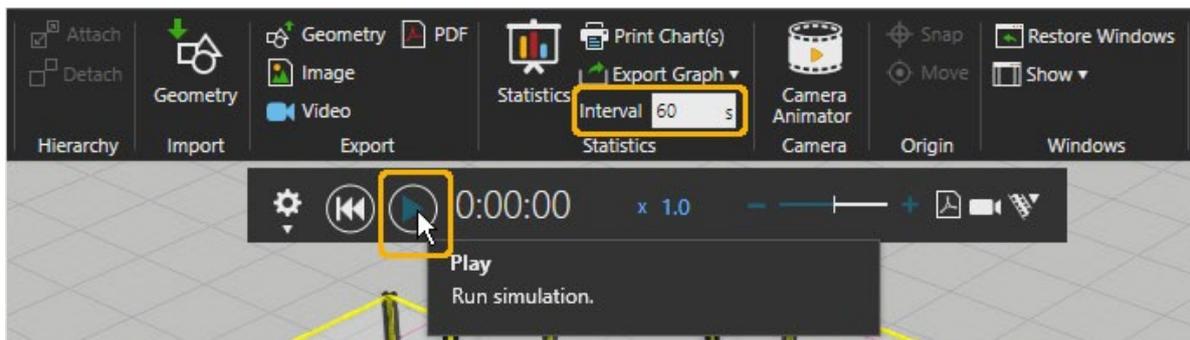
11. Then, as you watch the simulation play, you can see the statistics recorded based on the specified interval of *60* seconds.
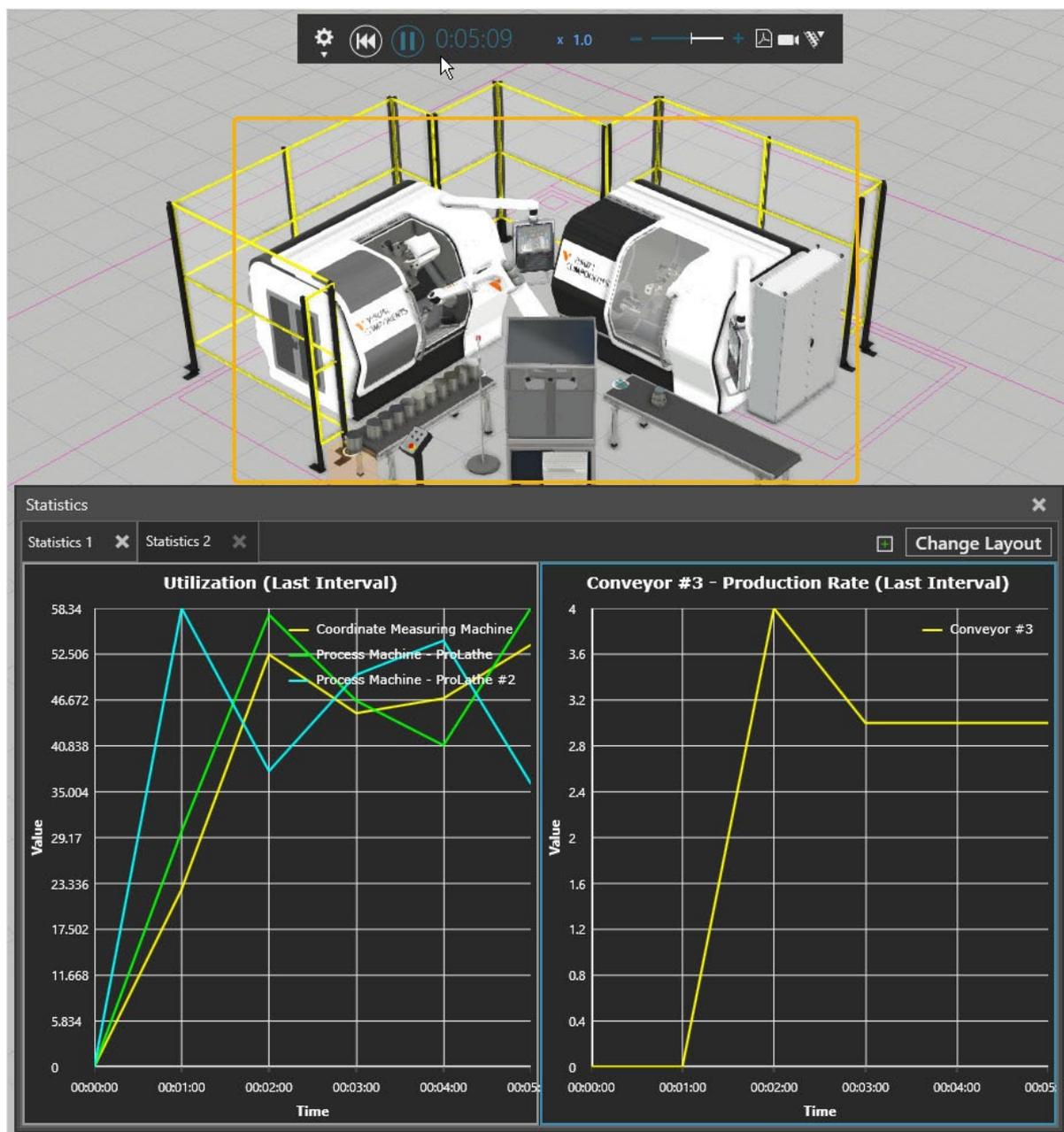
12. And remember that when viewing your statistics, you can move and resize the Statistics panel window as you wish.