Roboter im Einsatz für die SBB

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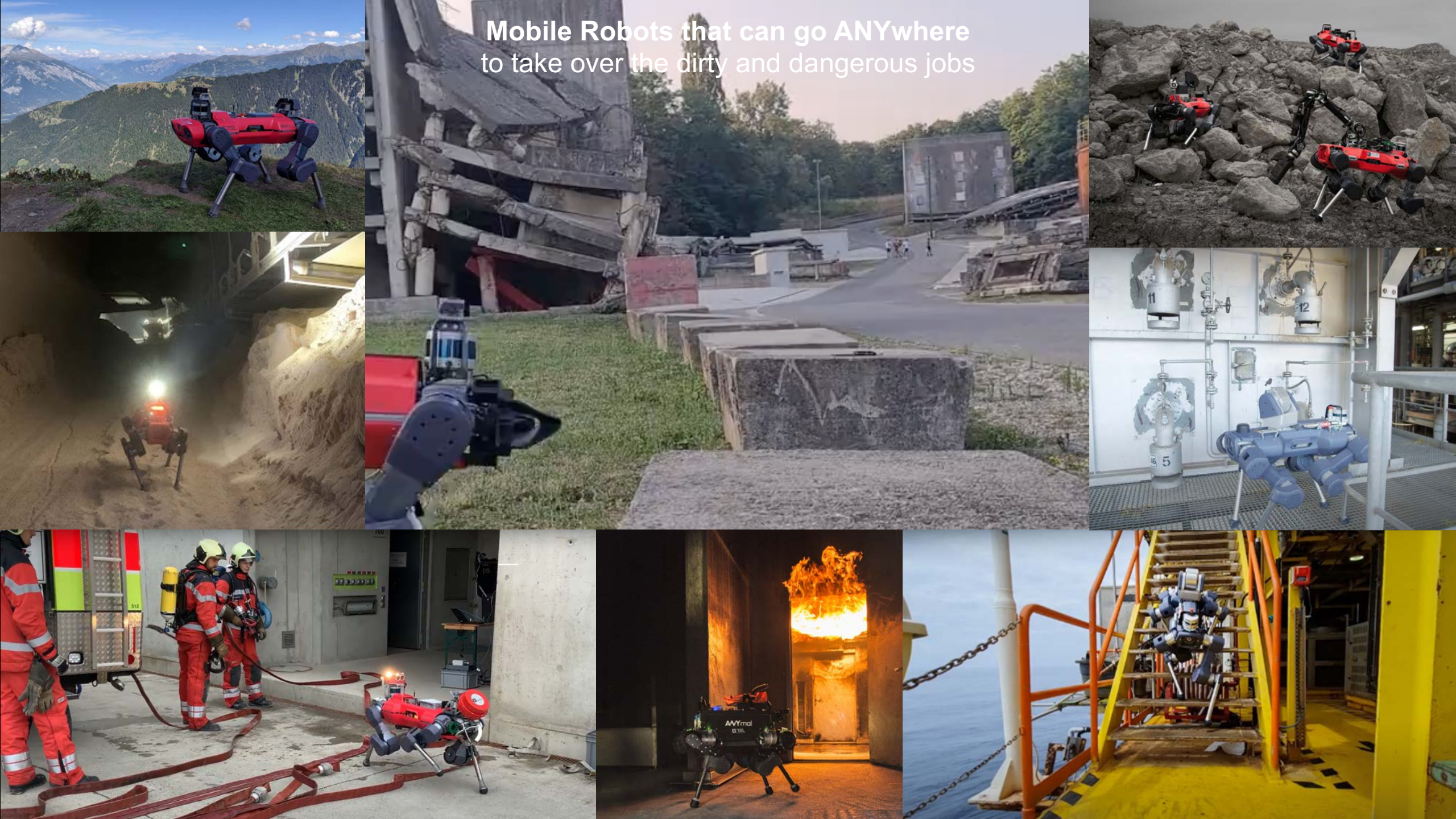
ETH zürich
ANYbotics
GRAVIS ROBOTICS


Mobile Robots that can go ANYwhere
to take over the dirty and dangerous jobs

From research prototypes to commercial products


2012


2014

2016

2018


2019


2021

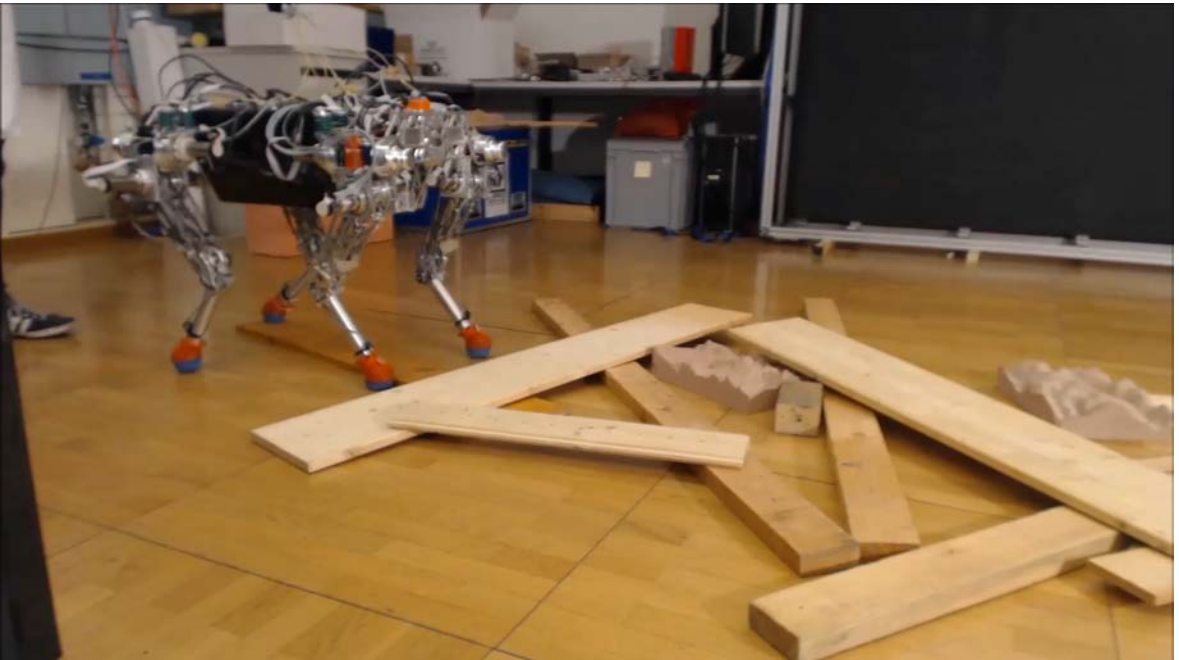
2022

ETH Zurich - Robotic Systems Lab

Research on autonomous robots

ANYbotics

founded 2016, >150 employees, >100 robots




AMV botics
>100 robots in the field

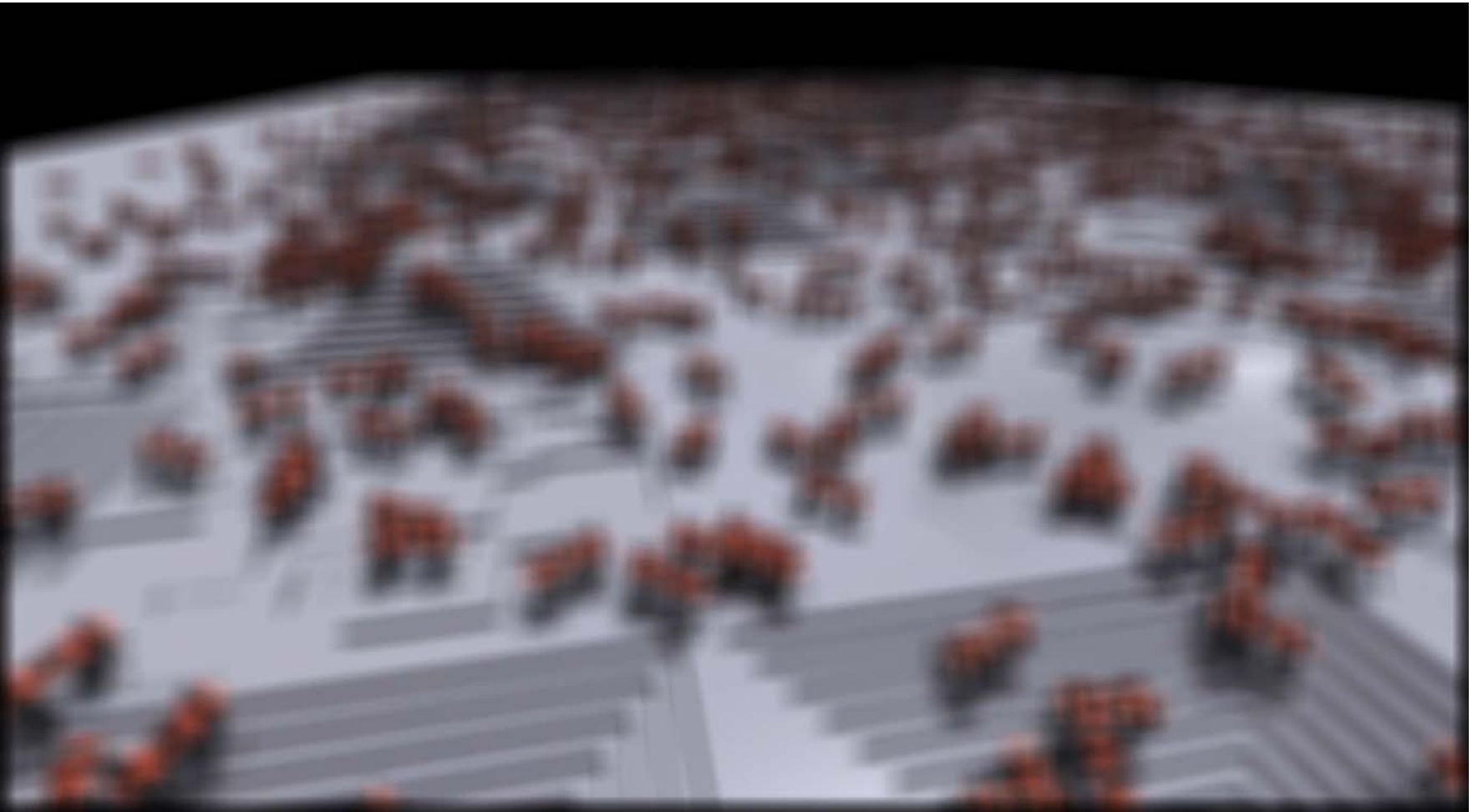
Industrial plant inspection

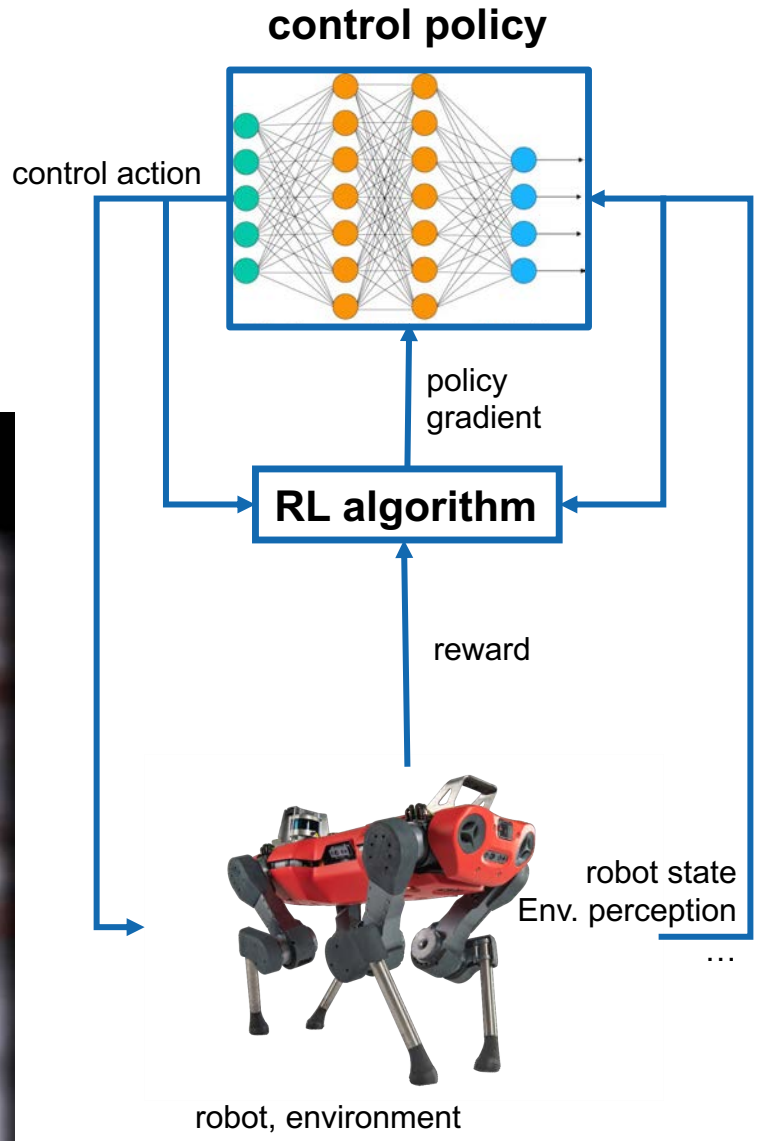
- Periodic condition monitoring and hazard detection of equipment
- Remote sensing from control room

ANYbotics Stadler

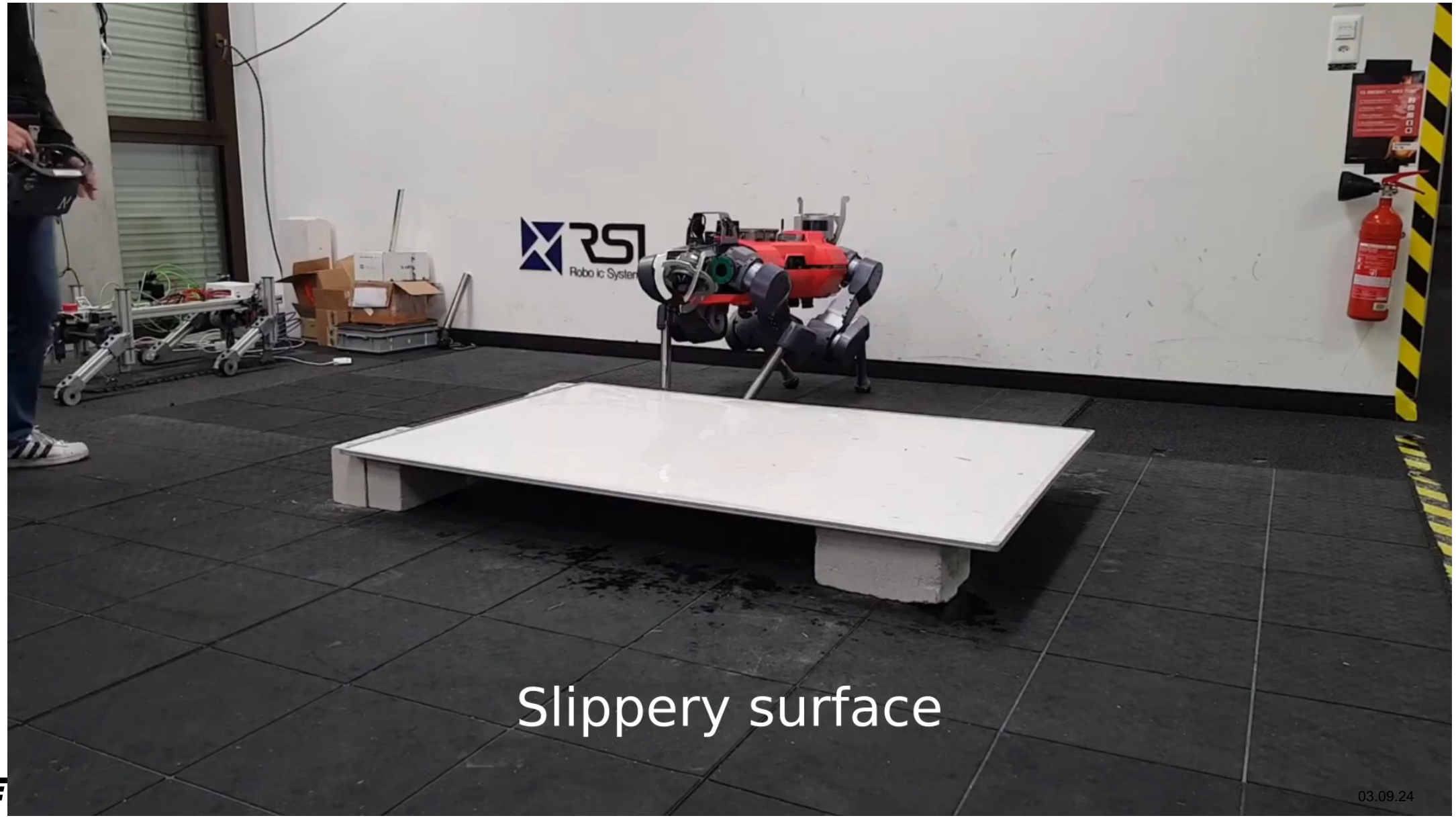
Reinforcement learning for locomotion control

- Learn from massive data generated with a fast and accurate simulator

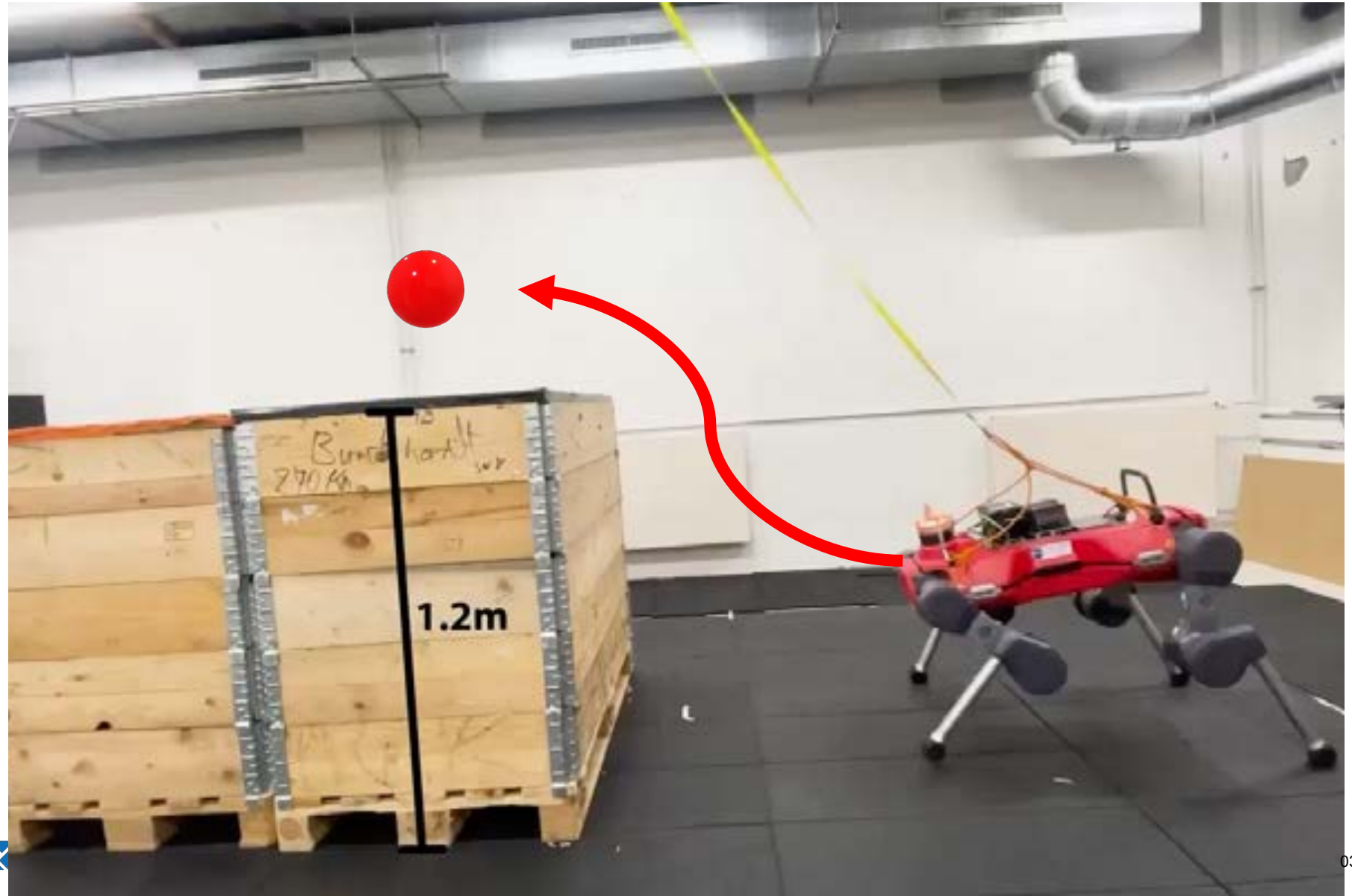




Robustness



Avoid human guidance - Let the robot figure out how to move

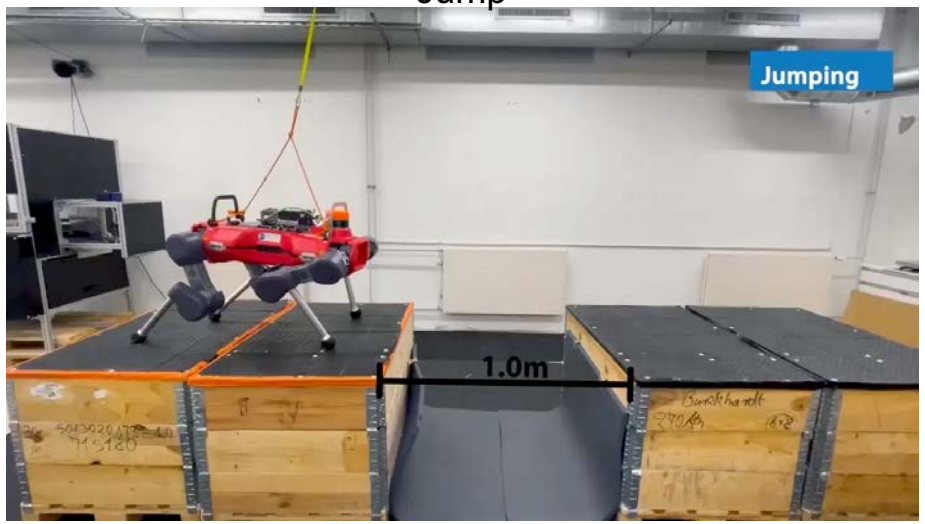


Locomotion Module

Climb up

Climb down

Jump



Crouch


03.09.24

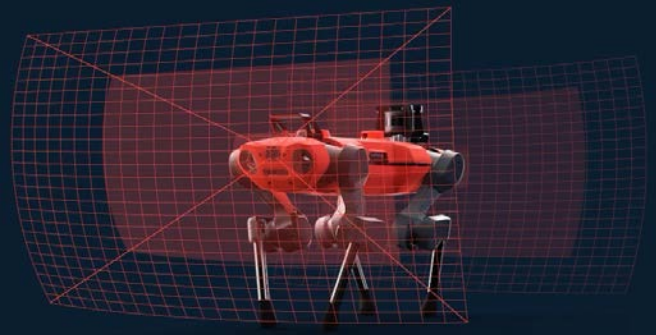
ANYmal perception

Velodyne Lidar

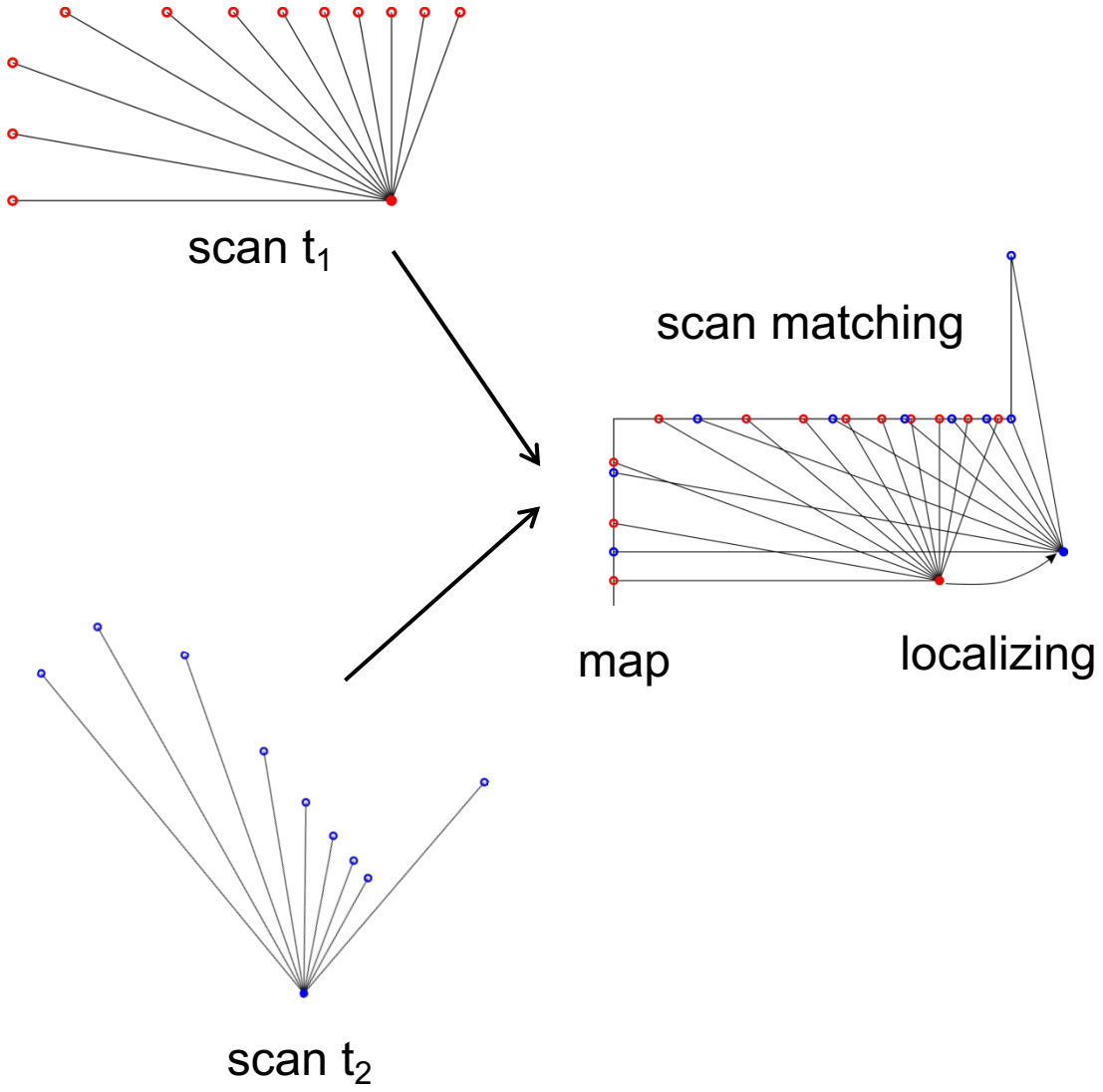
RTK GPS

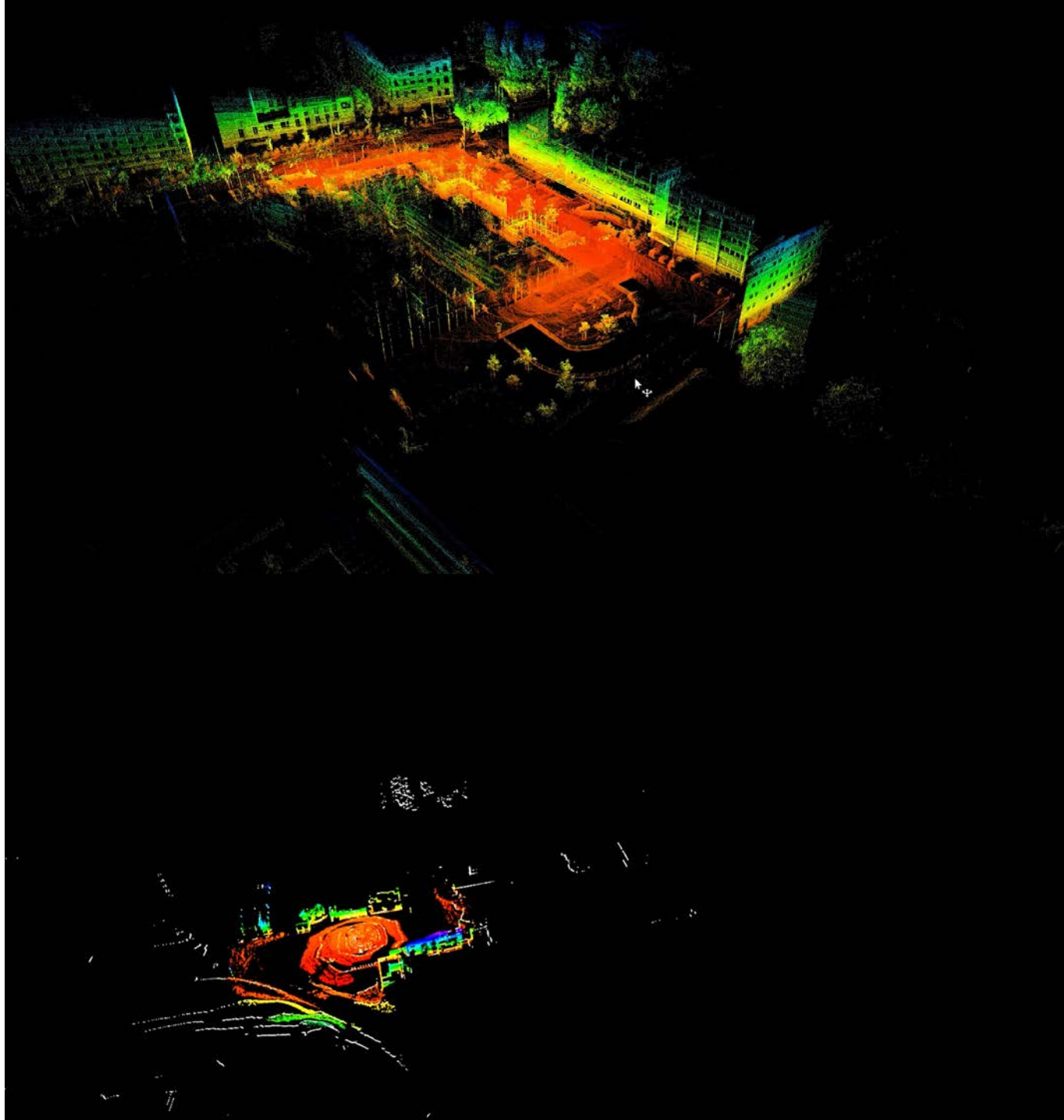
4-6x active stereo

2 x RGB wide angle



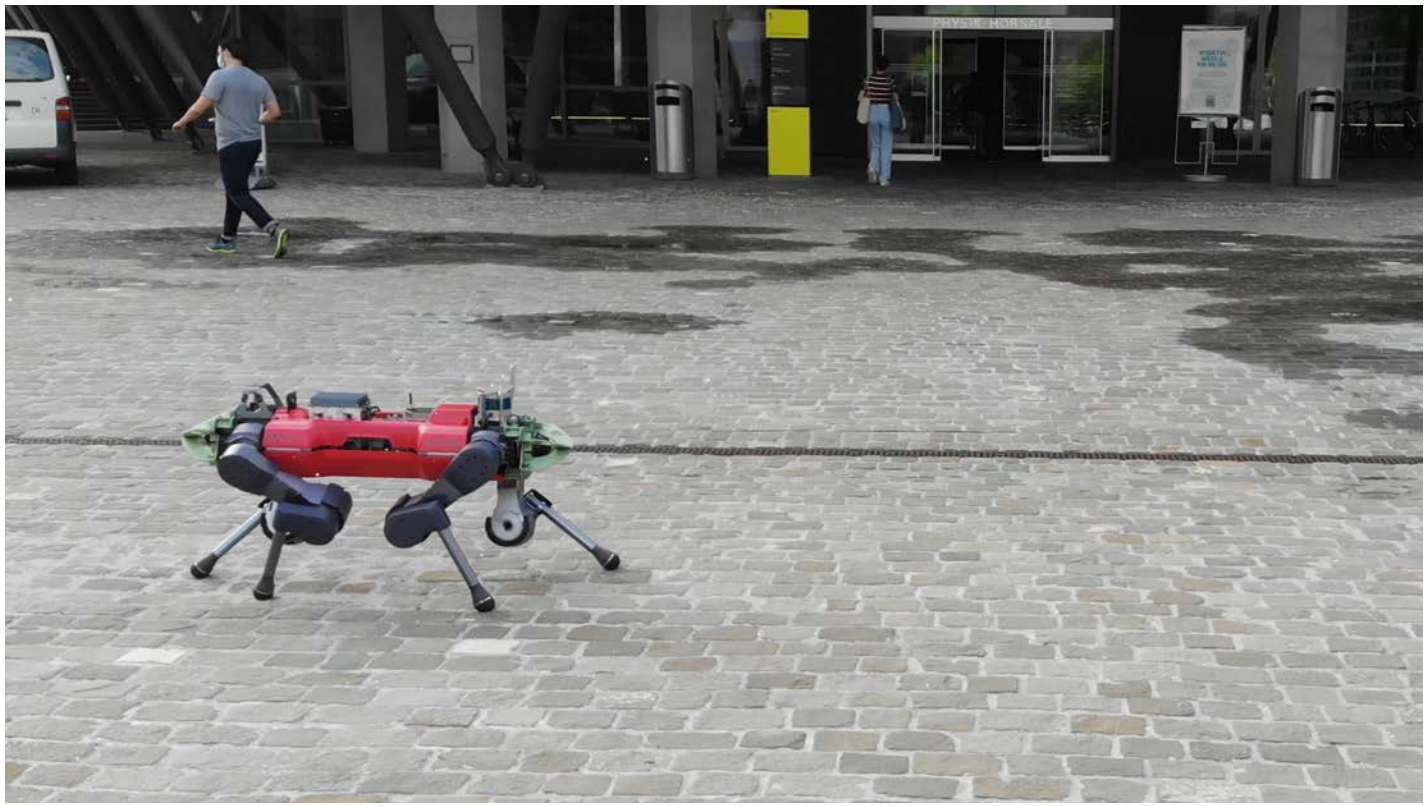
Environment perception





Reality capture enabled

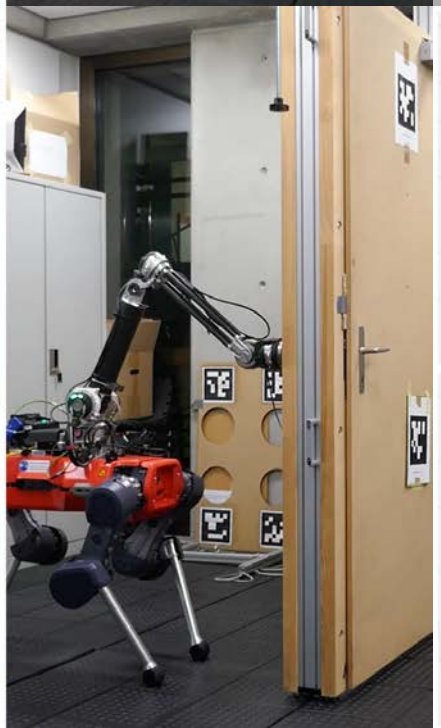
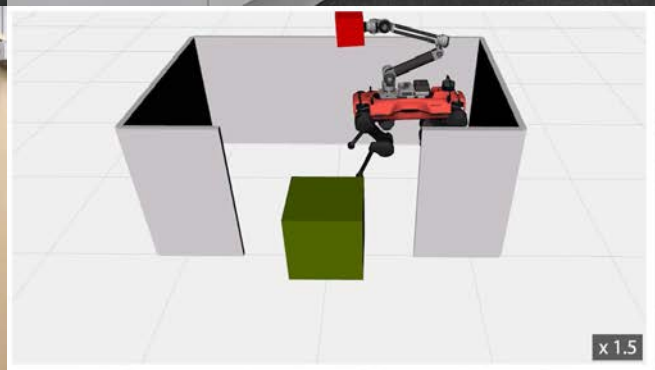
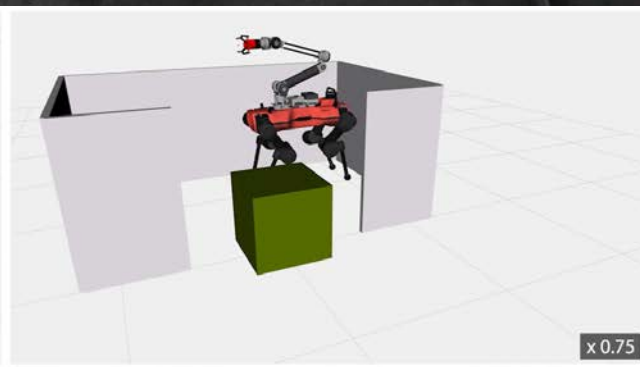
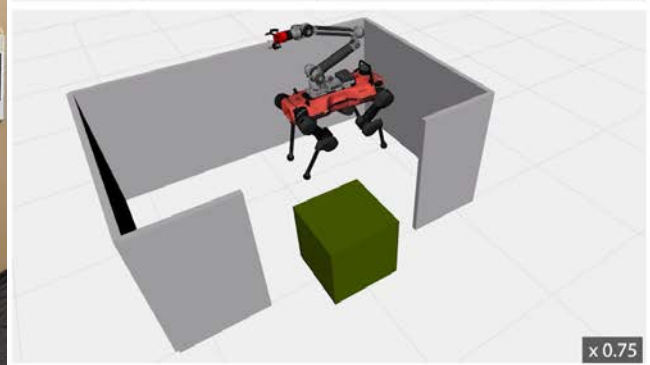
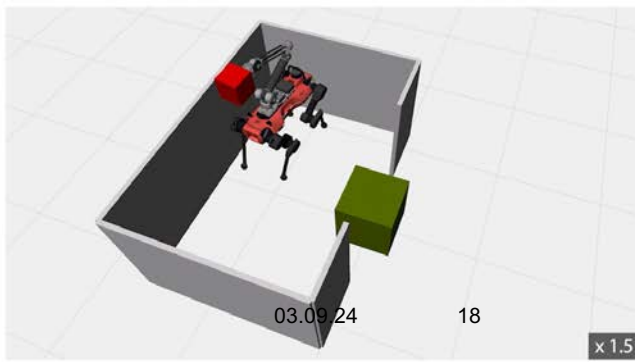
Capture 3D point clouds and panoramic imagery while ANYmal carries Leica BLK ARC through the environment





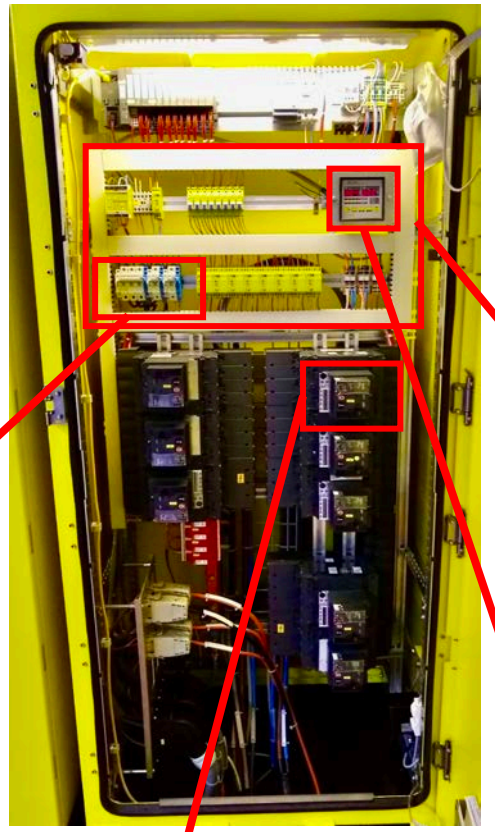




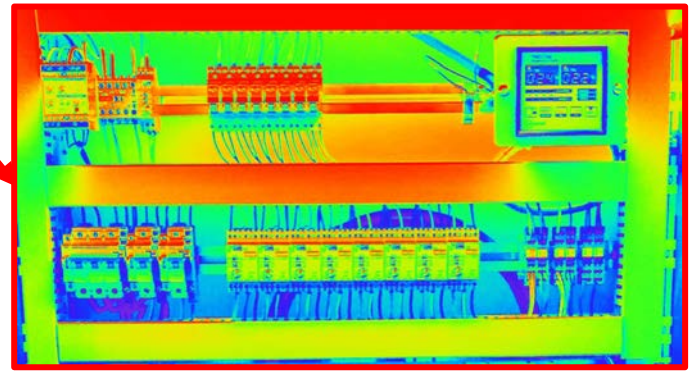


x 1.5

x 0.75

x 0.75

x 1.5

3D Reconstruction for Teleoperation

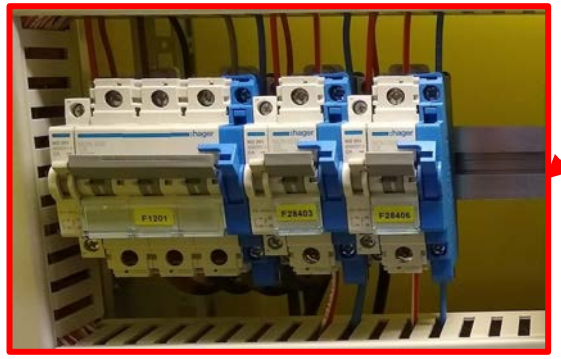
Open Door



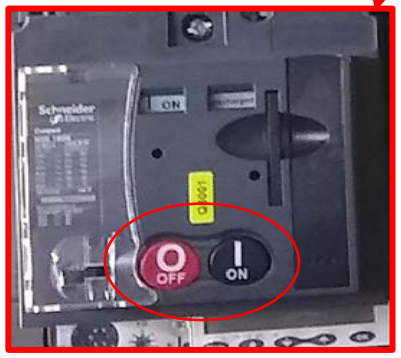
Record Thermal Images



Operate Switches

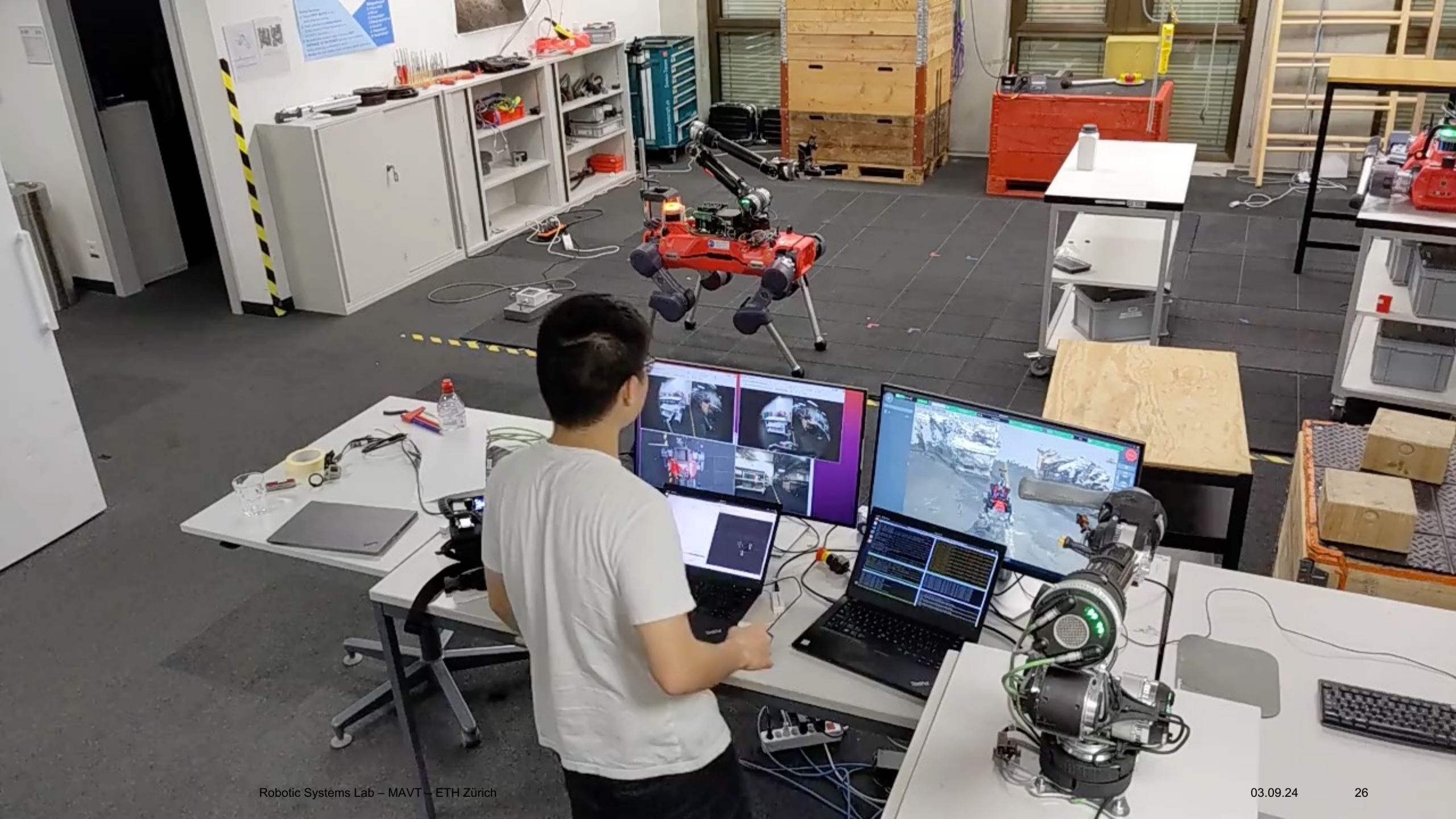


Push Buttons



Record RGB Images

Future of 3D Reconstruction for Teleoperation

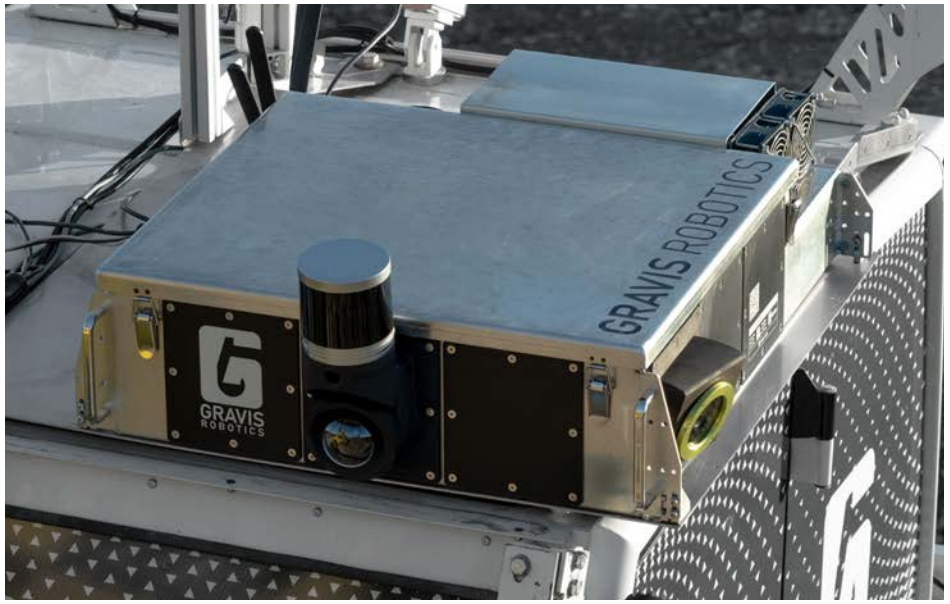



Fast


Robotic System Lab

Logistics applications with robots


SDRZ
ETH zürich
M545
SDRZ



Gravis Autonomy Kit

Rooftop Box

Sensing (Camera, Lidar, IMU, GPS)
Perception, mapping & localization

Compute
AI-based machine control for autonomy

Network (4G,5G,WiFi)
Augmented teleoperation

RVERI

menzi muck M545

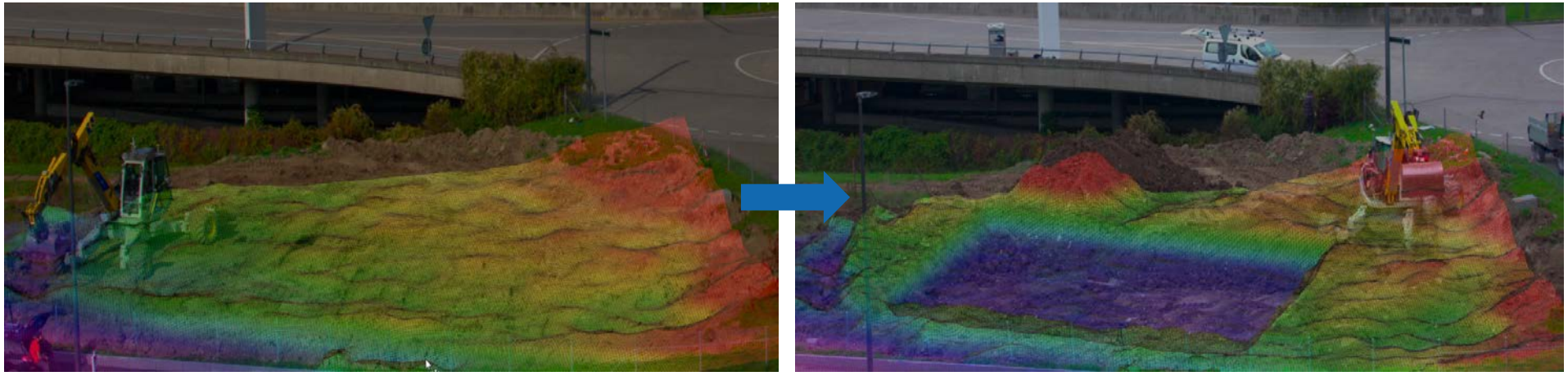
CAT 323

HITACHI ZE85

TAKEUCHI TB290-2

AI-Based Machine Control

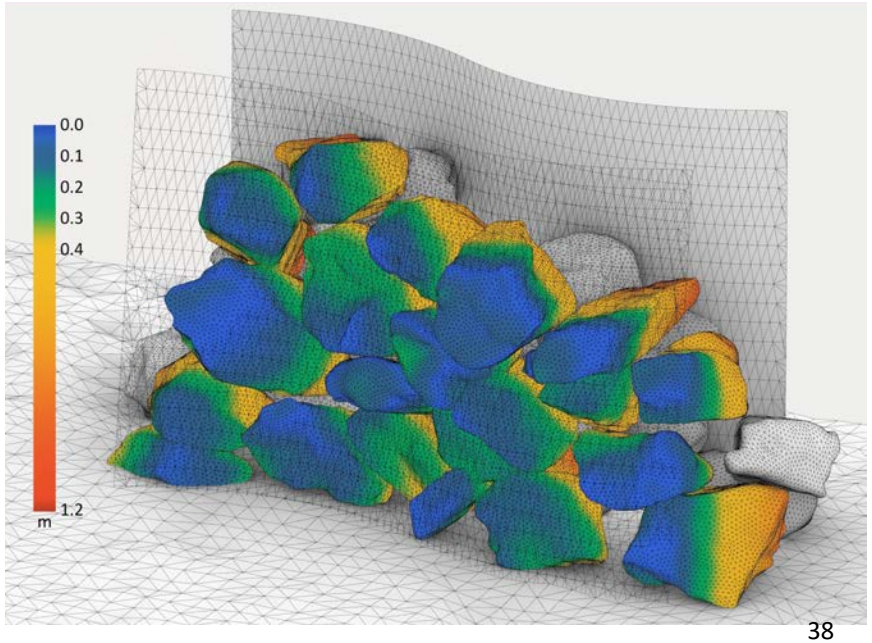
Autonomous Landscaping



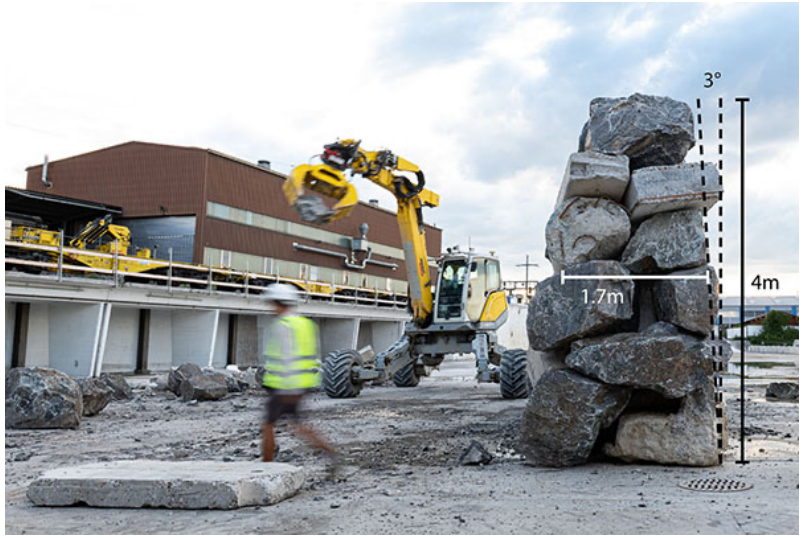
Autonomous Dry Stone

Robotic assembly with found objects

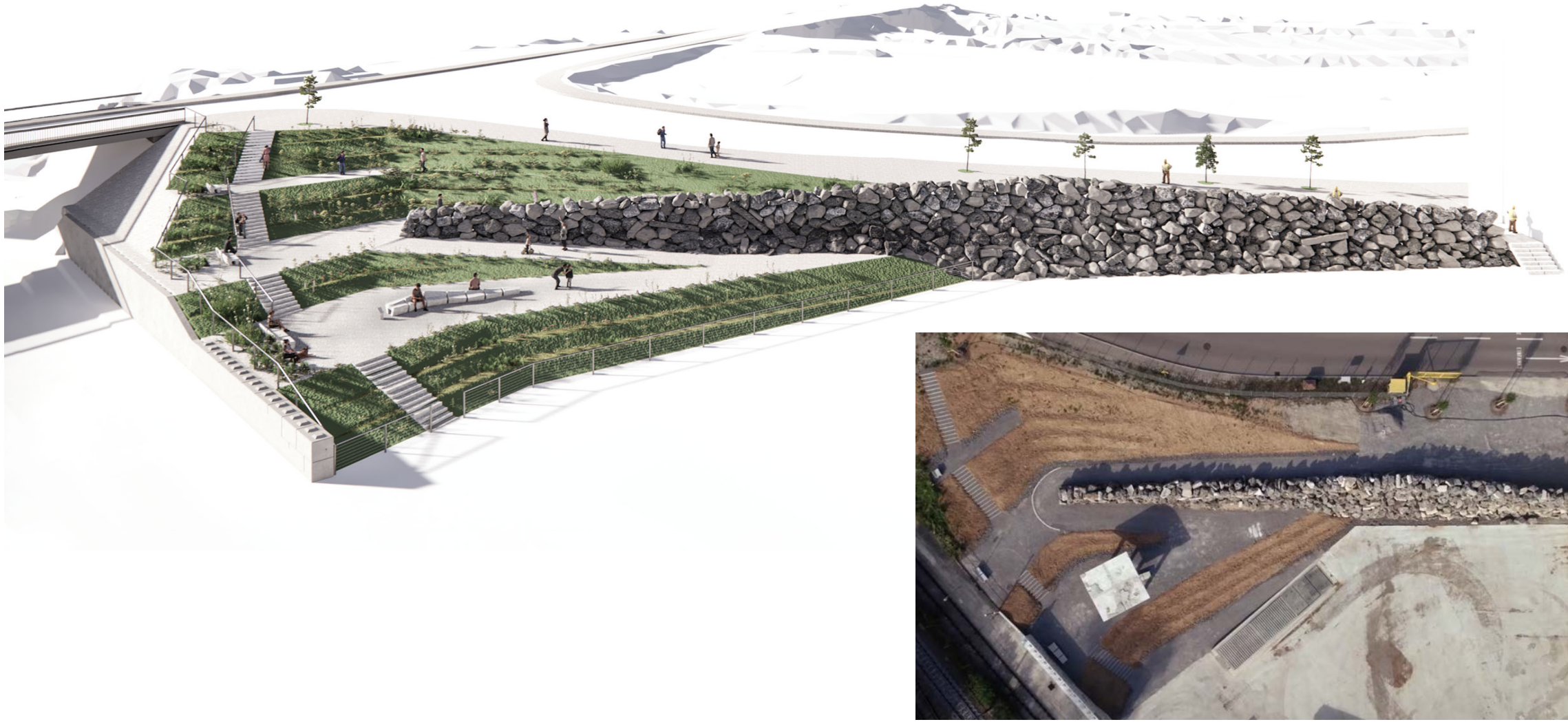
- Localization, manipulation, and planning for highly unstructured stones in the wild
- Autonomous grasping and 3D scanning
- Positioning planner considers stability and overall shape
- Use of raw and recycled materials as-is, without energy- and labor-intensive machining
- <50% carbon emissions compared to equally-performing concrete structures

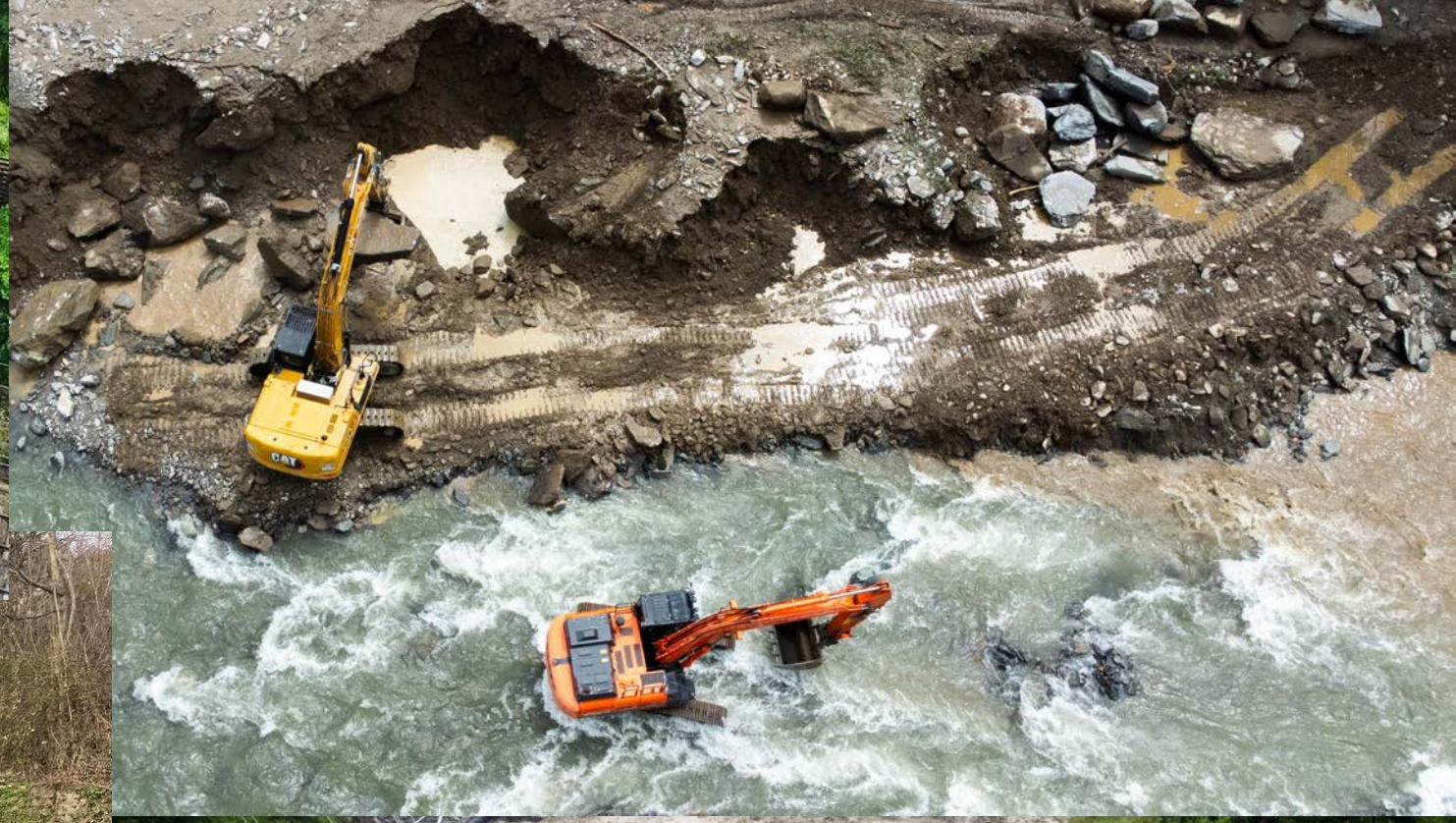


Autonomous Dry Stone



Large-scale Field Deployment: Oberglatt Circularity Park

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