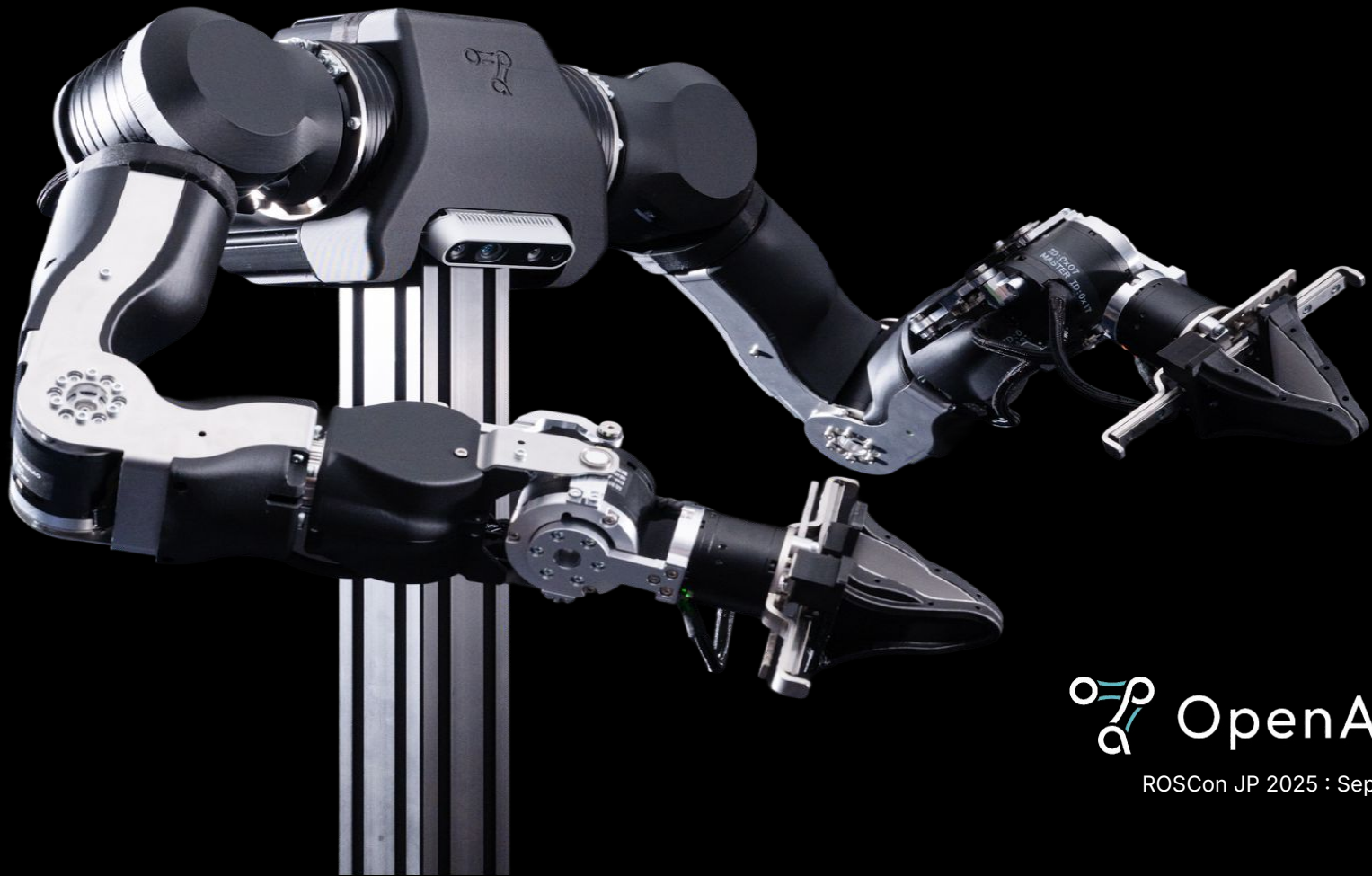




 OpenArm

ROSCON JP 2025 : Sep 9, 2025



fully open-source humanoid robot for physical AI research
and deployment in contact-rich environments.



7DOF

Bimanual Arms

633mm

Arm Reach

5.5kg

Weight per Arm

6.0kg

Peak Payload per Arm

1kHz

CAN-FD Control

\$6,500

Bill of Materials



Project Overview

website : overview and visuals

docs : assembly guide and SDK tutorials

github CAD, code, and issues!

website

openarm.dev

Contribution Guide

GitHub Issues

- enactic/openarm repo
- idea pool: project ideas, feature request, and tech issues.
- upvote, share ideas, and pickup unassigned issues

Discord

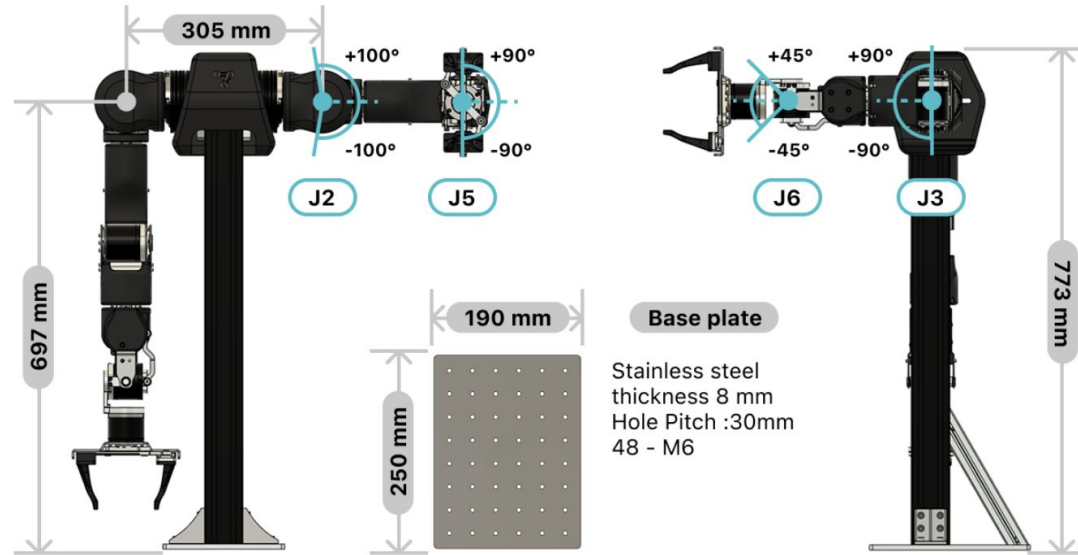
- connect and collaborate



Hardware

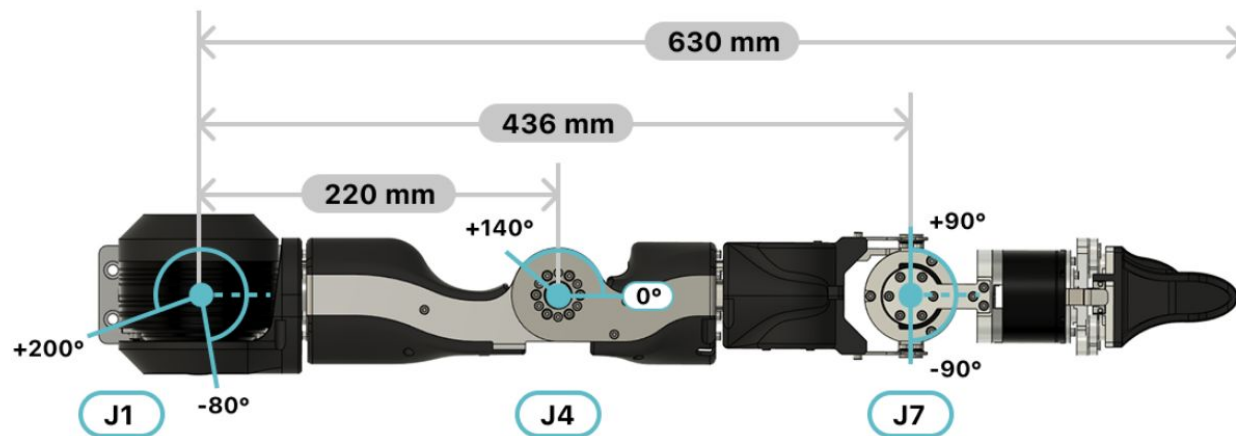


General Dimensions





General Dimensions





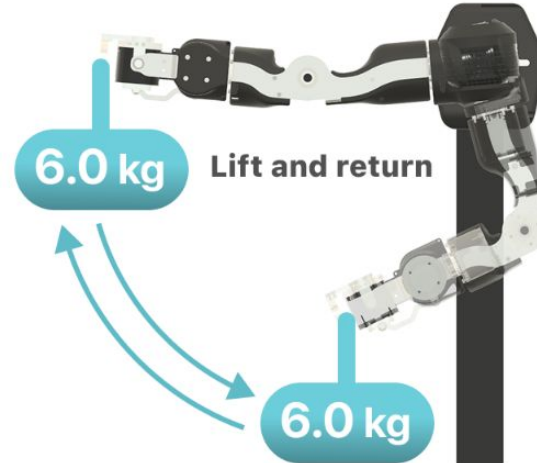
Payload Definition

Nominal Payload



Two types of payload measurement experiments were conducted to more clearly demonstrate the payload

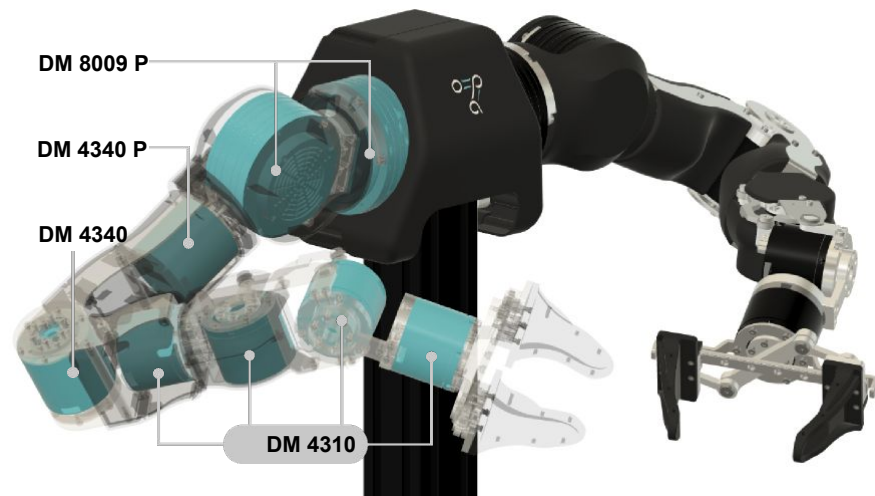
Peak Payload





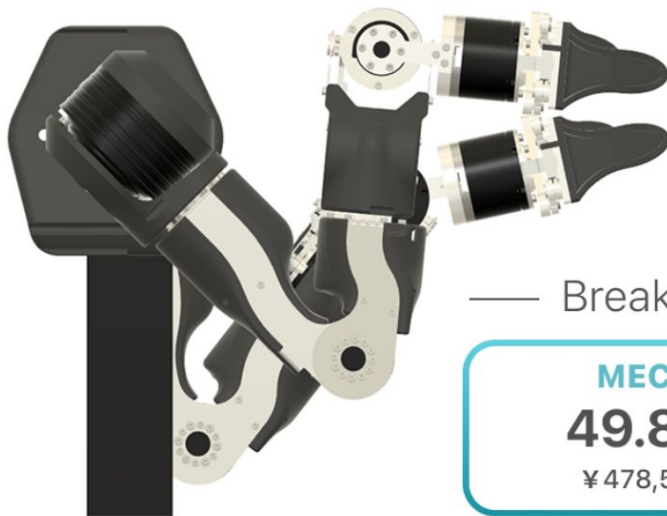
Motor Specifications

Configuration based on QDD motors





Make your own OpenArm



Total cost of body (2 Arms + 1 Pedestal)

¥ 960,438

≈\$6,500

— Breakdown of costs by category —

MECH

49.8%

¥ 478,518

MOTOR

41.4%

¥ 397,356

ELEC

8.8%

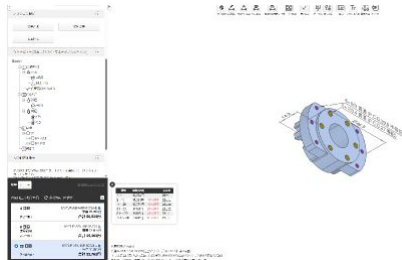
¥ 84,564



Procuring Components

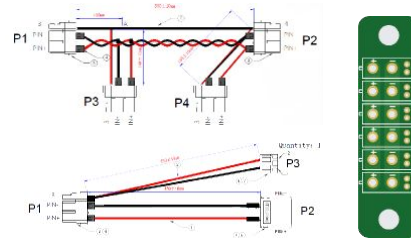
Mechanical Hardware

Model Numbers Provided!



Electrical Hardware

Drawings Provided!



Motors



Enactic



All CAD and Electrical Drawings are on GitHub

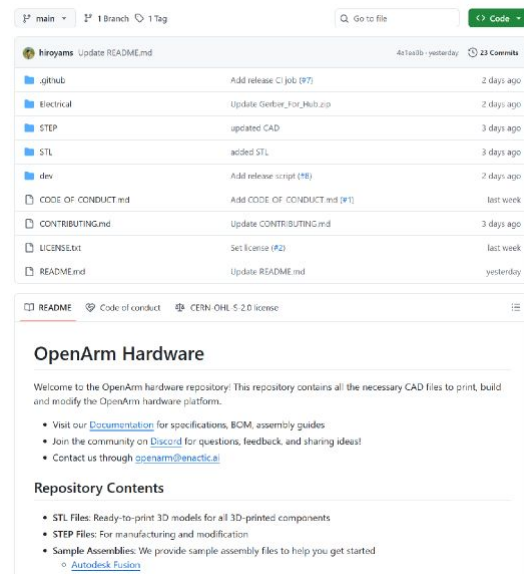
Easy to reference, edit, and manufacture !

Cables and PCB layouts

Complete Leader and Follower CAD!

All 3D printed components

Sample Assembly





Assembly Guide

Easy to assemble!

OpenArm Getting started Hardware Software Teleop Simulation Help

Specifications

- General
- Motor
- Gripper

Bill of Materials

- Procuring Components
- Arm (Manufacturing)
- Arm (Off-The-Shelf)
- Pedestal
- Gripper
- Electronics

Assembly Guide

- 0. Find CAD Files
- 1. Pedestal
- 2. J1-J2
- 3. J2-J3
- 4. J3-J4
- 5. J4-J5
- 6. J5-J6-J7
- 7. Gripper

Step 8: Final assembly

1. Attach **J2-J3** Sub-Assembly to the rotor of **J3** motor using 6 **M5x15** bolts



2. Attach **J2_A** to the rotor of **J2** motor using 6 **M5x18** bolts.



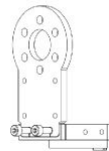
Step 2: J1-J2 Sub-Assembly

1. Attach the rear of the **J1** motor to **J2_A** with a **M6x8** bolt. Ensure the sensor and communication ports remain accessible. Ensure the **J1** motor has been correctly aligned to face **J2** motor.



Step 3: J2-J3 Sub-Assembly

1. Attach **J2_A** to the **J2** motor using 6 **M5x18** bolts.



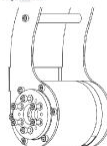
Step 4: J3-J4 Sub-Assembly

1. Attach **J4_A** to the **J3** motor using 6 **M5x18** bolts. Ensure the sensor and communication ports remain accessible. Ensure the **J3** motor has been correctly aligned to face **J4** motor.



Step 5: J4-J5 Sub-Assembly

1. Attach **J5_A** to the rear of **J4** motor using 6 **M5x18** bolts.

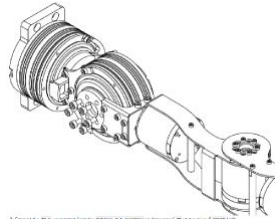


Step 6: J5-J6-J7 Sub-Assembly

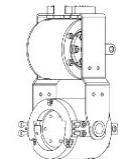
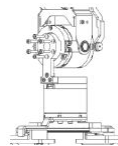
1. Attach the **J6** motor to the **J5** motor using 6 **M5x18** bolts. Ensure the sensor and communication ports remain accessible. Ensure the **J5** motor has been correctly aligned to face **J6** motor.



2. Attach **J7** to the rear of **J6** motor using 6 **M5x18** bolts.



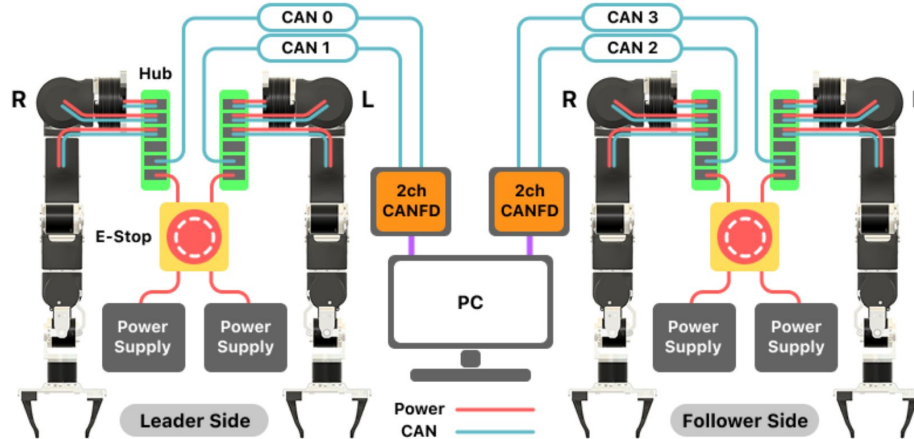
3. Attach the **J8** motor to the **J7** motor using 6 **M5x18** bolts. Ensure the sensor and communication ports remain accessible. Ensure the **J7** motor has been correctly aligned to face **J8** motor.



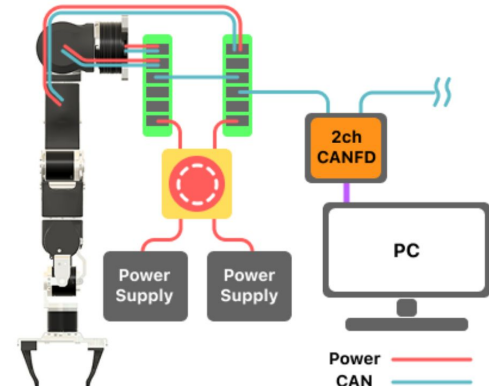


Wiring and Installation

Only 5 cables per arm!

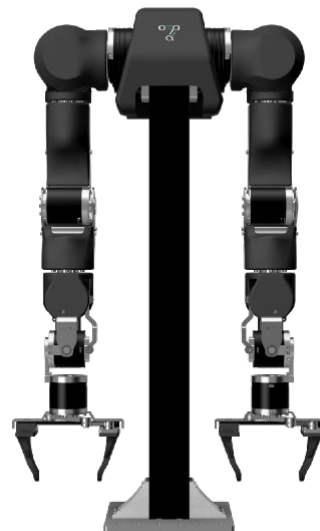
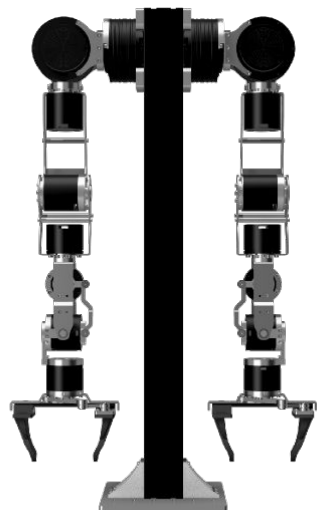


Higher Payload!





Casing

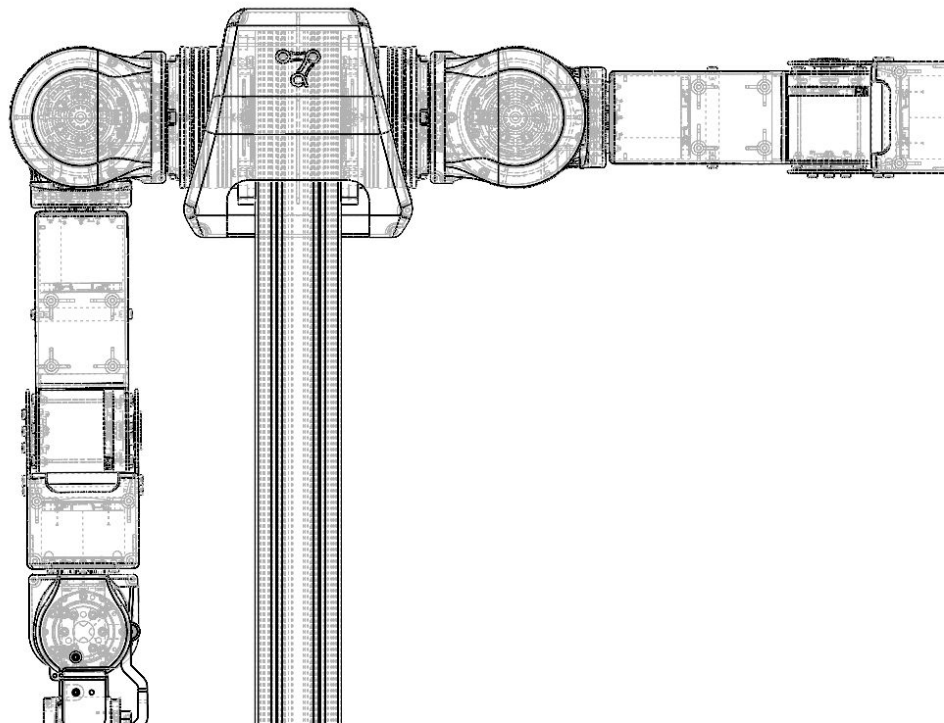


Software



Software items

- Robot Description
- CAN Communication Library
- ROS2 Integration
- Teleoperation





Robot Description

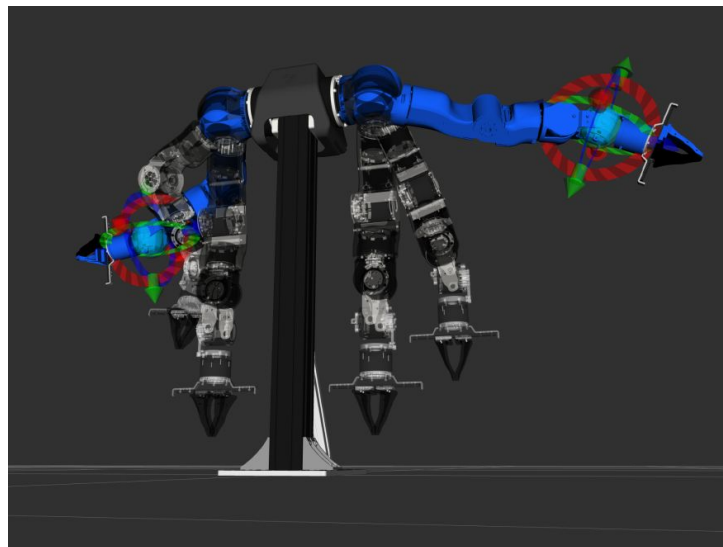
- Modularized URDF
 - Parameterized macros for easy configuration
 - Designing by components like "arm", "body", and "hand" improves scalability.
 - Already tested by KDL
 - Simplified Collision model





ROS2 Integration (WIP)

- **ROS2 Controller**
Bridge the hardware and controllers
- **Movelt2**
Allows advanced kinematics and motion planning





Teleoperation

- Leader-Follower Teleoperation

- Gravity compensation
- Bilateral control

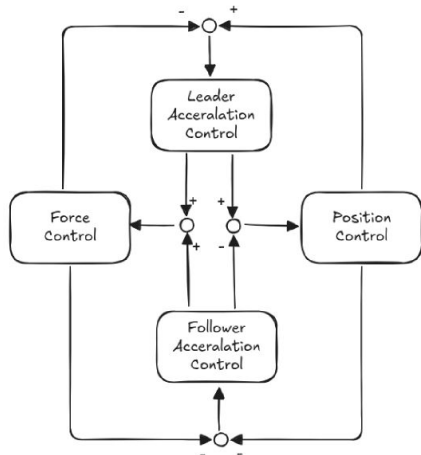
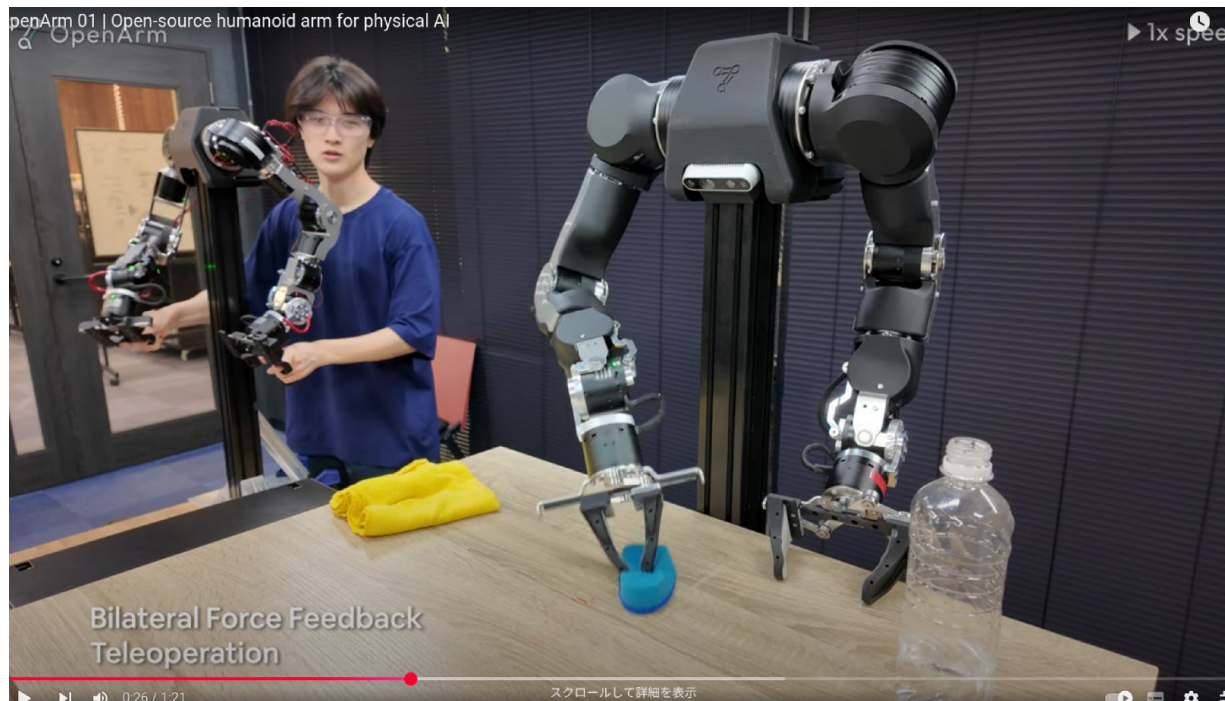


Fig: Bilateral control architecture





Teleoperation





Teleoperation

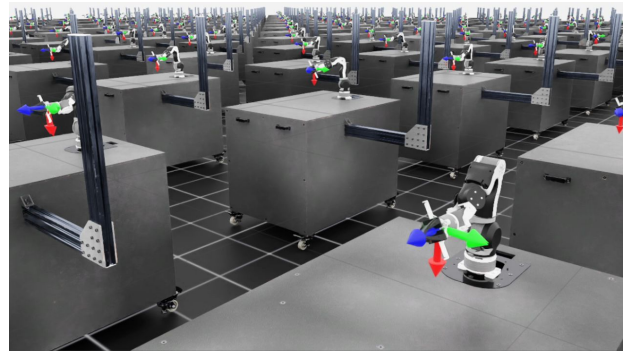
- VR Teleoperation
 - integration with Meta Quest 3 (coming soon!)



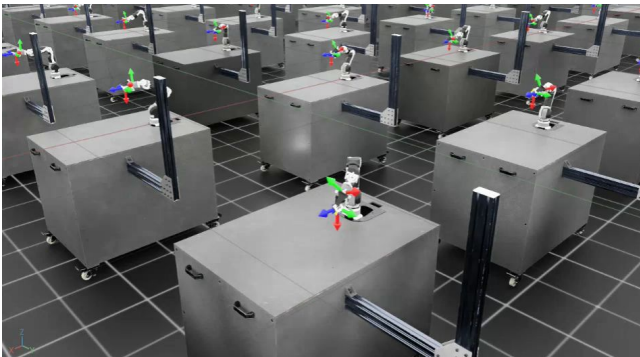


Simulation

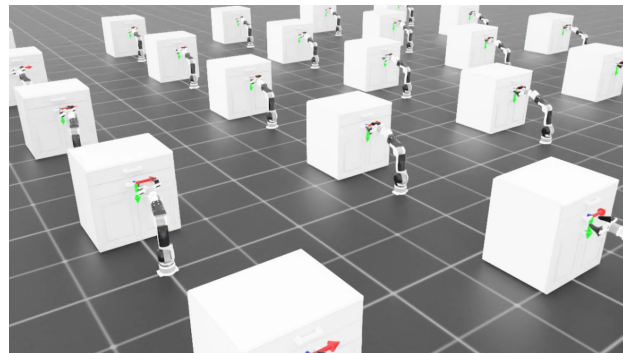
- Reinforcement Learning
 - Experiments on Isaac Lab (coming soon!)



Reach



Lift cube



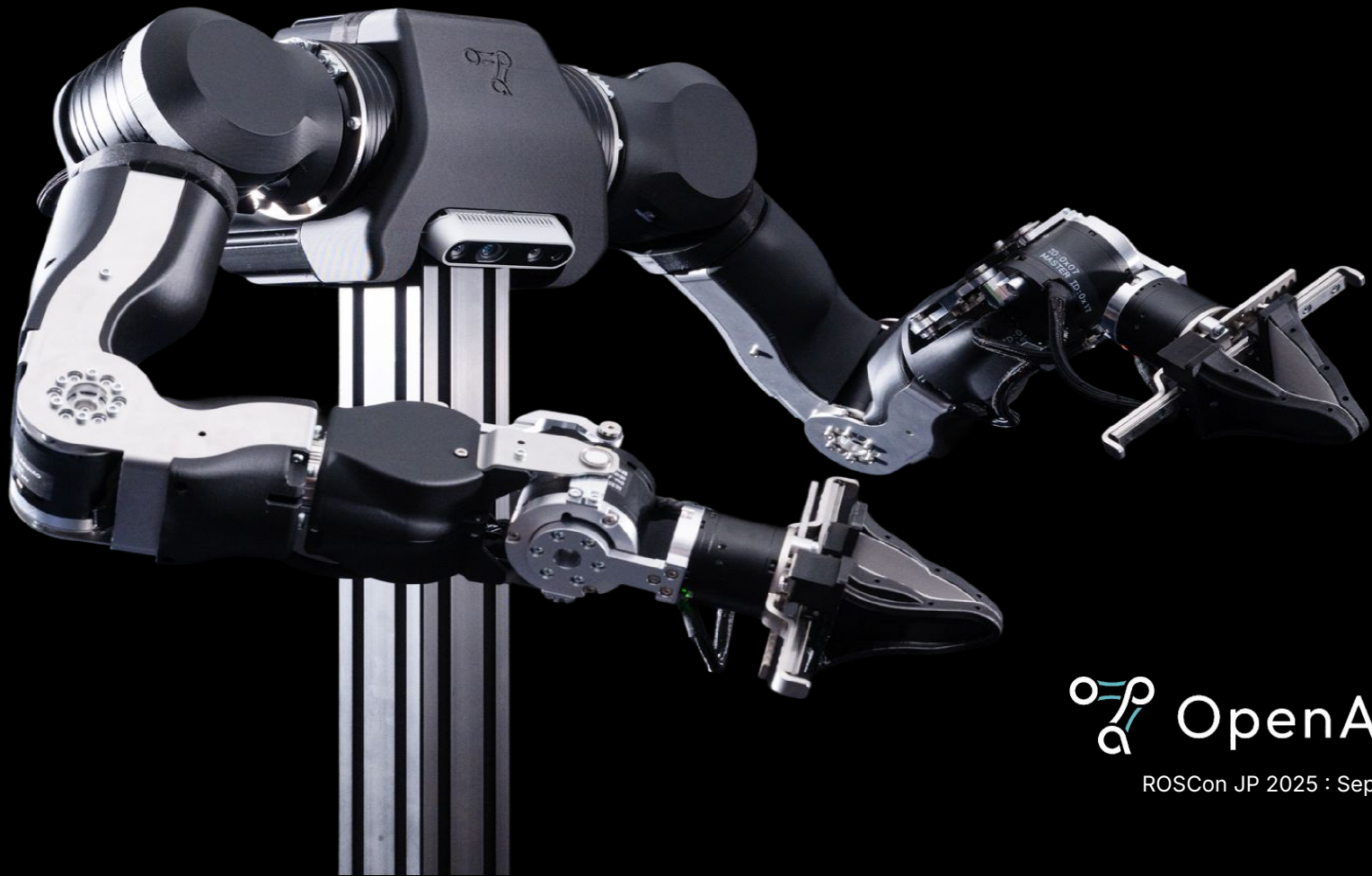
Open drawer



Simulation

- Mujoco support (WIP)





 OpenArm

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