



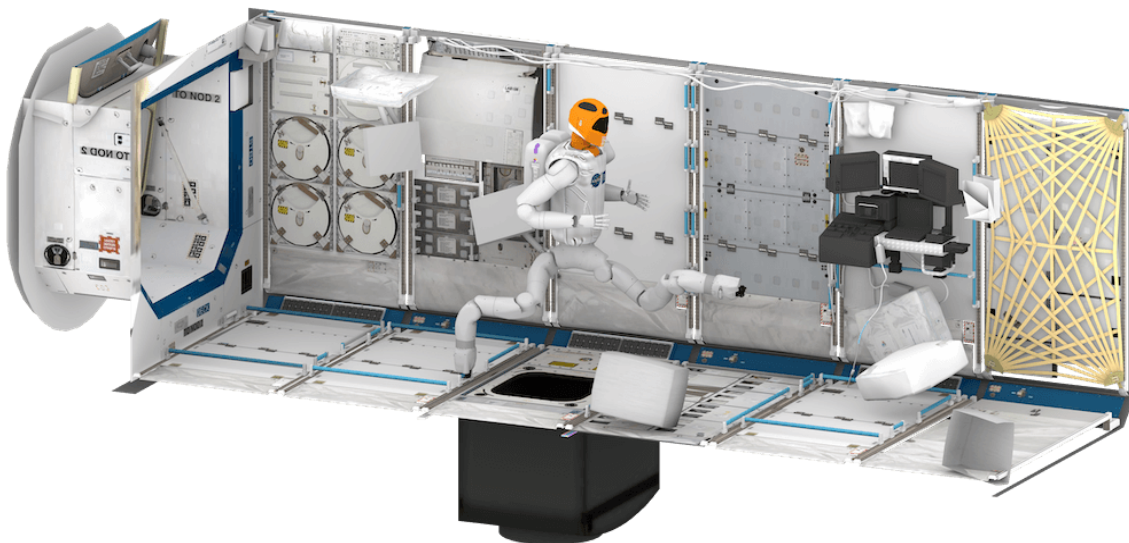
Solution Brief

Movelt Studio is a robotic manipulator interface software that enables human operators to do more complex tasks today. Our approach supports a broad range of unstructured and high latency environments such as urban areas, inside buildings, microgravity, and subsea.

In an ideal world, robot arms would be fully autonomous, requiring minimal human interaction. The reality is that today there are many domains where combining human problem solving and robot performance provides the most significant upside.

Our Movelt Studio supports *supervised autonomy*, enabling you to decide which tasks to execute while letting the software figure out how. From augmented manual control with Manipulation Assist™ to an autonomous mode with intelligent monitoring, Studio enables you to work with robot arms more efficiently.

The Movelt Studio user interface is streamlined, designed for ease of use, and does not require previous training in robotics. With Movelt Studio, your team will improve robotic arm operations by introducing more robot autonomy and decreasing oversight. Reduced oversight allows fewer operators to monitor a team of robots.



About Movelt Studio

Why Robot Arms

The world around us has been built and designed by humans with human arms and hands. By enabling robots to do complex manipulation tasks in unstructured environments-- human tasks in human spaces-- the application space and versatility of robots explode.

Not Just Teleoperation

We do not believe in simply giving an operator a joystick and video feed. Movelt Studio provides supervised autonomy, meaning it can understand its environment, plan complex motion around obstacles, and select optimal grasp strategies for interacting with the world around it.

Easy to Command

Movelt Studio provides user interfaces for creating *objectives* or complex sequences of tasks. Objectives can be pre-canned or created on the fly during operation as new needs for the robot arise. *Tasks* are the primitives within which objectives are built, and an extensive library of tasks ensures that the robot can achieve new levels of capabilities.

Extensible

Movelt Studio provides an optional C++ plugin interface, enabling developers to create custom tasks unique to their applications.

Safer and More Reliable

Unlike traditional teleoperation approaches with limited situational awareness for human operators, Movelt Studio largely removes the execution responsibilities from the human. This reduces operator fatigue and prevents human error from incomplete awareness of the remote operating environment.

A Unique Approach

While many companies provide cloud services for monitoring fleets of AMRs (autonomous mobile robots), PickNik is taking an arm-centric and autonomous-first approach to human-in-the-loop. We are the creators of the popular Movelt platform and understand the unique challenges of high-degree-of-freedom, non-linear robot arms. Originally developed for NASA, we've created an intelligent solution that understands its environment and can auto-generate plans for achieving multi-step tasks.

Get to Market Faster

When embarking on a new robotics product or startup, time to market is crucial. Studio allows you to deploy solutions that are not yet 100% reliable by having a human backup at the ready.

Built on Open Standards

Movelt Studio is built on top of the open-source Movelt platform, an industry standard for robotic arm control through the Robot Operating System (ROS). Many aspects of Studio can be customized and optimized using Movelt's plugin architecture.

Key Features



Expanded Manipulation Modes

Automatic Objective Execution

Choose from a library of pre-built objectives and sit back as your robot arm autonomously executes a multi-step mission.

Quick Task Execution

Leverage affordance templates to easily perform known tasks with minimum operator involvement.

Cartesian Control

Manually move the robot's end-effector for traditional real-time jogging needs.

Joint Control

For small interactions, tests, and debugging.

Human Augmented Control

Simulated Preview

Review proposed motion before executing.

Breakpoints and Step-Throughs

Specify points when the operator should be prompted to monitor the task more carefully.

Logging and Introspection

Enable tagging and reporting of undesired behavior for improvement and diagnosis.

Assign Keep Out Zones

Specify keep-out areas that the robot should avoid, improving safety and execution.

Modularity

Robot Agnostic

Runs on any ROS-compatible robot and can be integrated with non-ROS compatible robots.

User Interface Device Support

Support for laptops, touch screens, and game controllers.

Optimized Teleoperation

Local Network Operation

For guaranteed reliability when it matters, Studio can operate locally on the edge, without internet connectivity.

Remote Operation

Command from across the world and to the moon.

Low Latency Support

Works in environments with unreliable or slow connections with significant delays.

Advanced MoveIt Capabilities

Object Detection and Grasp Generation

Automatically chooses ideal grasp points using machine learning algorithms.

Navigation + Path Planning Support

Uses SLAM and navigation capabilities, enabling robot mobility.