



MOVEIT PRO WORKS HERE

Enabling Cell Manufacturing at Scale

SEPTEMBER 9

9:00 AM MOUNTAIN (US)

4:00 PM UK

TODAY'S GUESTS

Meet Today's Speakers

Automating cell therapy manufacturing with reliable robot motion.



DAVE COLEMAN

Founder & Chief Product Officer

PickNik Robotics



LEO STEENSON

Head of Robotics

Cellular Origins



BEC EGAN

Senior Robotics Software Engineer

Cellular Origins

HOUSEKEEPING FOR TODAY

We want to hear from you.



Use the Q&A tab

Ask anything as we go. We'll answer live at the end — the more you send, the better the session.



More about Movelt Pro

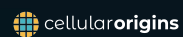
picknik.ai

picknik.ai/moveit-pro-core



More about Cellular Origins

cellularorigins.com



MOVEIT PRO WORKS HERE · THE SERIES

Catch Up on Past Episodes

Every episode is on demand at picknik.ai/webinars.



Rocket Lab

Reliable motion control and autonomy for space robotics.

picknik.ai/webinars/Rocket_Lab



BMW Group

Innovating automotive assembly with autonomous manipulation.

picknik.ai/webinars/BMW-Group...



Hivebotics

Building a \$100M robotics empire.

picknik.ai/webinars/Hivebotics...



cellular**origins**



cellular**origins**

Introduction – Leo Steenson

- Constellation system technical authority and Head of Robotics since 2024
- Joined TTP in early 2022 as "CO recruit #1" working on architecting and building out early Constellation system prototypes
- B.Eng in Mechanical Engineering and PhD on Model predictive control for over-actuated AUVs
- 10 years at Schlumberger Research working on advanced control and condition monitoring of large fluid systems



Introduction – Bec Egan

- Studied Mechatronics Engineering with a major in Space Engineering at the University of Sydney
- Previous role at Boeing Research and Technology (BR&T) in Melbourne, Australia, developing innovative robotics for aerospace manufacture
- Moved to Cambridge UK in early 2024 to join the Cellular Origins team



Cell therapies offer new hope. Manufacturing will determine how far it can reach.

- Cell and gene therapies are curing diseases we couldn't touch previously, transforming outcomes for patients with limited treatment options.
- The industry has moved rapidly and new approved therapies are expanding the number of patients who could benefit.
- However, access remains limited, and cell therapy is still relatively little known outside the industry.
- Availability is a major constraint, and manufacturing is one of the biggest barriers to wider patient access.



Emily Whitehead – the first child to be cured of acute lymphoblastic leukaemia using CAR T-cell therapy

Cellular Origins was founded to enable wider cell therapy access.

Cellular Origins began within Cambridge technology consultancy TTP, bringing experience in:

- Robotics
- Automation
- Life sciences
- Complex systems engineering



How the Constellation[®] system works



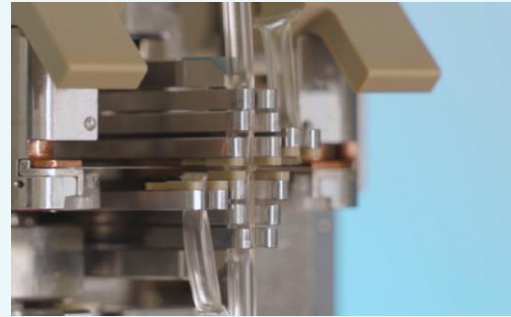
Mobile robots

Transport cell material and consumables and operate instruments at each workstation, automating the process end to end.



Modular workstations

Flexible configuration of workstations containing validated bioprocessing instruments, modified for robotic interaction.



Sterile fluid transfer

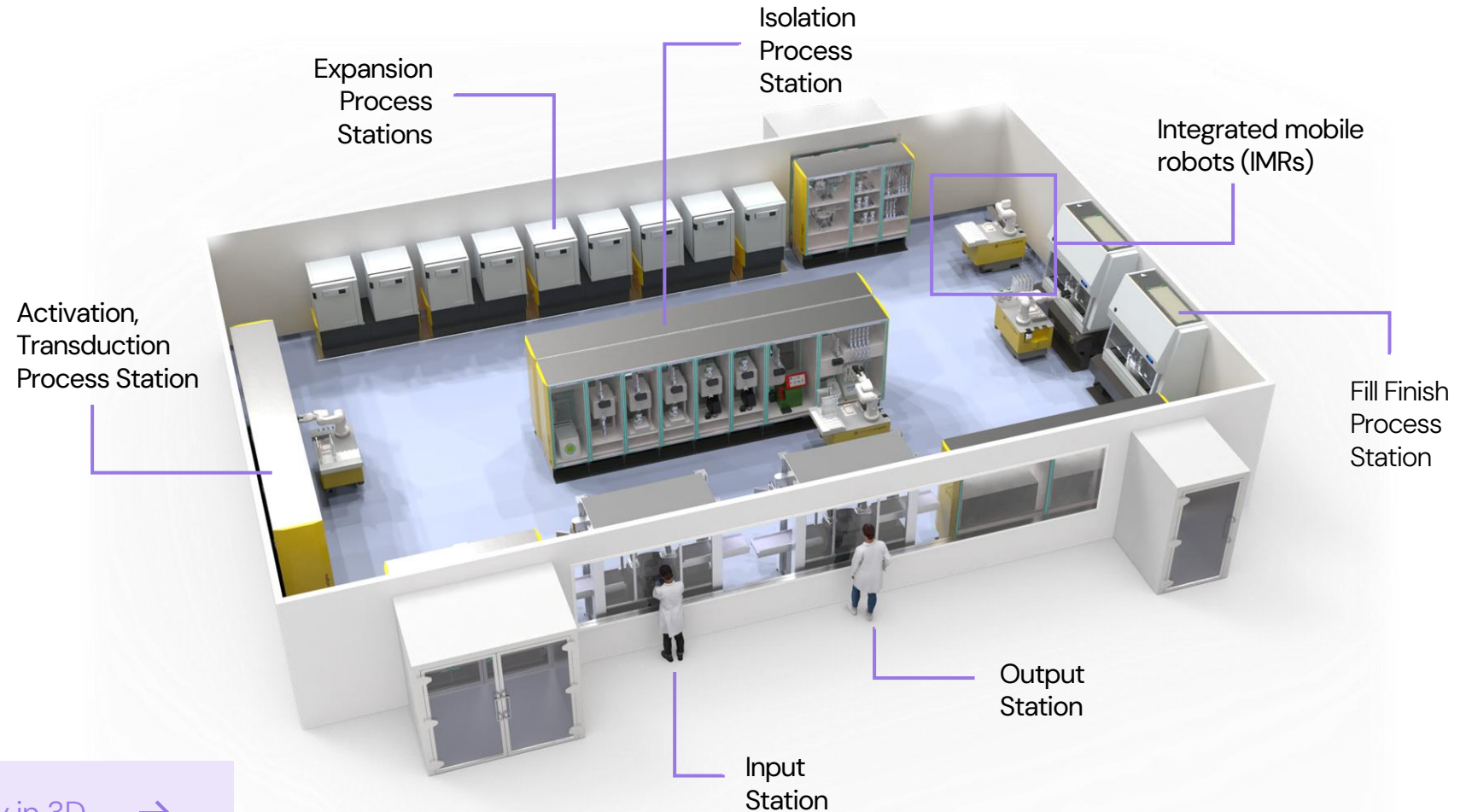
Cell materials remain in a closed system throughout, with sterile welding maintaining a sealed fluid pathway so the material is never exposed.



Total digital integration

Single software layer that orchestrates the workflow, tracks every action, and generates complete digital batch records of cell therapy manufacturing.

Constellation[®] – a fully-automated cell therapy manufacturing system.



Explore a CAR-T manufacturing facility in 3D →

Built to preserve biological performance at scale.

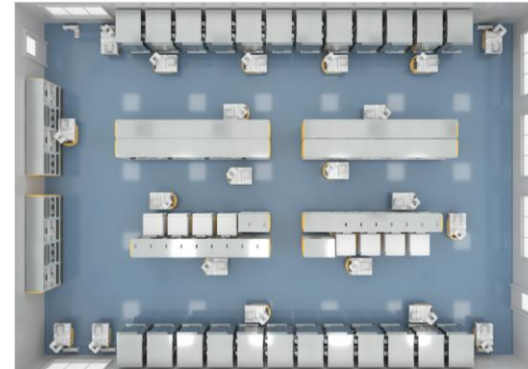
Scaling-up is easy. Configurable workstations allow manufacturers to add capacity where it is needed, without duplicating infrastructure.



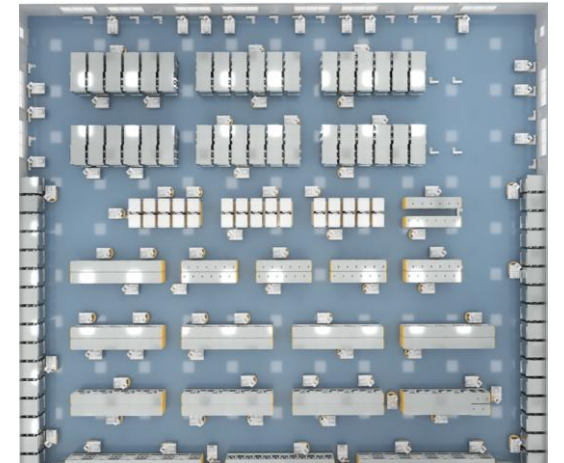
500 doses per year



1,000 doses per year



10,000 doses per year



50,000 doses per year

An introduction to Cellular Origins



What is needed from our robotics?

MiR250 mobile base

Stäubli TX2-60 industrial 6-axis robot

End effectors

Safety systems

Other features

- Factory navigation
- Obstacle avoidance
- Docking at workstations
- Trajectory execution for object manipulation
- Cleanroom compliant
- Pick and place end effector
- Welder: sterile connection
- Sealer: sterile disconnection
- 3 additional SICK microScan3 LiDARs
- Workstation confirmation cameras
- Wafer changer
- Waste bin
- Tool storage slots
- Extendable transport unit tray
- Process transport unit stand



What does the robotic software stack need to do?

- Navigation and precision docking to a workstation within the factory
- Confirmation and localisation of the workstation using multiple onboard cameras
- Configuration of safety systems
- IMR top-module tasks including:
 - Initialisation: safety, localisation and scene instantiation
 - Tool change and tray move
 - Pick and place
 - Instrument loading
 - Sterile connection (tubing manipulation, weld and seal)



Solving a capability gap

Our pathway to PickNik

Phase 1

Initial approach

- ROS1-based robotics stack
- Open-source MoveIt planners
- Sequential joint and Cartesian moves

The challenge

- ROS1 approaching end of life
- Planning failures late in trajectory execution
- Sensitivity to docking variation
- Difficulty around singularities

Why PickNik?

- Connected at ROSCon 2024
- Independent review of our robotics challenges as part of a Solution Study
- MoveIt Task Constructor identified as a potential route
- Initial MoveIt Pro discussions

Building on the capability

The next robotics challenge

Phase 2

Next steps

- ROS1 to ROS2 robotic software stack
- Introduce MoveIt Task Constructor (MTC)
- Joint cache to seed known joint moves

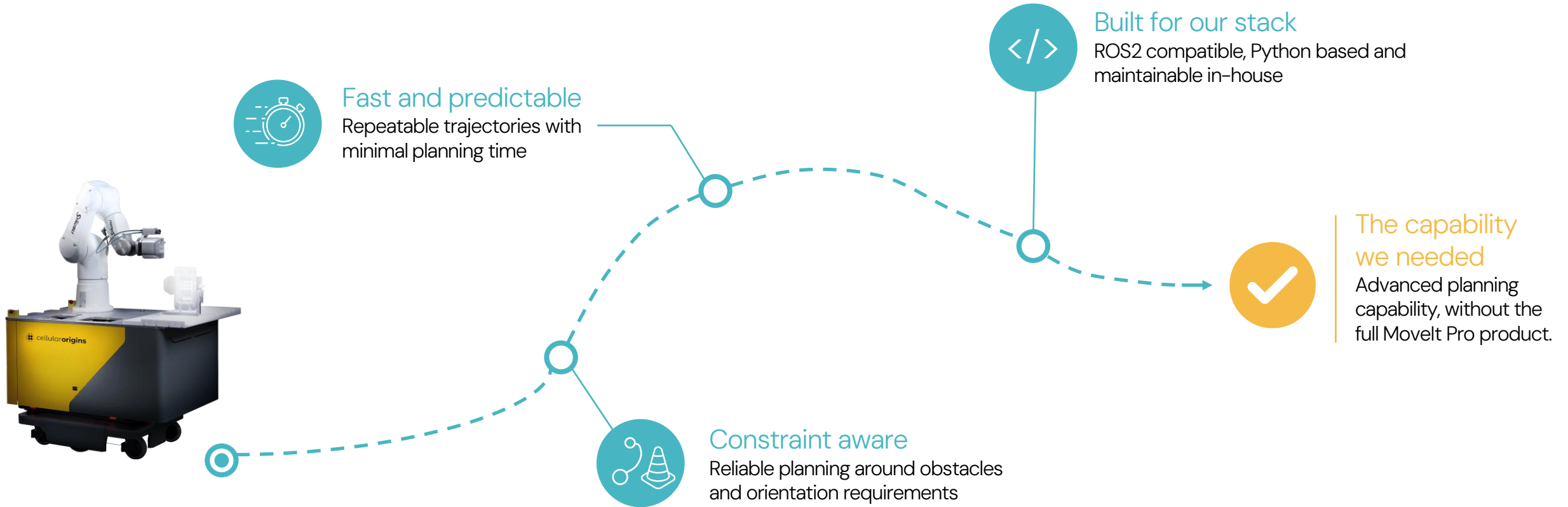
New challenge

- Increased trajectory planning time
- Additional planning time increases for constrained moves
- Unpredictable motion trajectories

Collaboration

- MoveIt Pro software trial at Cellular Origins
- Close collaboration with the PickNik team to fully assess the tool and refine approach

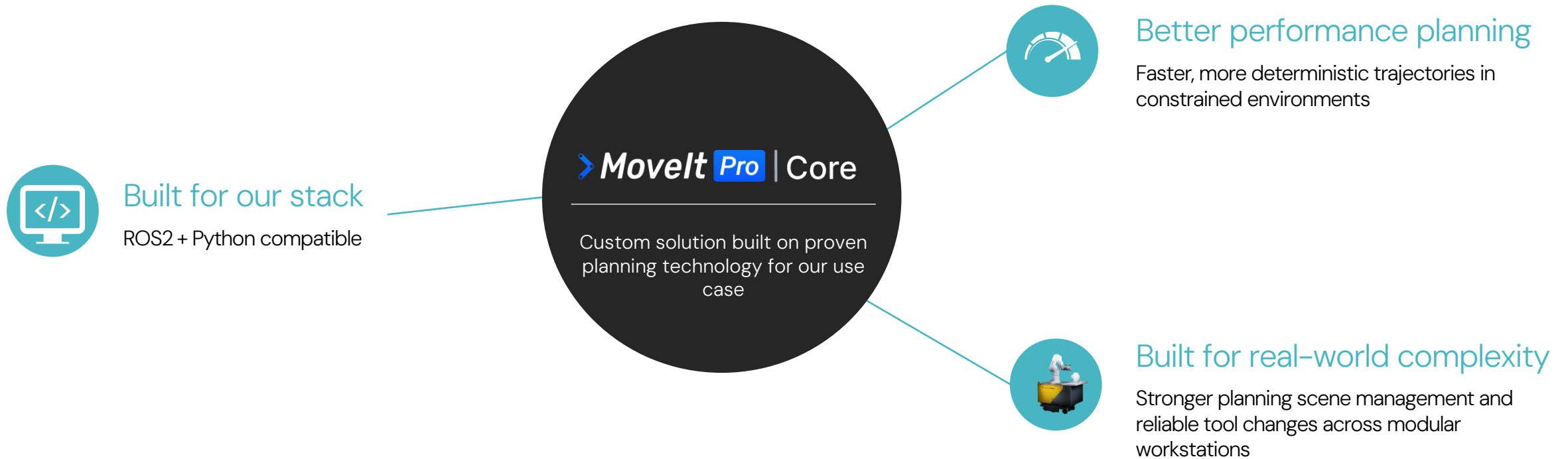
From trial to clarity: defining the brief



Access to advanced planning capability that delivers fast, predictable trajectories in complex, constrained environments – ROS2 compliant, Python-based, fully integrated with our existing software stack.

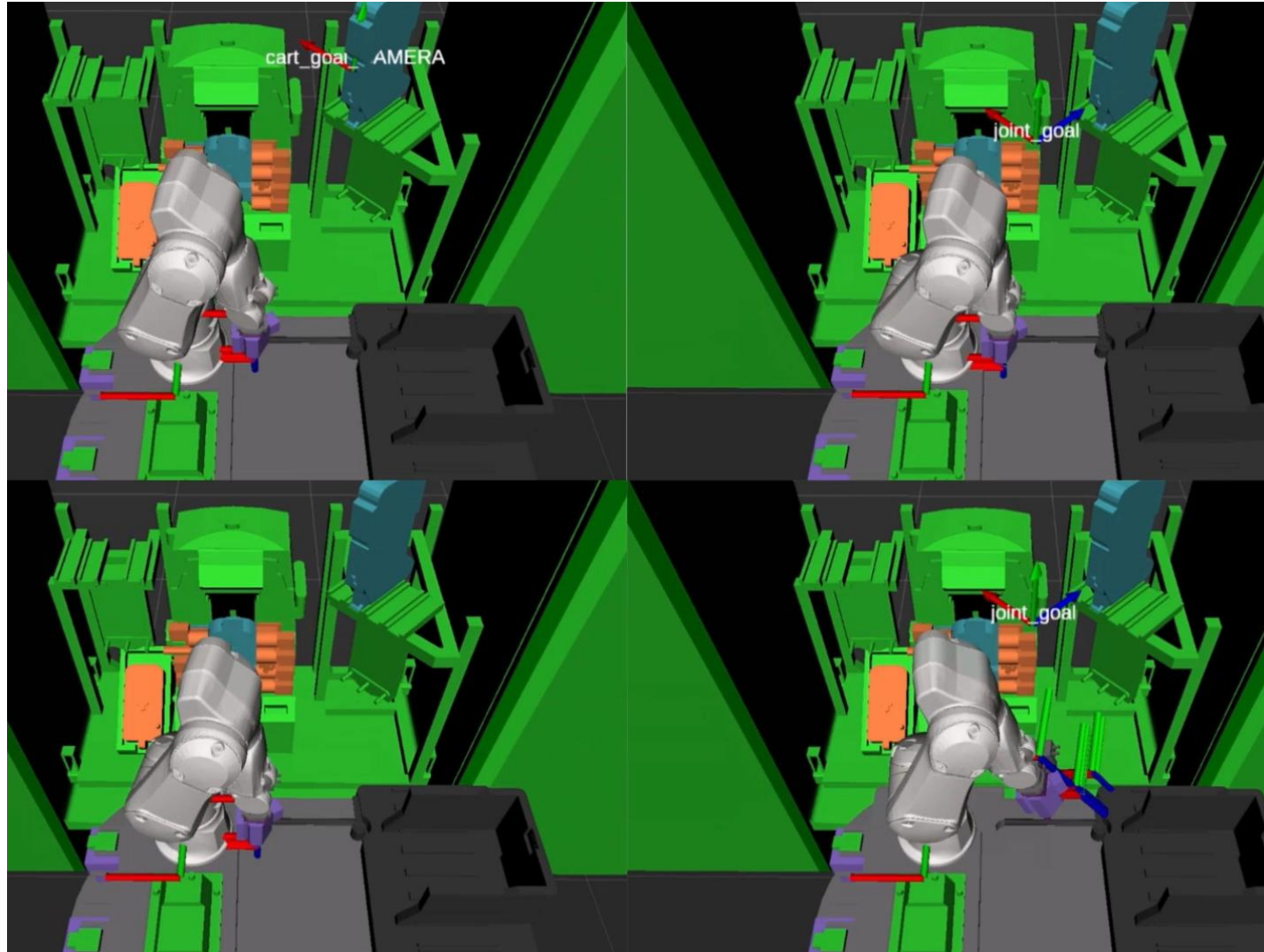
The solution: MoveIt Pro Core

Developed collaboratively with the [PickNik](#) team, iterating on feedback, refining Python interfaces and resolving deployment constraints



Planning improvements

Movelt2 Open Source



Movelt Pro Core

Movelt2 Open Source

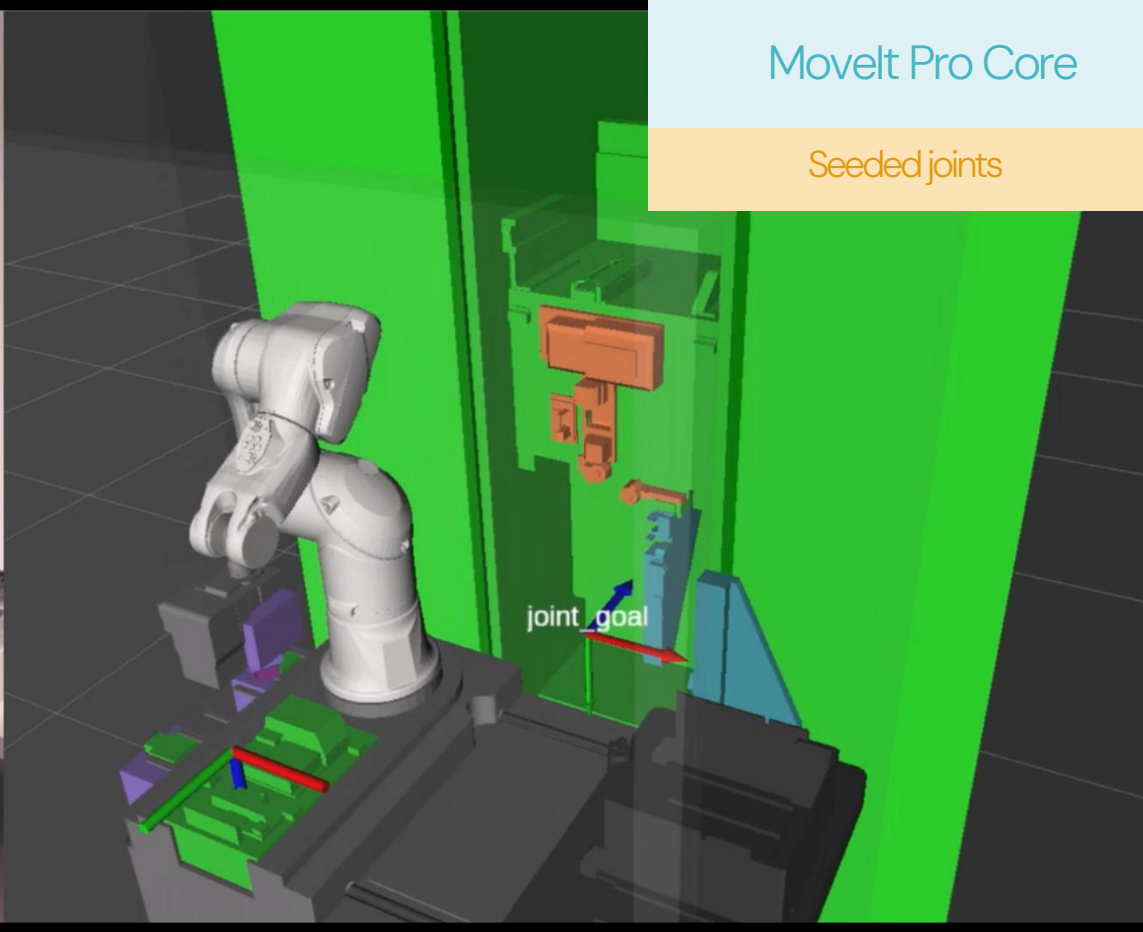
Seeded joints

Movelt Pro Core

Seeded joints

Planning improvements

Complex trajectory execution



Movelt Pro Core

Seeded joints

Watch our technology in action!





MoveIt **Pro**

**The Platform to Build and Deploy
Production Ready Physical AI**

Product Family Overview



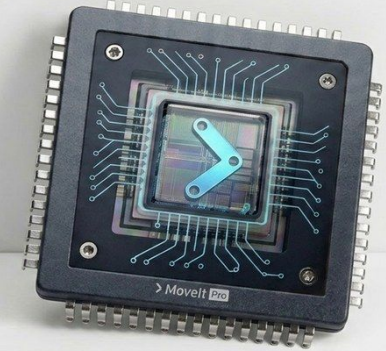
Movelt Pro Desktop App

- Build, simulate, and test robot apps.
- UI for visualizing, debugging, and editing Behavior Trees.
- High-fidelity physics simulator.
- Collect robot training data through teleoperation.



Movelt Pro Runtime

- Real-time libraries embedded on the deployed robot.
- No compiling or simulation - runs on lower-spec hardware.
- For production deployment.



Movelt Pro Core

- Real-time controllers.
- Inverse kinematics solvers.
- Planners.
- Minimum dependencies.

Reduce your software engineering time by 75% or more.

Movelt Pro makes your robotics developers 4x more productive.

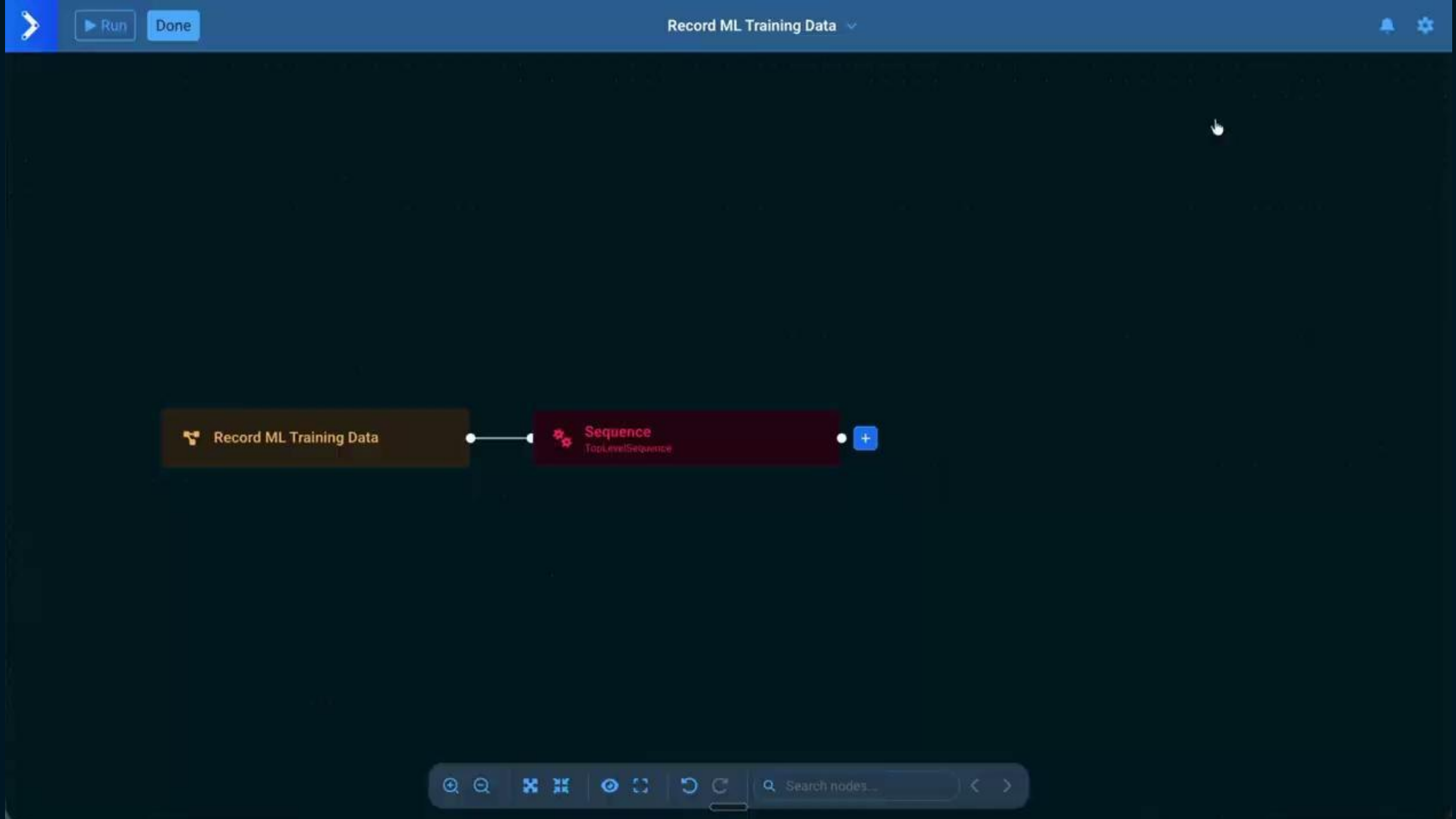


Code it or Claude it. Then **visually** debug it.

Other tools limit you to one development methodology.
With MoveIt Pro, you get the best of several worlds.

- ✓ **Works with your favorite Agentic AI tools**
 - pre-built skills, agents, and safety guarantees.
- ✓ **Write Python or C++**
 - you can always fall back to code.
- ✓ **Visualizations and Simulation**
 - to speed up your testing and debugging loop
- ✓ **External APIs** to command MoveIt Pro programmatically from your application.





Model Based Design with Behavior Trees & Debugger

All-In-One Robotics Application Platform

RUNTIME AUTONOMY

ML for Perception & Grasping

Off the shelf models for most applications

End-to-End ML

Increase dexterity with generalizable AI

Real-time Planners, Controllers, Solvers

Collision & force aware automatic trajectory generation

Mobile Base Navigation

Integrated for AMRs and humanoids on wheels

USER INTERFACES

Behavior Tree Builder

Visually build reactive logic, more flexibly than state machines

Robot Visualizer

Understand robot telemetry and logic

Debugging Toolchain

Insert breakpoint and view parameters at runtime

Teleoperation Suite

Five modes of human in the loop control

SIMULATION

AI Training Sim

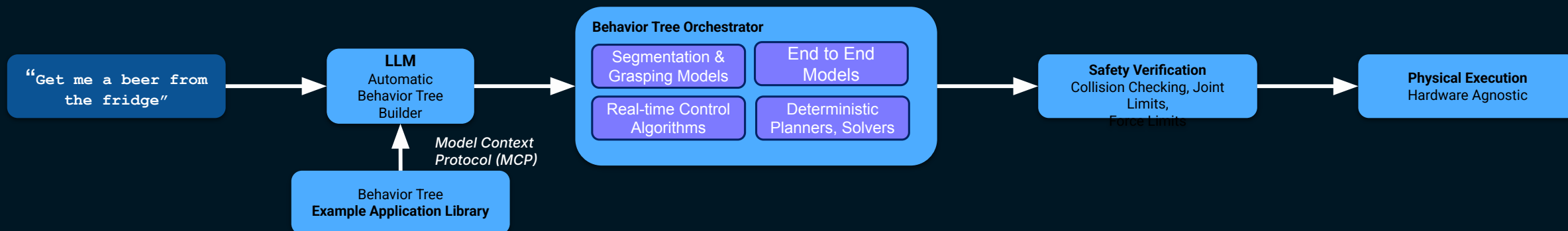
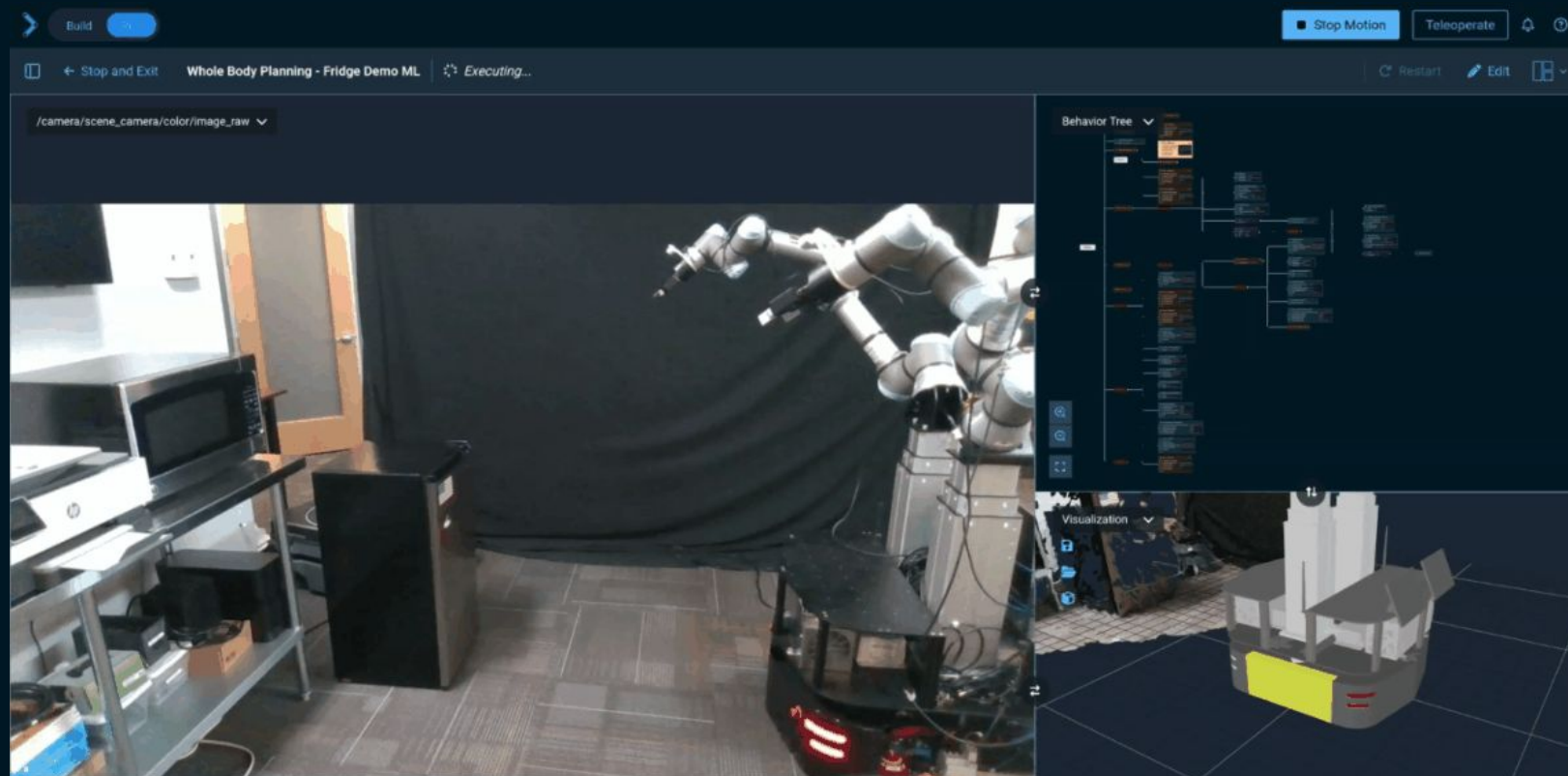
Toolchain for synthetic training data generation

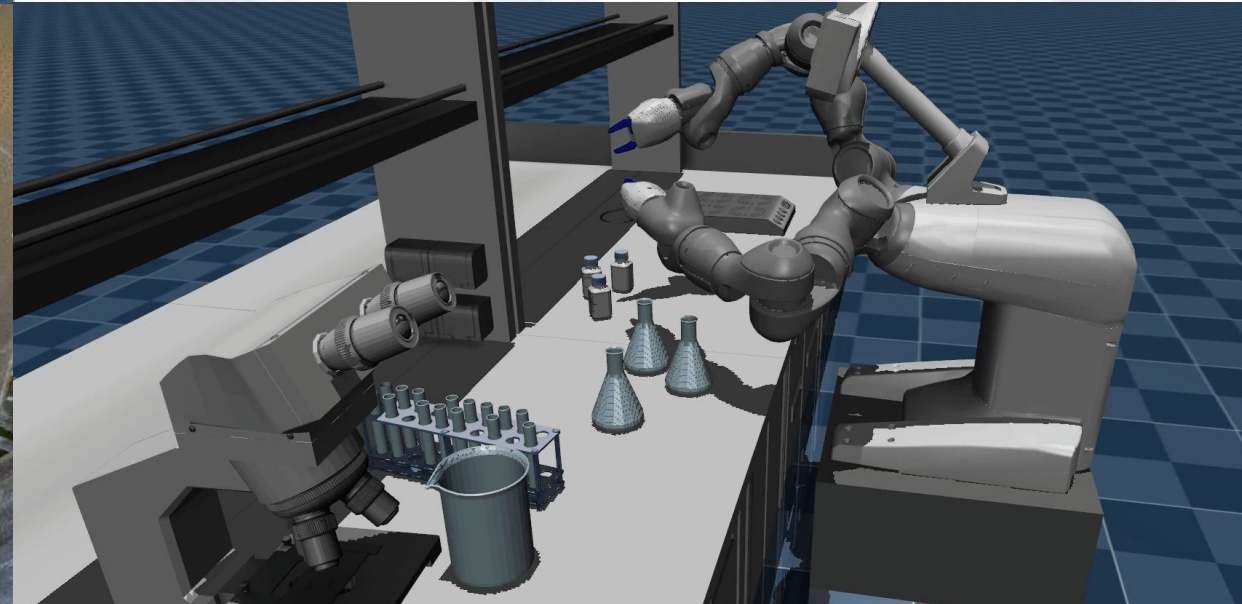
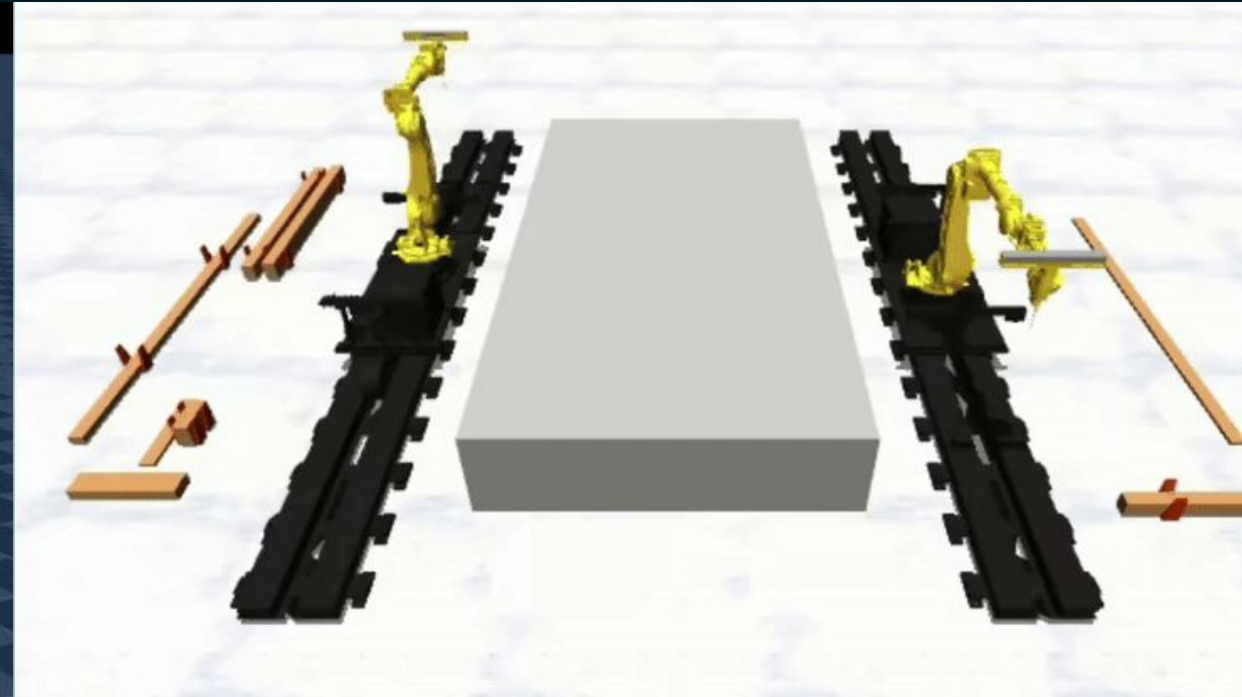
Offline Developer Sim

Create apps without or before robot hardware

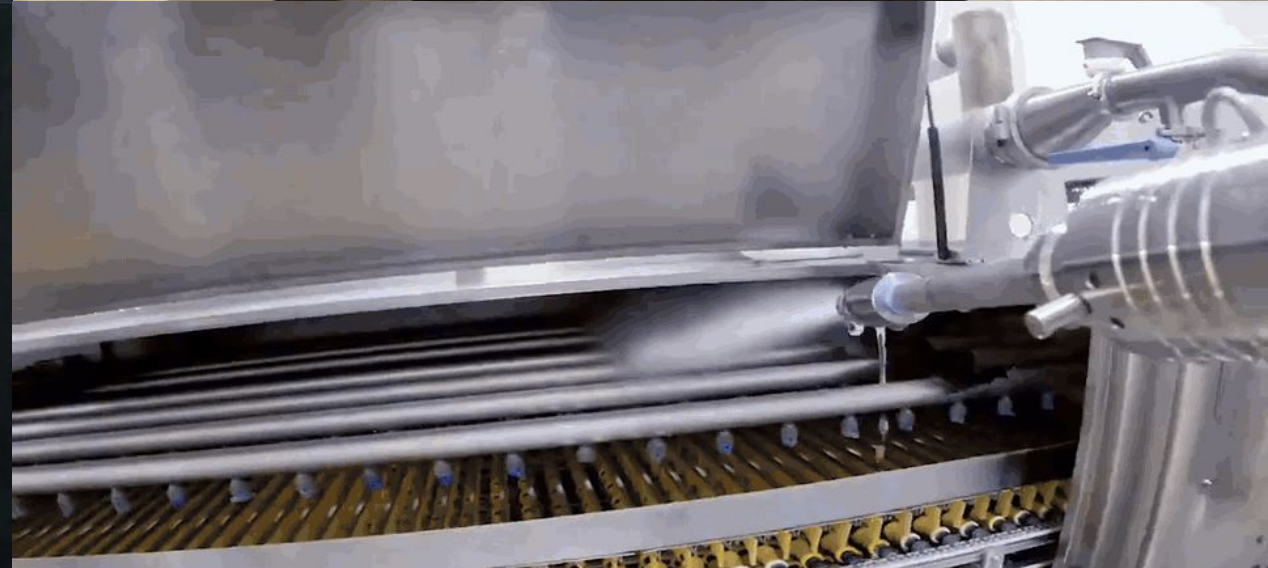
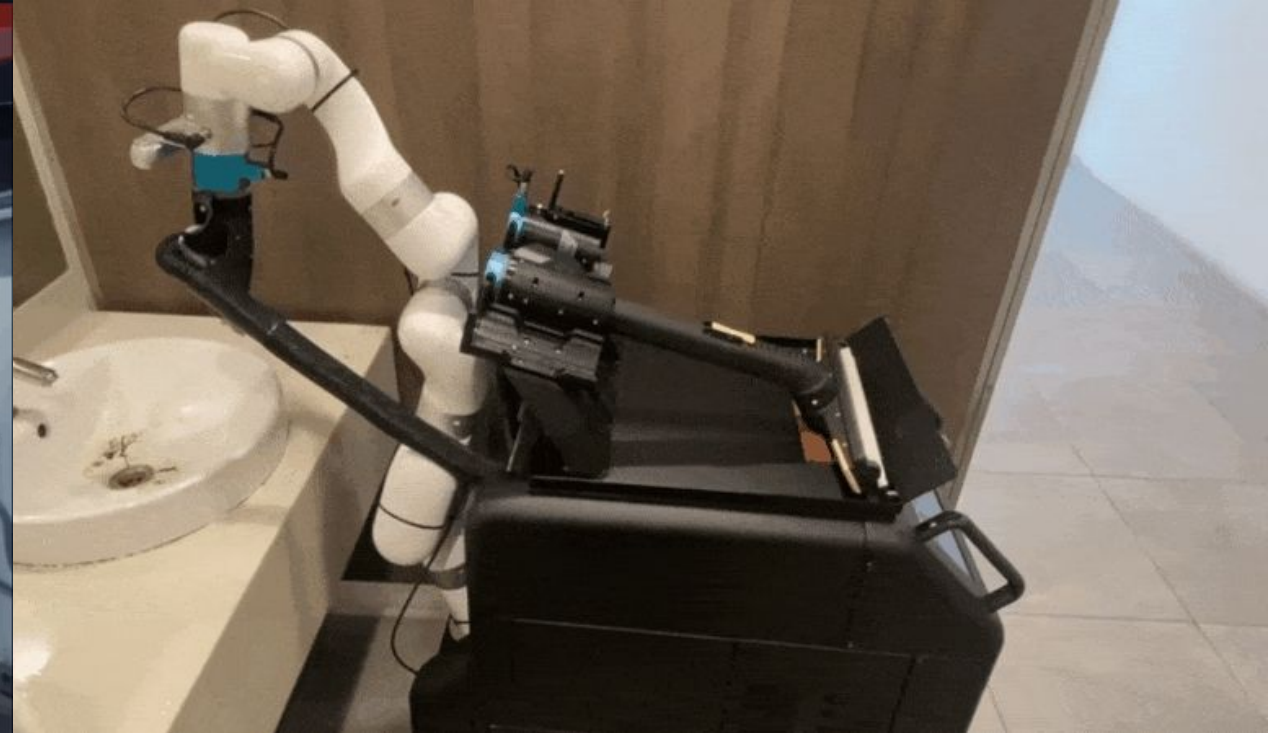
Combined, this enables

Complex intelligence for **humanoids** and robots of **all form factors**

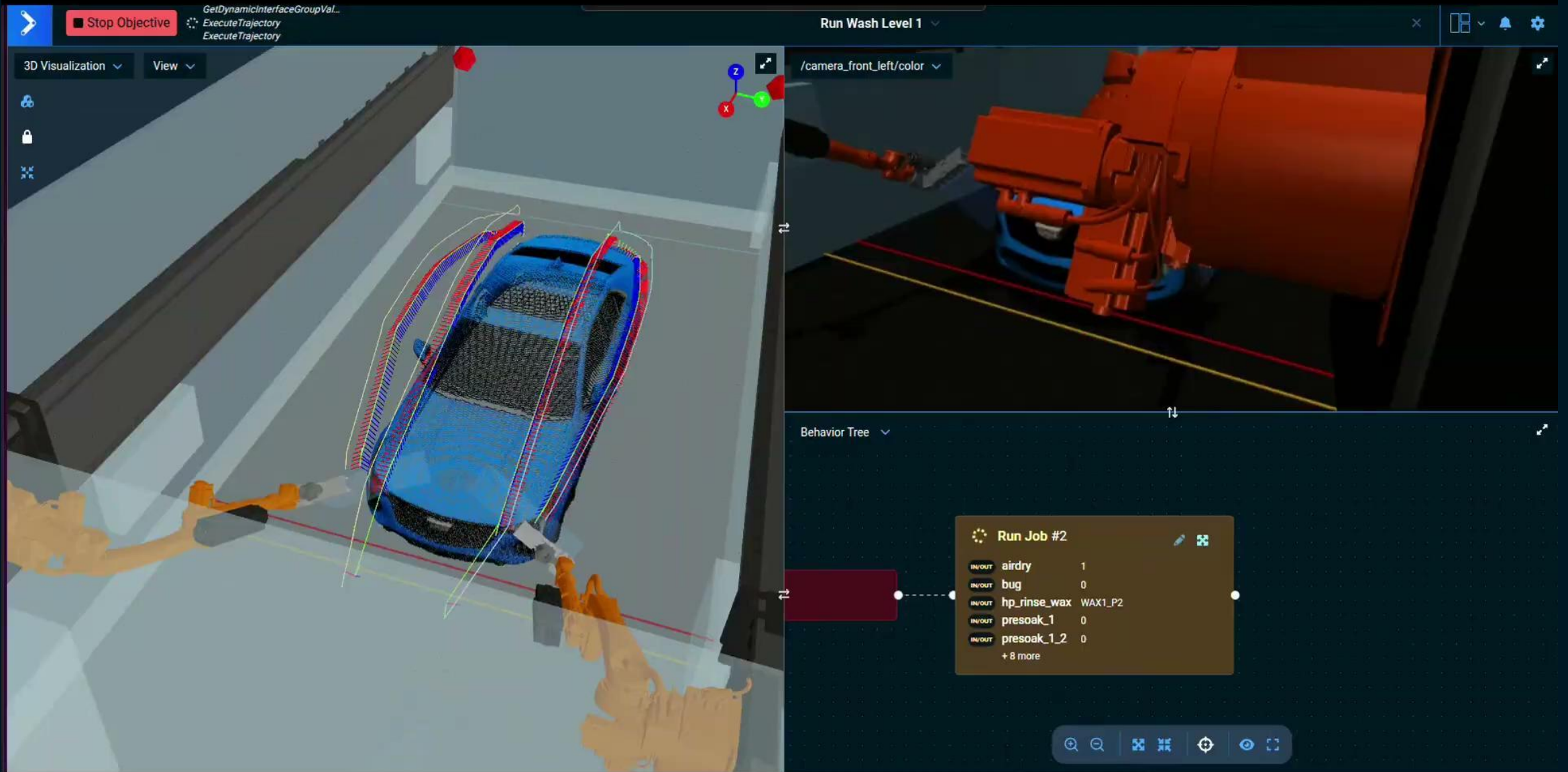




Application Category: Pick and Place



Application Category: Scan and Plan



Real-time Scan and Plan with Cartesian Planning

BuildRun

Stop and ExitML Move Boxes to Loading ZoneExecuting...RestartEdit

Visualization

ViewNavigation

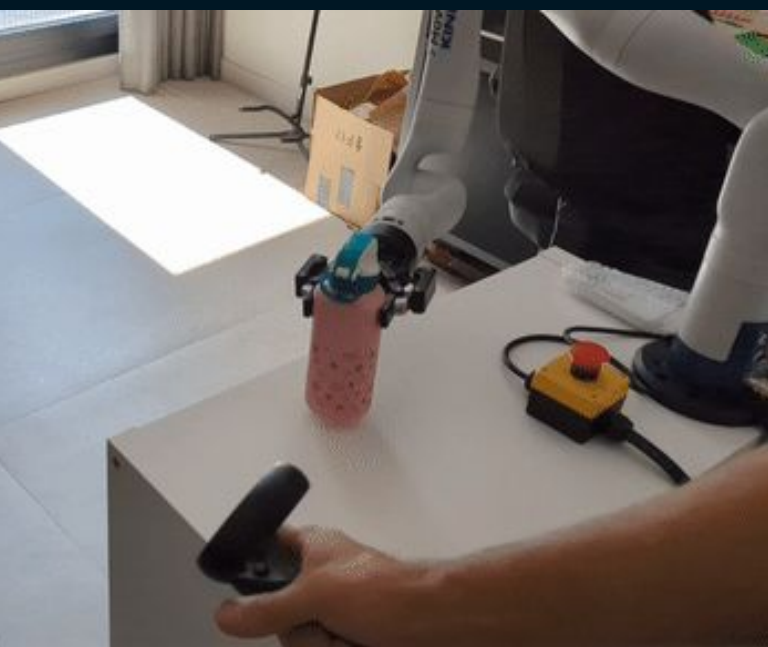
Behavior Tree

Taskboard

Type	Value
Move Boxes to Loading Zone	
Move Boxes to Loading Zone Start from Waypoint::7	
Move Boxes to Loading Zone Start from Waypoint::7/Clear Snapshot::18	
Move Boxes to Loading Zone Start from Waypoint::7/Move to Pose No Preview::69	
Move Boxes to Loading Zone Start from Waypoint::7/Move to Waypoint::18	
Move Boxes to Loading Zone Start from Waypoint::7/Move to Waypoint::18/Move to Joint State::13	
Move Boxes to Loading Zone Start from Waypoint::77	
Move Boxes to Loading Zone Start from Waypoint::77/Clear Snapshot::88	

/scene_camera/color

Mobile Pick and Place with ML Segmentation



Many Teleoperation and Human in the Loop Modes

 Universal Robots Driver Quality Score: Great High-Bandwidth Streaming ROS Vendor Supported DRIVER Movell Gold Integration CONFIG	 KUKA KR Cybertech Series Driver Quality Score: Great High-Bandwidth Streaming ROS Vendor Supported DRIVER Movell Gold Integration CONFIG	 FANUC Driver Quality Score: Great High-Bandwidth Streaming ROS Vendor Supported DRIVER Movell Gold Integration CONFIG	 Franka Robotics Driver Quality Score: Great High-Bandwidth Streaming ROS Vendor Supported DRIVER Movell Gold Integration CONFIG
 Kinova Driver Quality Score: Great High-Bandwidth Streaming ROS Vendor Supported DRIVER Movell Gold Integration CONFIG	 UFactory Driver Quality Score: Great High-Bandwidth Streaming ROS Vendor Supported DRIVER Movell Gold Integration CONFIG	 Motiv Space Systems Driver Quality Score: Great High-Bandwidth Streaming ROS Vendor Supported Movell Gold Integration	 HDT Global Driver Quality Score: Average Low-Bandwidth Trajectory ROS Vendor Supported Movell Gold Integration
 Elite Robots Driver Quality Score: Great High-Bandwidth Streaming ROS Vendor Supported DRIVER Movell Gold Integration	 ABB Driver Quality Score: Great High-Bandwidth Streaming ROS Community Support DRIVER Movell Gold Integration	 AgileX ROS Vendor Supported DRIVER	 Aubo ROS Vendor Supported DRIVER
 Comau	 Delta	 Denso Driver Quality Score: Average Low-Bandwidth Trajectory	 Doosan

Compatible with any robot hardware

See more on our Hardware Partner Ecosystem

BEFORE YOU GO

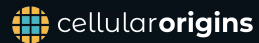
Where to Next

STAY IN TOUCH



picknik.ai

picknik.ai/moveit-pro-core



cellularorigins.com



COME FIND US IN PERSON



ROSCon 2026

Toronto · September 22–24

PickNik is at booth #7

Dave Coleman is co-presenting
the Space ROS keynote

roscon.ros.org/2026

RoboBusiness

Santa Clara, CA · October 20–21

robobusiness.com

Questions?

Drop them in the Q&A tab — we'll take as many as we can.





Thank you.

picknik.ai

