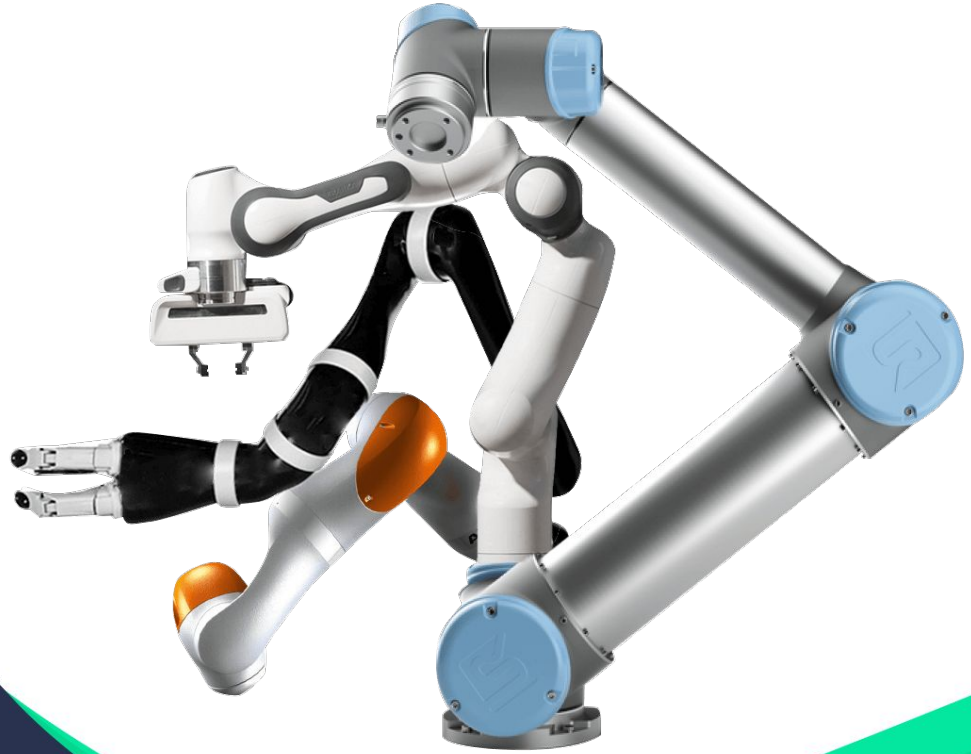
PICKNIK ROBOTICS



MoveIt Studio Developer Platform

ROS Industrial Americas Community Meeting

September 21, 2022

Dave Coleman, PhD
CEO of PickNik Robotics
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MoveIt

What is it?

The motion planning platform for ROS.

Robot Arm Planning
Motion and Path Generation

Mobile Base Navigation
Mobile Manipulation

Perception and Vision
Dynamic Scene Understanding

Inverse Kinematics
With Complex Constraints

Realtime Motion Control
Reactive Closed-Loop Motions Generation

Grasping and Manipulation
Picking, Placing, and more

moveit.ros.org

PICKNIK ROBOTICS

MoveIt Studio

Why?

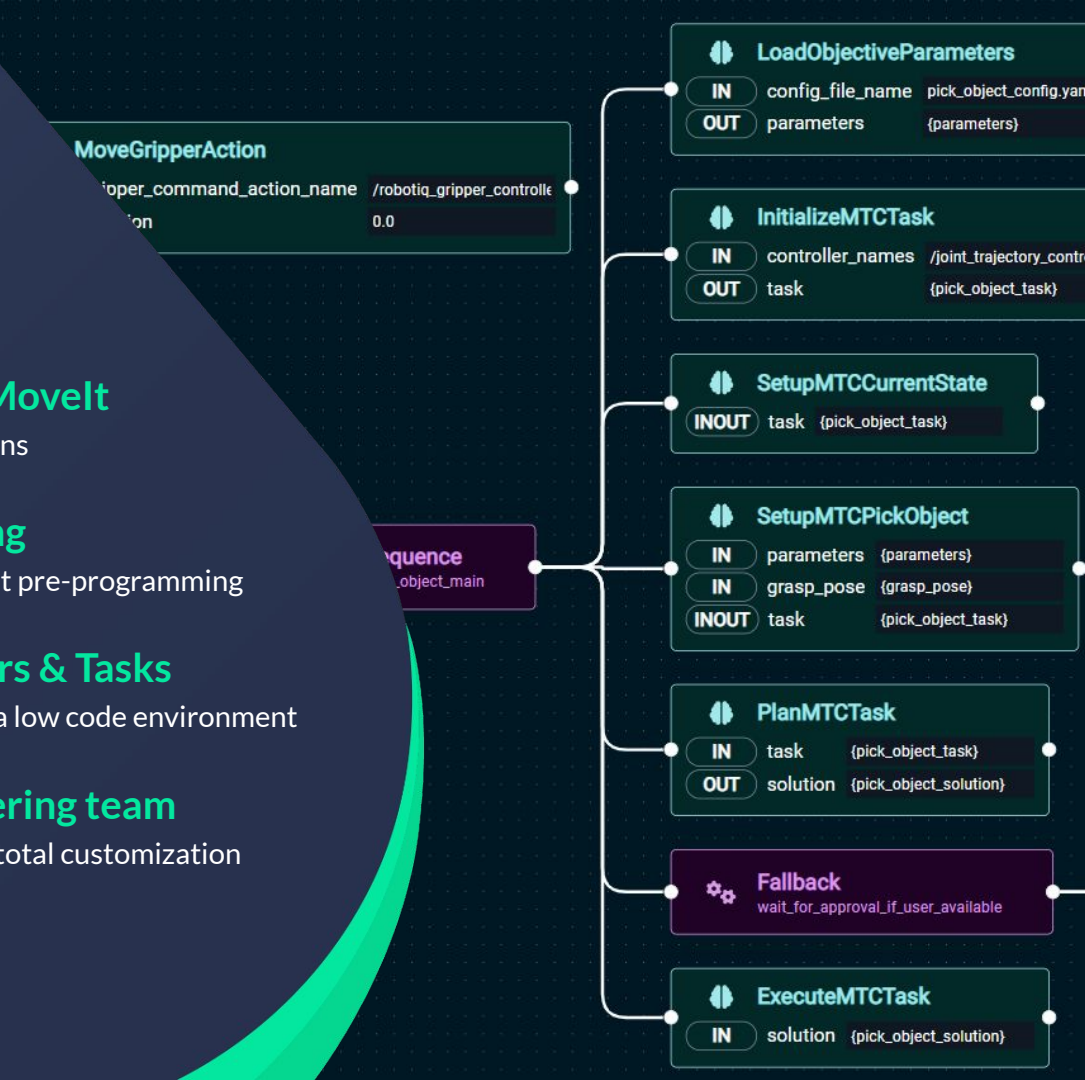
We kept solving the same problems for our 70+ customers to date, and wanted to distill all our best practices into one product.

- Shortcut your development time
- Empower your engineering team
- Easily build and debug advanced applications
- Reduce need for experts
- Enable validating prototypes faster

MoveIt Studio

Developer Platform

- **Tightly integrated Behavior Trees + MoveIt**
  Develop complex, fault-tolerance robotic applications
- **Task Level Planning + Motion Planning**
  Solve multi-step tasks in real time, without waypoint pre-programming
- **Leverage pre-built library of Behaviors & Tasks**
  Out of the box many applications can be created in a low code environment
- **Infinitely extendable by your engineering team**
  Custom behaviors/plugins can be written, allowing total customization



PICKNIK ROBOTICS

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Remote Monitoring and Error Recovery

- Have a recovery plan in place
- Get robots back online faster
- Enable developers to WFH
- Remotely reset protective stop
- View debug logs online

In partnership with:

Formant

MoveIt Supervisor

- Suited for operator in the loop applications
- Robust to high latency environment
- Leverages supervised autonomy: *mosty automated*

In partnership with:

PICKNIK ROBOTICS

Live Demo!

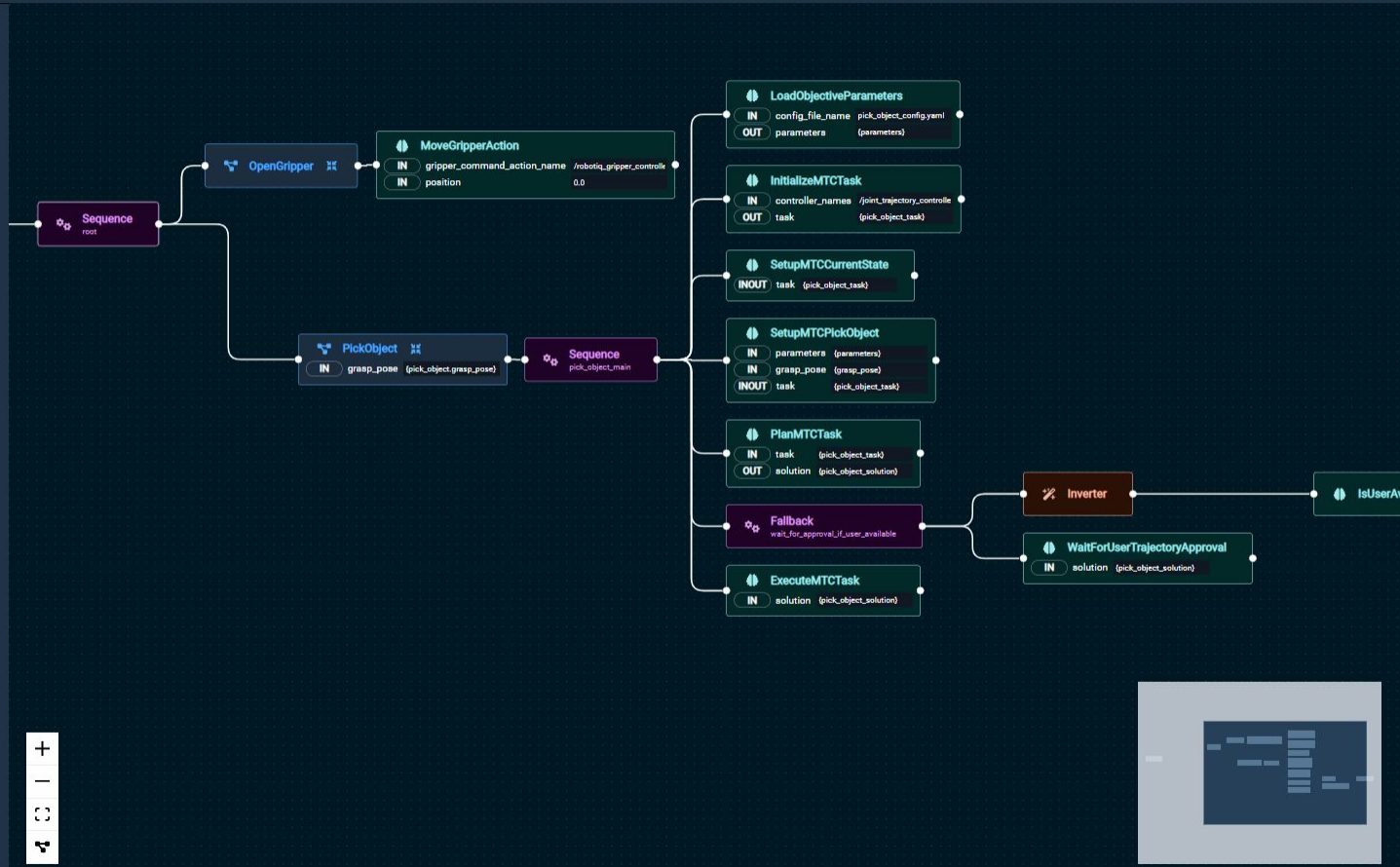
It usually works :-)

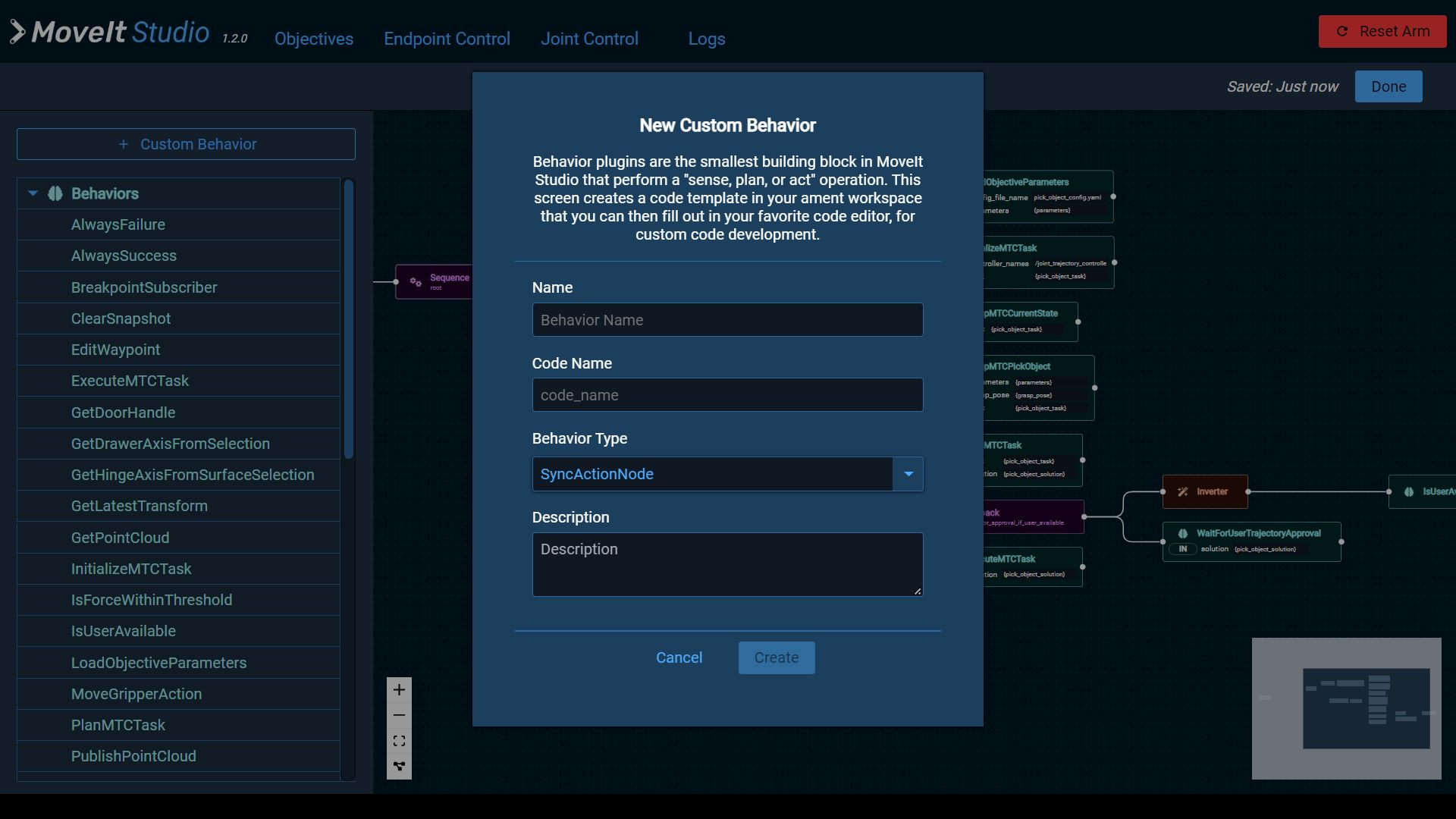
Pick Object
Pick up a small object

Saved: Just now Done

+ Custom Behavior

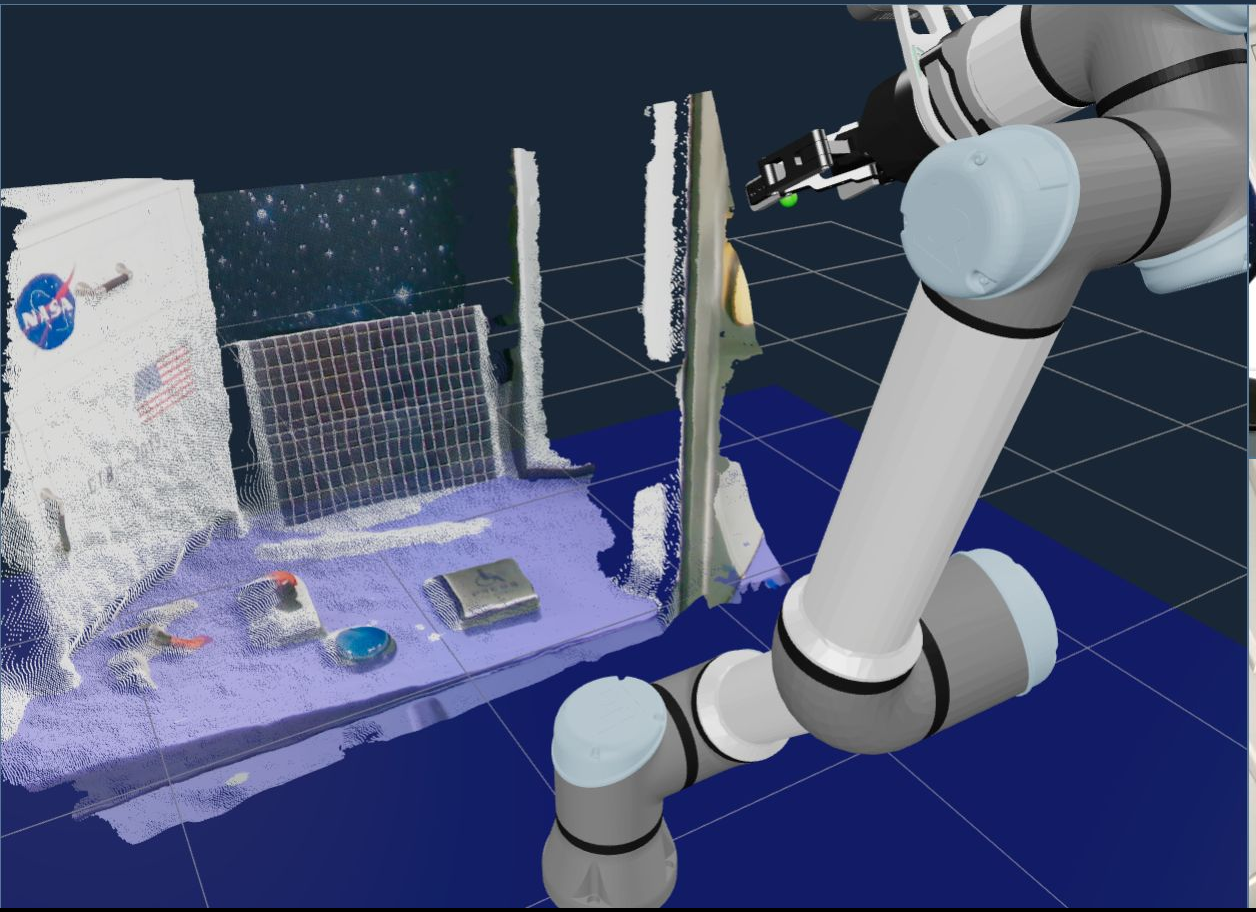
- **Behaviors**
  - AlwaysFailure
  - AlwaysSuccess
  - BreakpointSubscriber
  - ClearSnapshot
  - EditWaypoint
  - ExecuteMTCTask
  - GetDoorHandle
  - GetDrawerAxisFromSelection
  - GetHingeAxisFromSurfaceSelection
  - GetLatestTransform
  - GetPointCloud
  - InitializeMTCTask
  - IsForceWithinThreshold
  - IsUserAvailable
  - LoadObjectiveParameters
  - MoveGripperAction
  - PlanMTCTask
  - PublishPointCloud

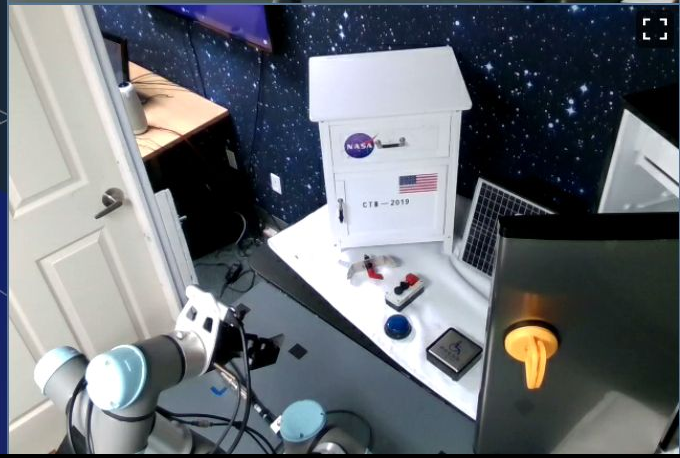


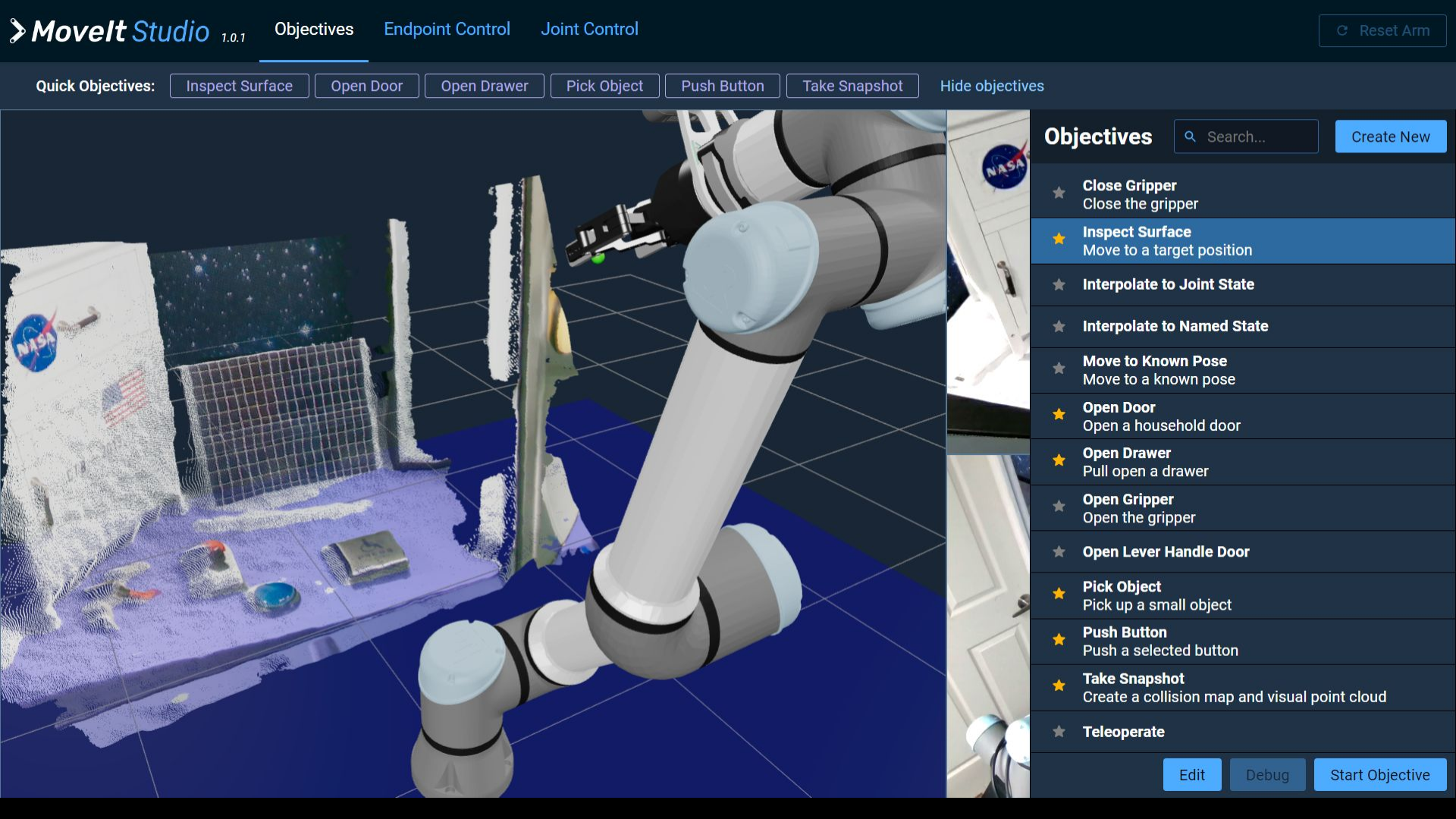

MoveIt Studio 1.2.0
Objectives
Endpoint Control
Joint Control
Logs
Reset Arm
Saved: Just now
Done
+ Custom Behavior
Behaviors
AlwaysFailure
AlwaysSuccess
BreakpointSubscriber
ClearSnapshot
EditWaypoint
ExecuteMTCTask
GetDoorHandle
GetDrawerAxisFromSelection
GetHingeAxisFromSurfaceSelection
GetLatestTransform
GetPointCloud
InitializeMTCTask
IsForceWithinThreshold
IsUserAvailable
LoadObjectiveParameters
MoveGripperAction
PlanMTCTask
PublishPointCloud
New Custom Behavior
Behavior plugins are the smallest building block in MoveIt Studio that perform a "sense, plan, or act" operation. This screen creates a code template in your ament workspace that you can then fill out in your favorite code editor, for custom code development.
Name
Behavior Name
Code Name
code_name
Behavior Type
SyncActionNode
Description
Description
Cancel
Create
Sequence
root
Inverter
WaitForUserTrajectoryApproval
IN
solution
{pick_object_solution}

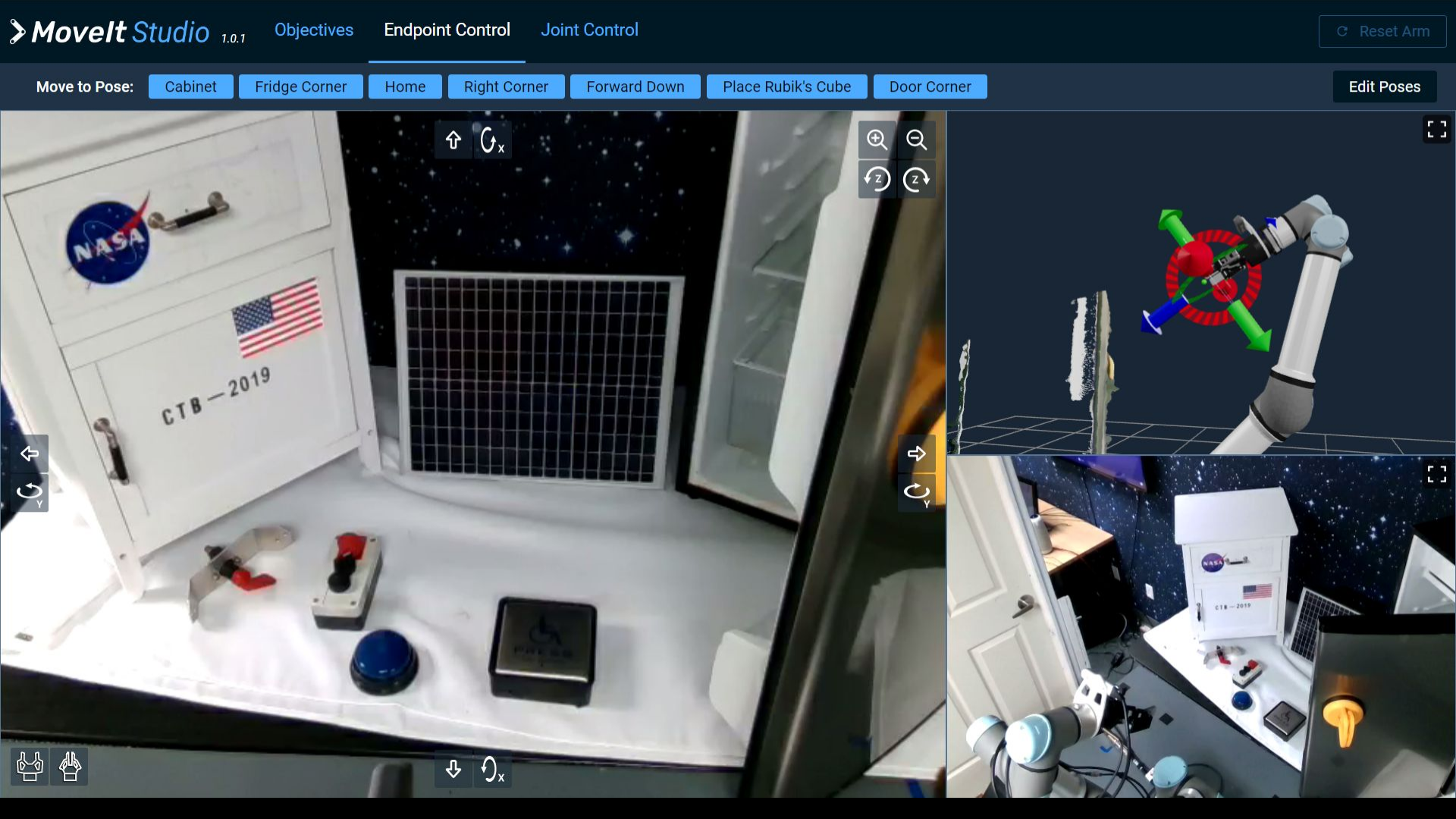
MoveIt Studio 1.0.1 | Objectives | Endpoint Control | Joint Control | Reset Arm

Quick Objectives: Inspect Surface | Open Door | Open Drawer | Pick Object | Push Button | Take Snapshot | Show all objectives



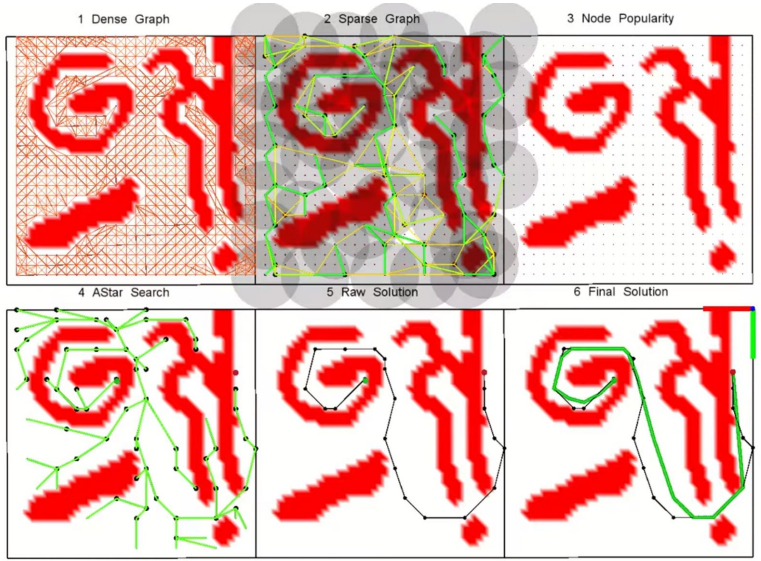



MoveIt Studio 1.0.1
Objectives
Endpoint Control
Joint Control
Reset Arm
Quick Objectives:
Inspect Surface
Open Door
Open Drawer
Pick Object
Push Button
Take Snapshot
Hide objectives
Objectives
Search...
Create New
Close Gripper
Close the gripper
Inspect Surface
Move to a target position
Interpolate to Joint State
Interpolate to Named State
Move to Known Pose
Move to a known pose
Open Door
Open a household door
Open Drawer
Pull open a drawer
Open Gripper
Open the gripper
Open Lever Handle Door
Pick Object
Pick up a small object
Push Button
Push a selected button
Take Snapshot
Create a collision map and visual point cloud
Teleoperate
Edit
Debug
Start Objective


MoveIt Studio 1.0.1
Objectives
Endpoint Control
Joint Control
Reset Arm
Move to Pose:
Cabinet
Fridge Corner
Home
Right Corner
Forward Down
Place Rubik's Cube
Door Corner
Edit Poses
NASA
CTB—2019

Coming Soon

- **Trajectory Introspection**
  Understand when trajectories fail
- **PRM Graph Planning Caching**
  Plan faster and smarter
- **Optimal Trajectory Tuning**
  Benchmark and improve performance



Thank you

Schedule a call with us!

We'll send you a live demo

Free trial coming soon

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