



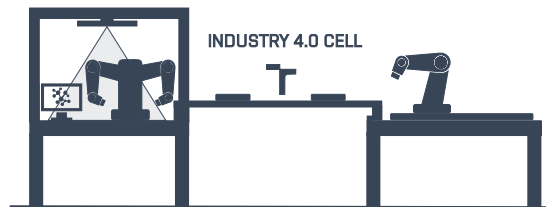
INSTITUTE OF AUTOMATION AND
COMPUTER SCIENCE



Programming for robots and manipulators

Lecture 2.2

Roman Parak



1. Introduction
2. Robot Control
3. Type of Simulation Tools
 - 3.1 Standard: B&R, ABB, UR, etc.
 - 3.2 Modern: ROS, NVIDIA Omniverse, etc.
 - 3.3 Unity3D

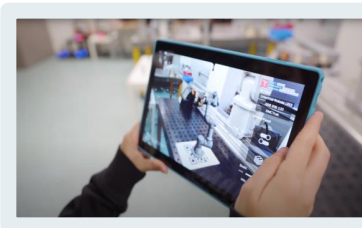


Introduction

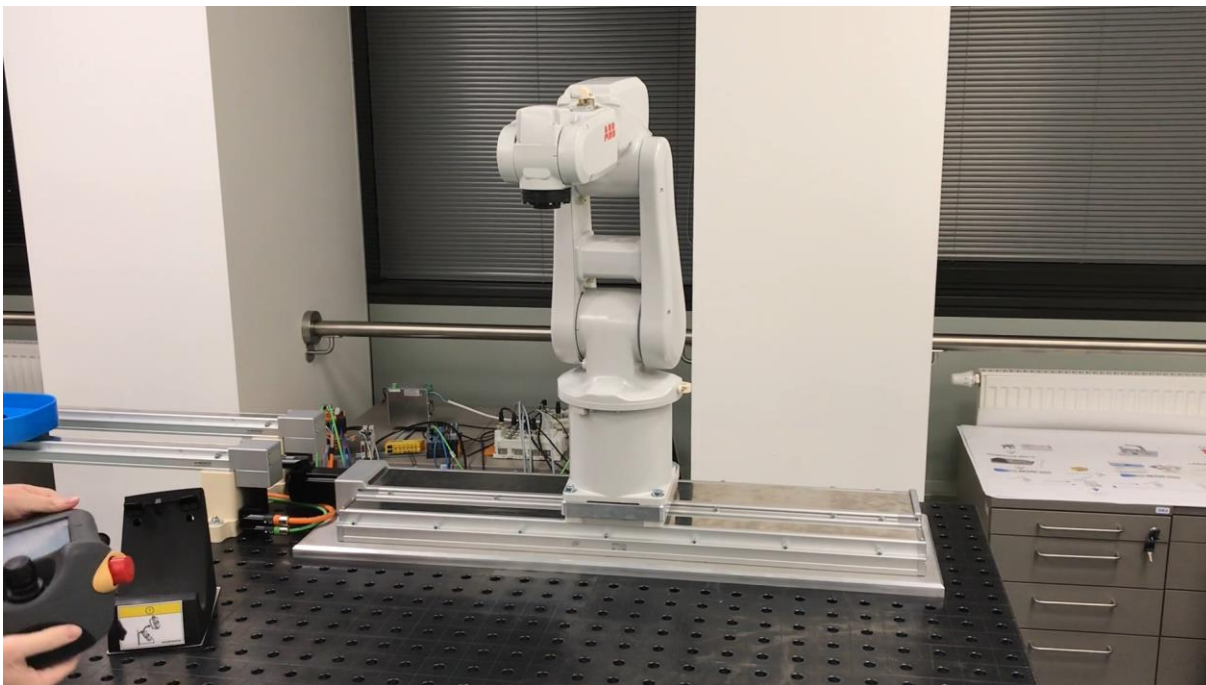
Simulation tools are built to replicate real-world robotic applications as closely as possible, taking every environmental and physical factor into account and testing for all possible variables.

Why use simulation tools?

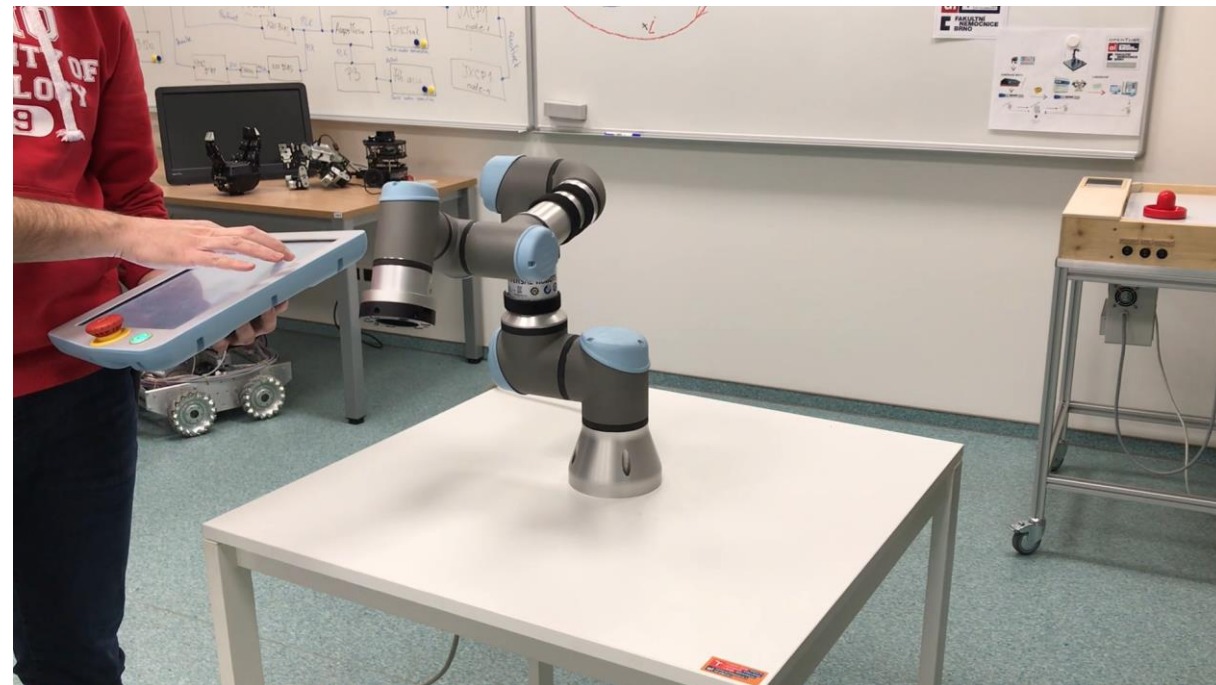
1. Proof of Concept and Proof of Design.
2. Reduced Integration Costs.
3. Shorter System Delivery Times.
4. Something else?



Robot Control

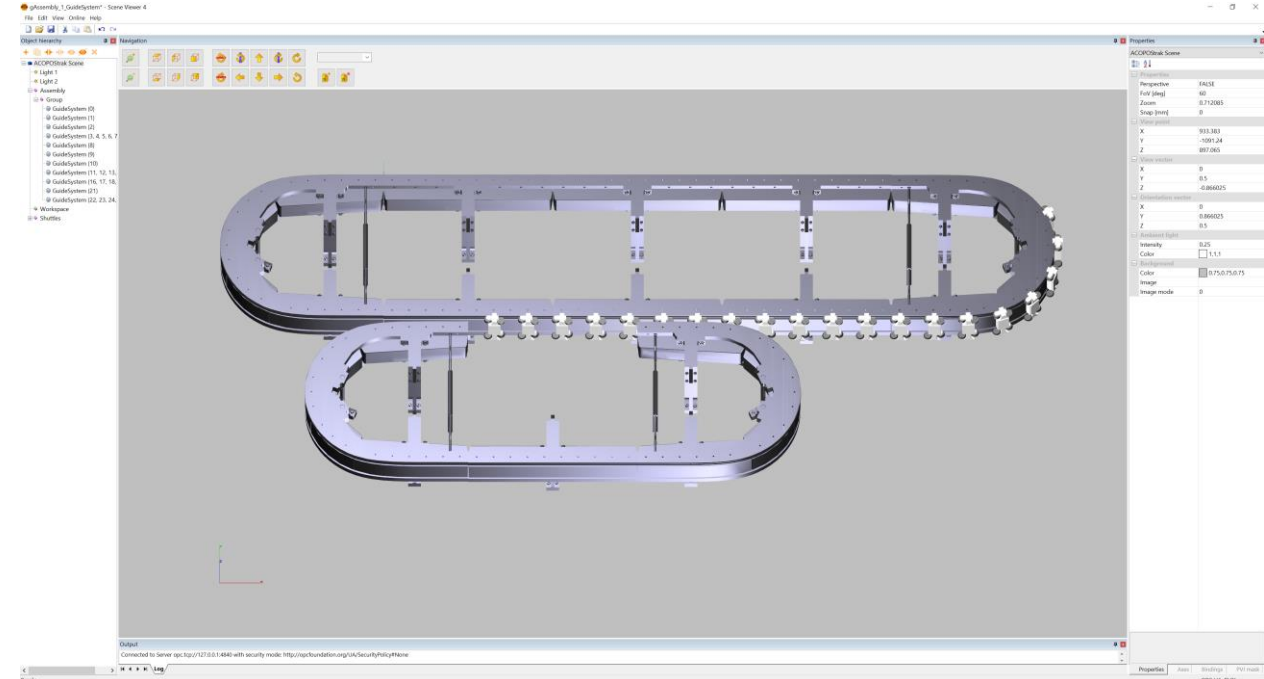
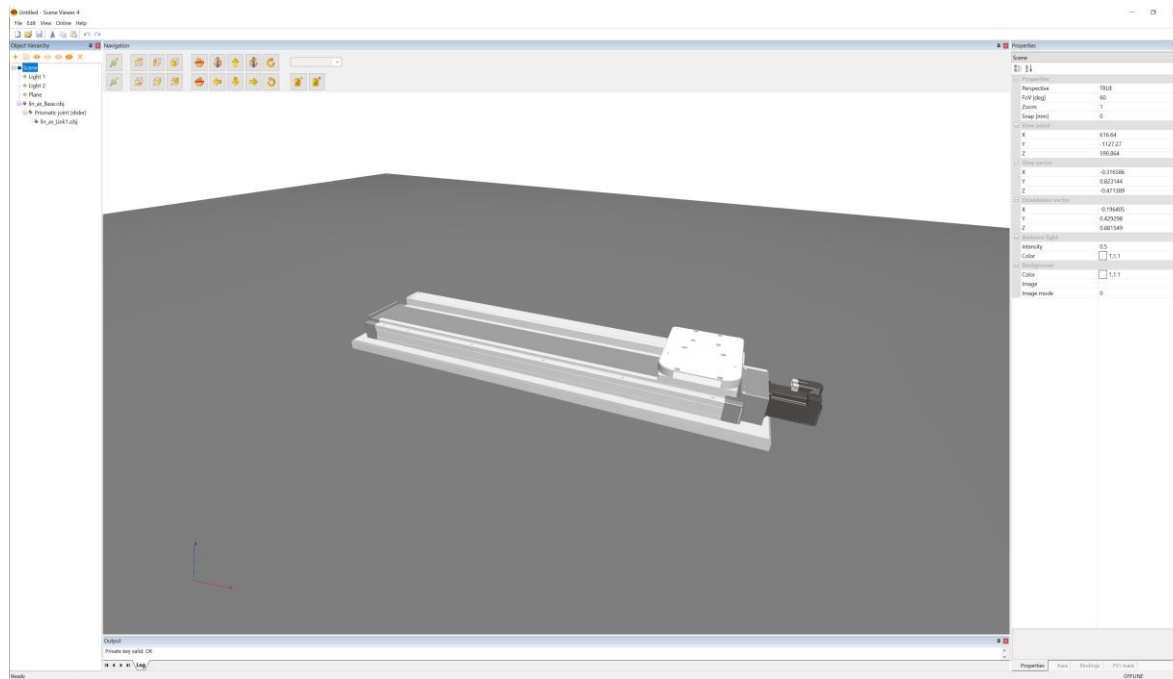


Industrial Robot ABB IRB 120



Collaborative Robot Universal Robots UR3

Type of Simulation Tools



B&R Automation - SceneViewer

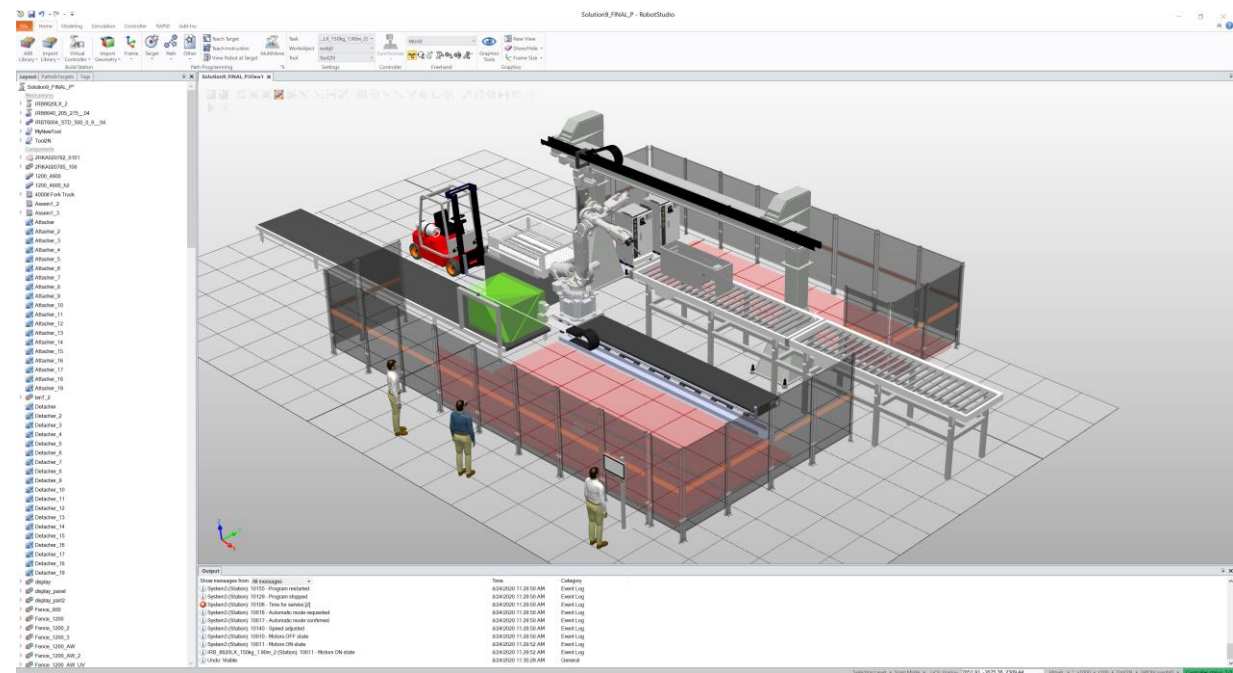
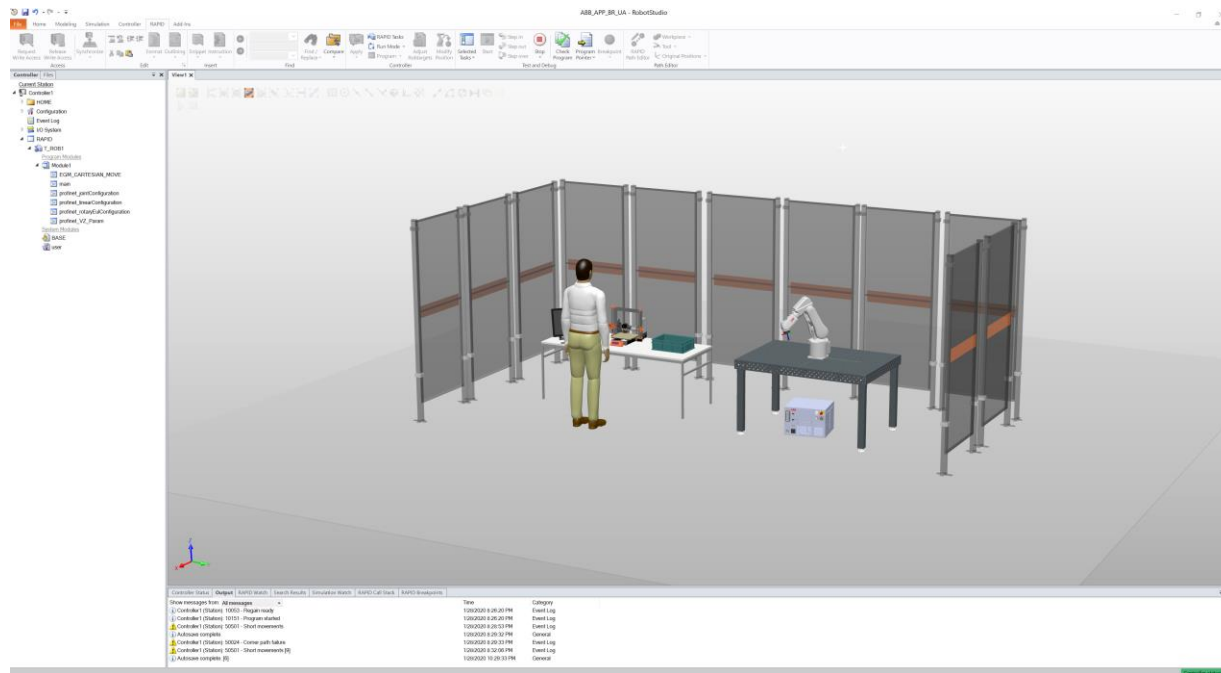
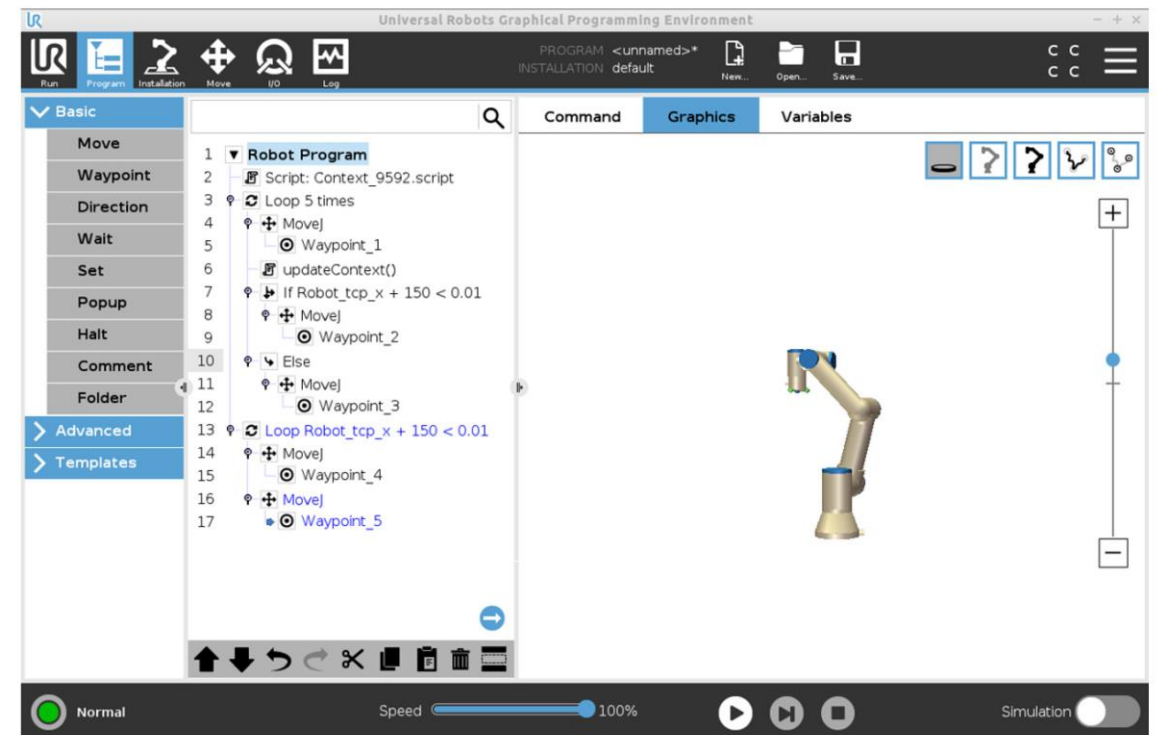
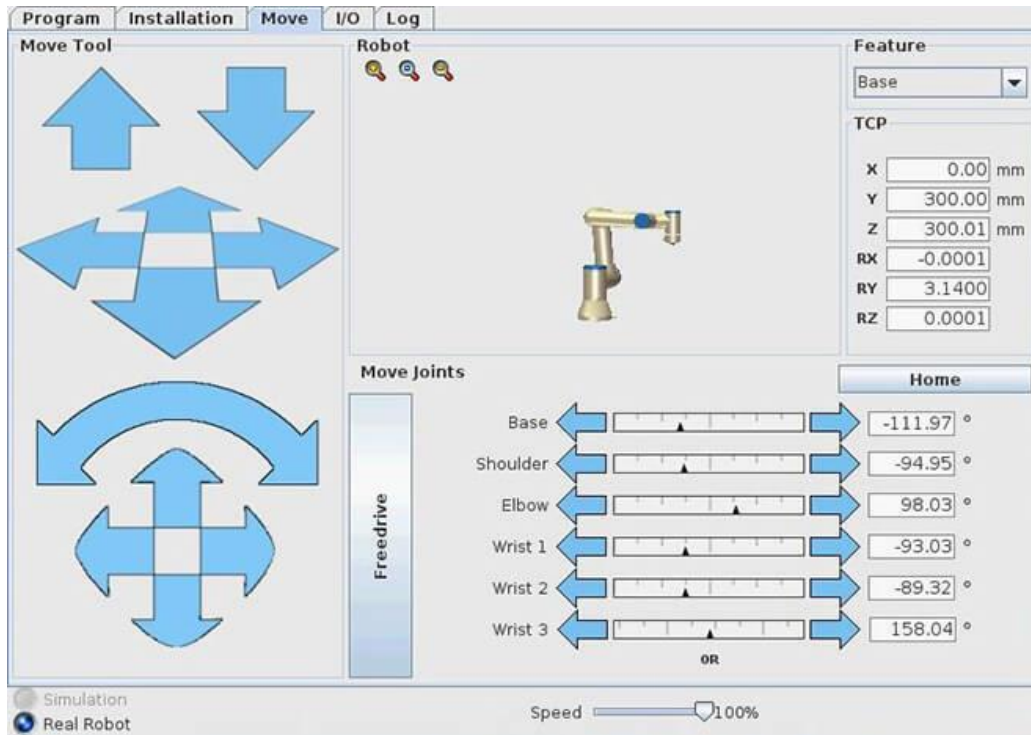
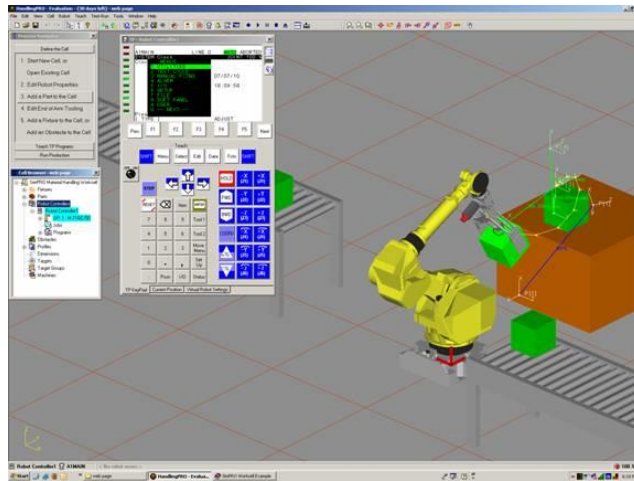


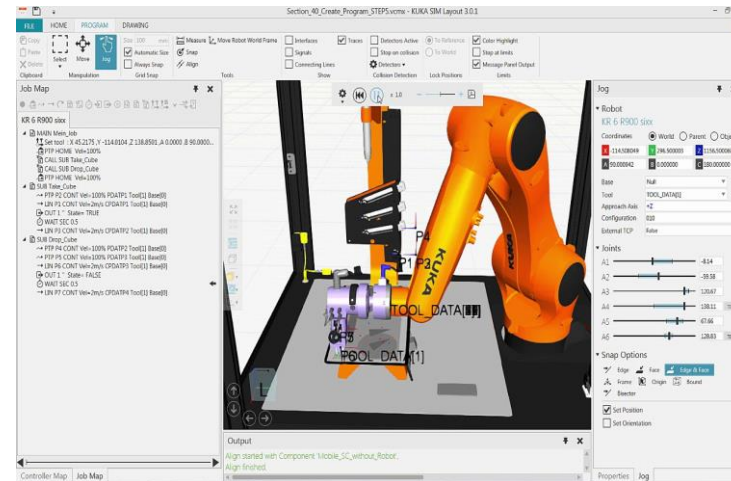
ABB RobotStudio



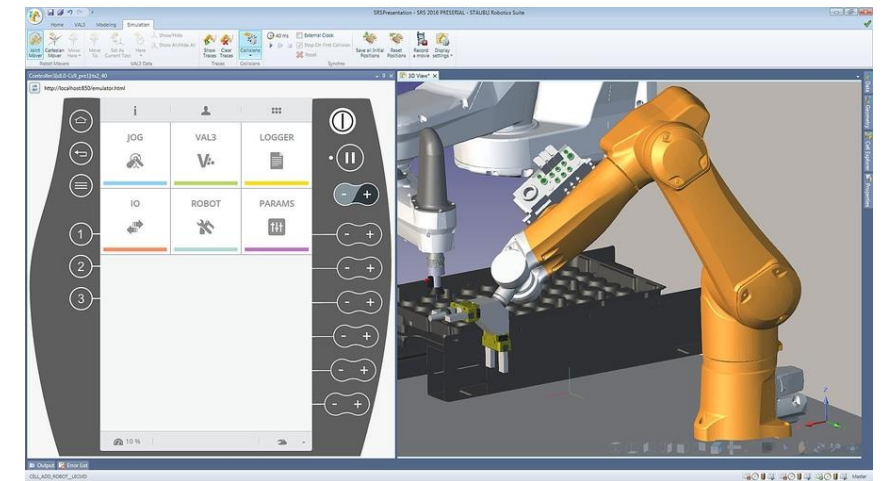
UR – Polyscope



Fanuc Roboguide



Kuka Sim Pro



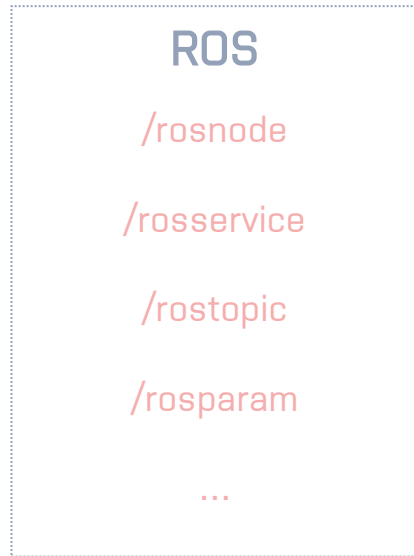
Staubli Robotics Suite

ROS, an open-source project, provides a common framework for robotics applications. ROS is heavily utilized by the research community for service robotics applications, but its technology can be applied to other application areas, including industrial robotics.

ROS-Industrial:

ROS-Industrial is an open-source project that extends the advanced capabilities of ROS to manufacturing automation and robotics. The ROS-Industrial repository includes interfaces for common industrial manipulators, grippers, sensors, and device networks.





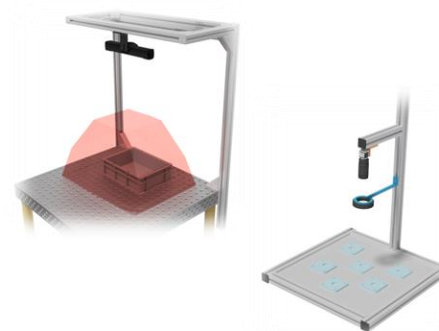
TCP / IP, OPC UA, etc.



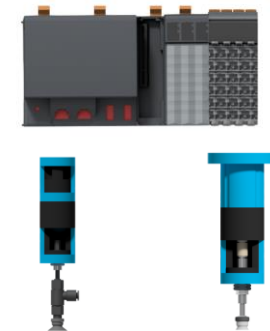
Industrial / Collaborative Robots

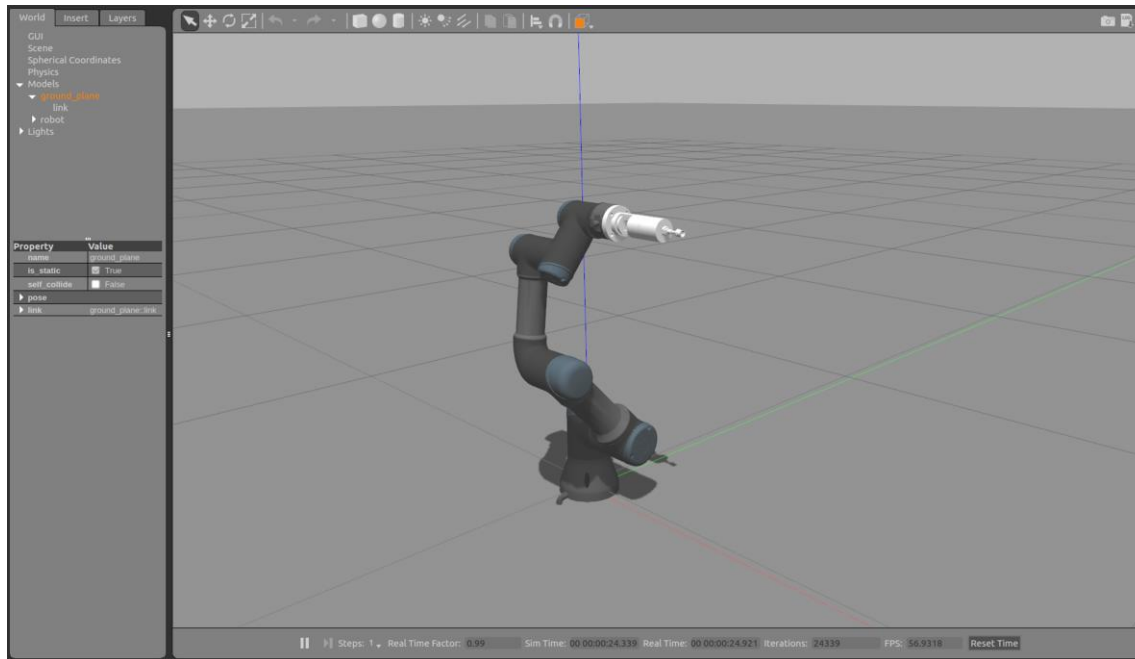


Sensors / Cameras

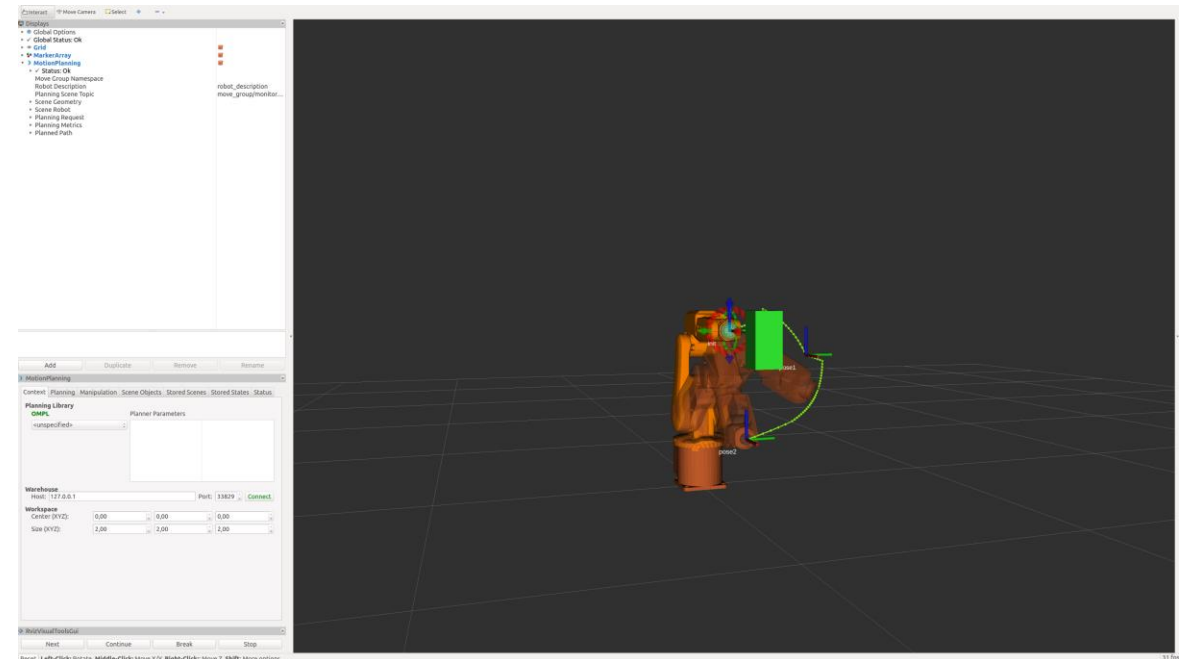


Other

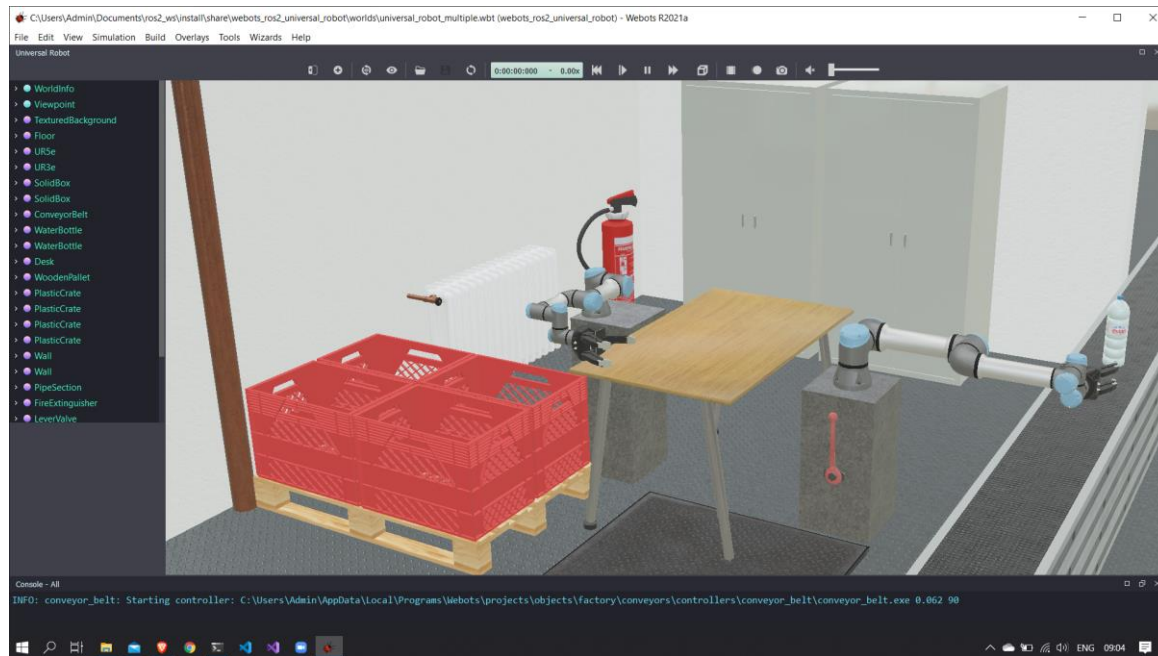




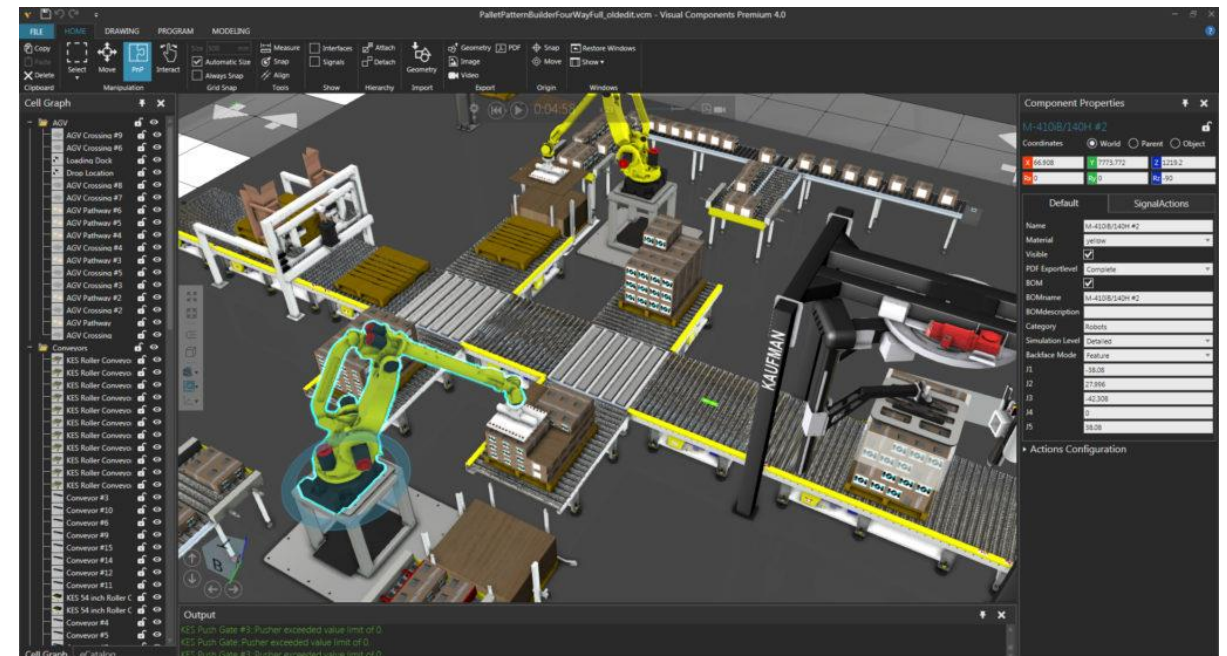
Gazebo



RVIZ



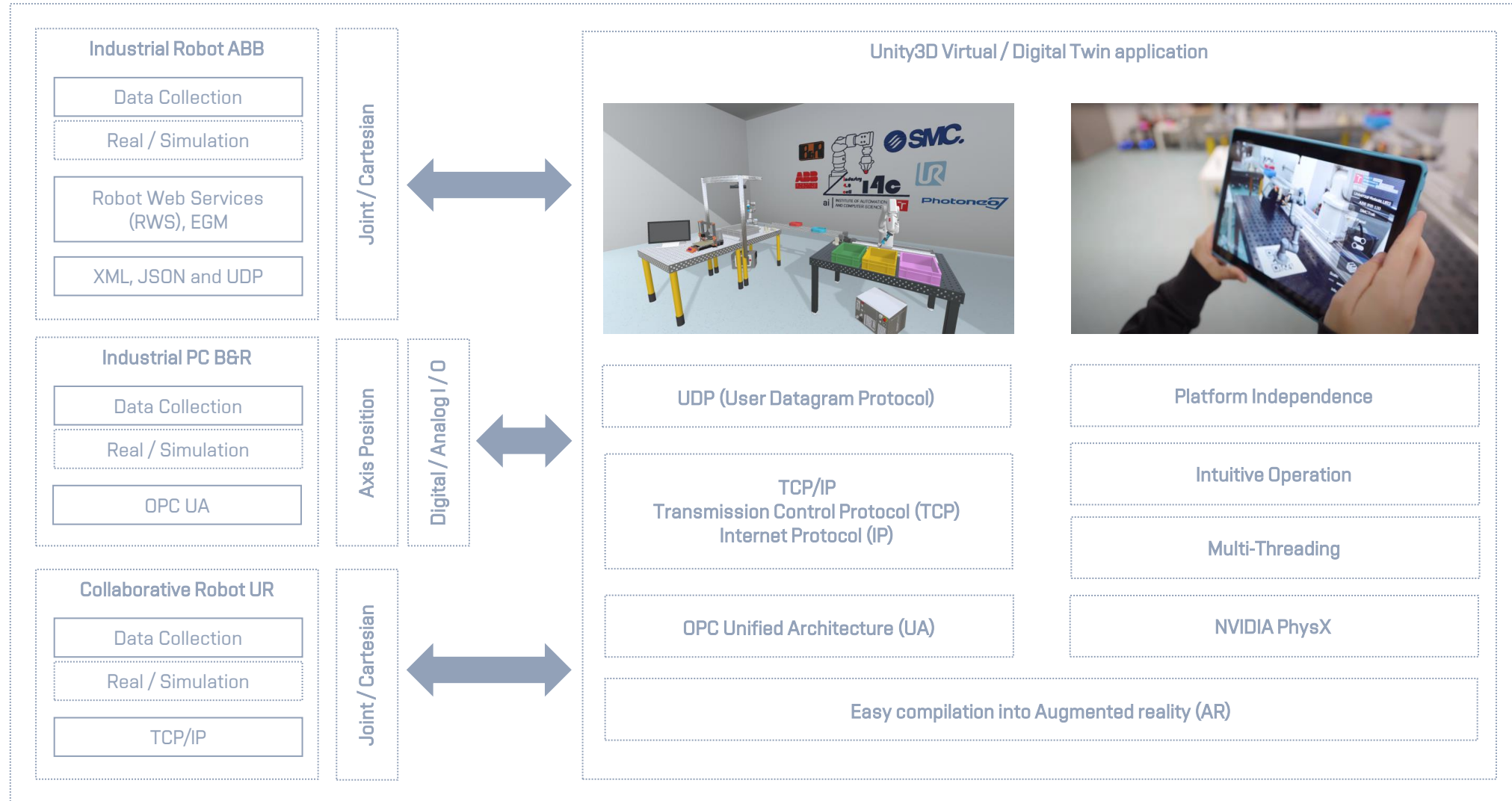
WEBOTS



Visual Components

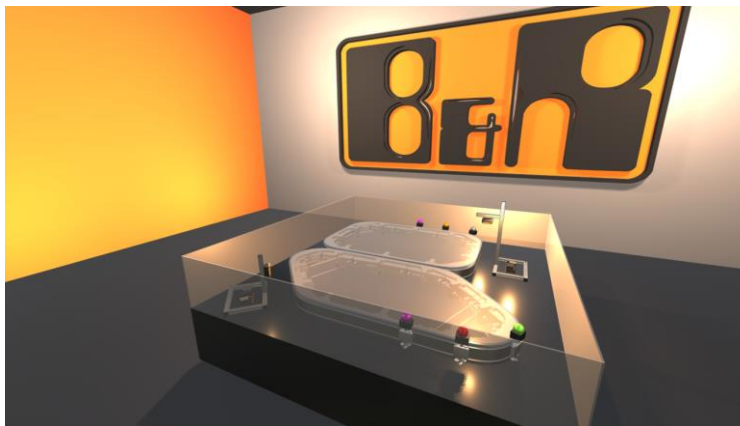


NVIDIA Omniverse





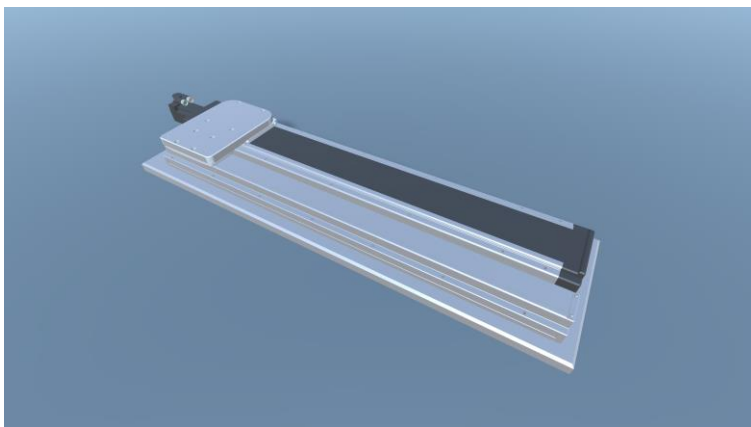
Industry 4.0 Cell: Sorting Line



B&R Automation ACOPOStrak



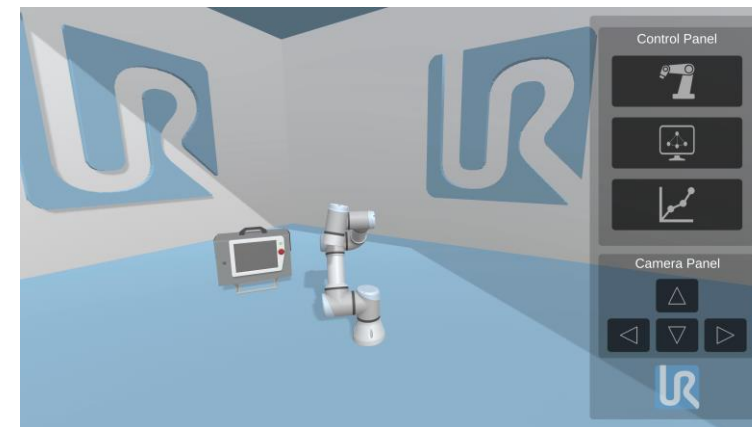
Industrial Robot ABB IRB 120



Simple Linear Axis (B&R Automation, SMC)



Sorting Machine (B&R Automation, SMC)



Collaborative Robot Universal Robots UR3

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Questions?





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