

Robotics for Complex Environment

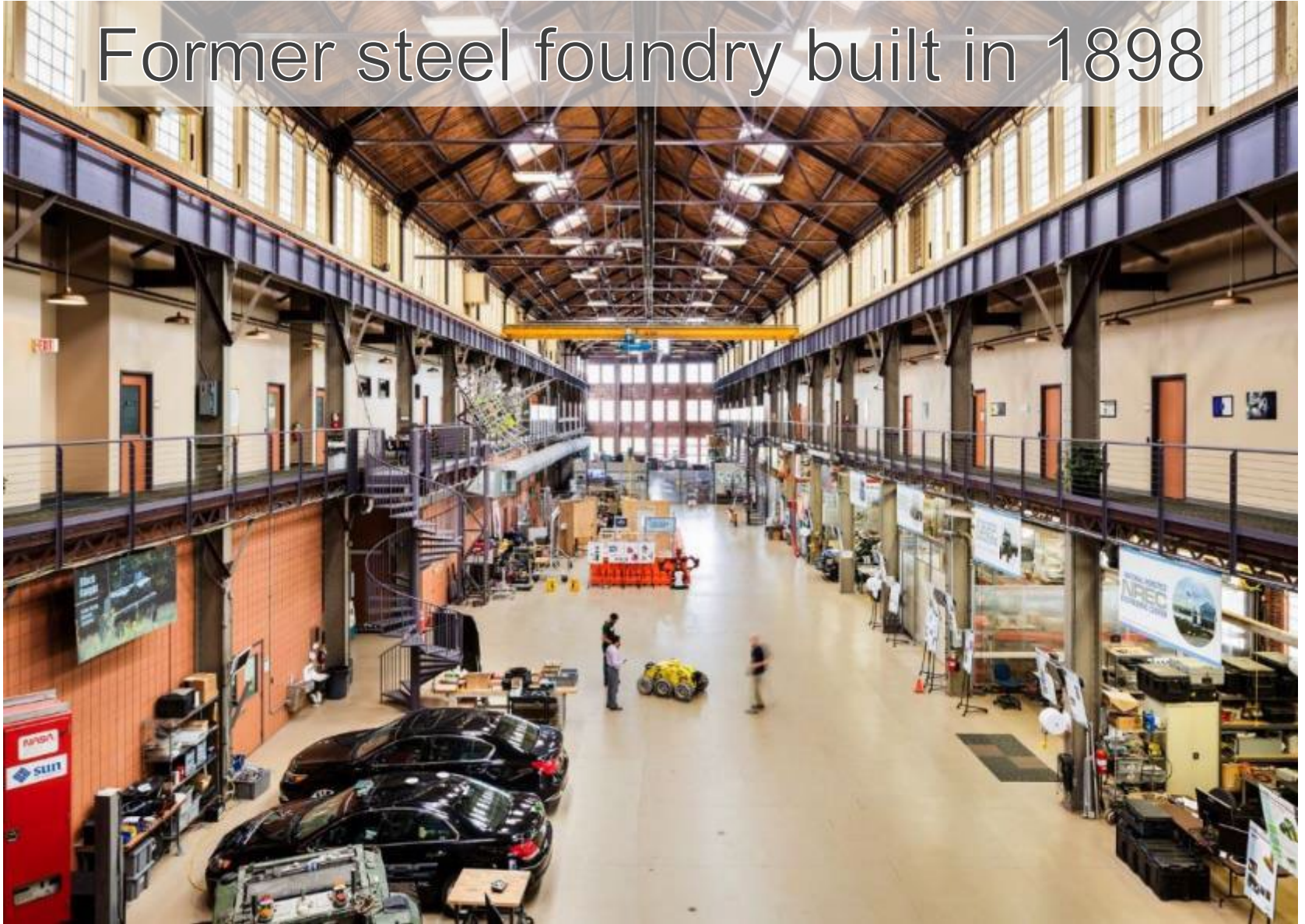
By Jeff Legault

NREC Facilities

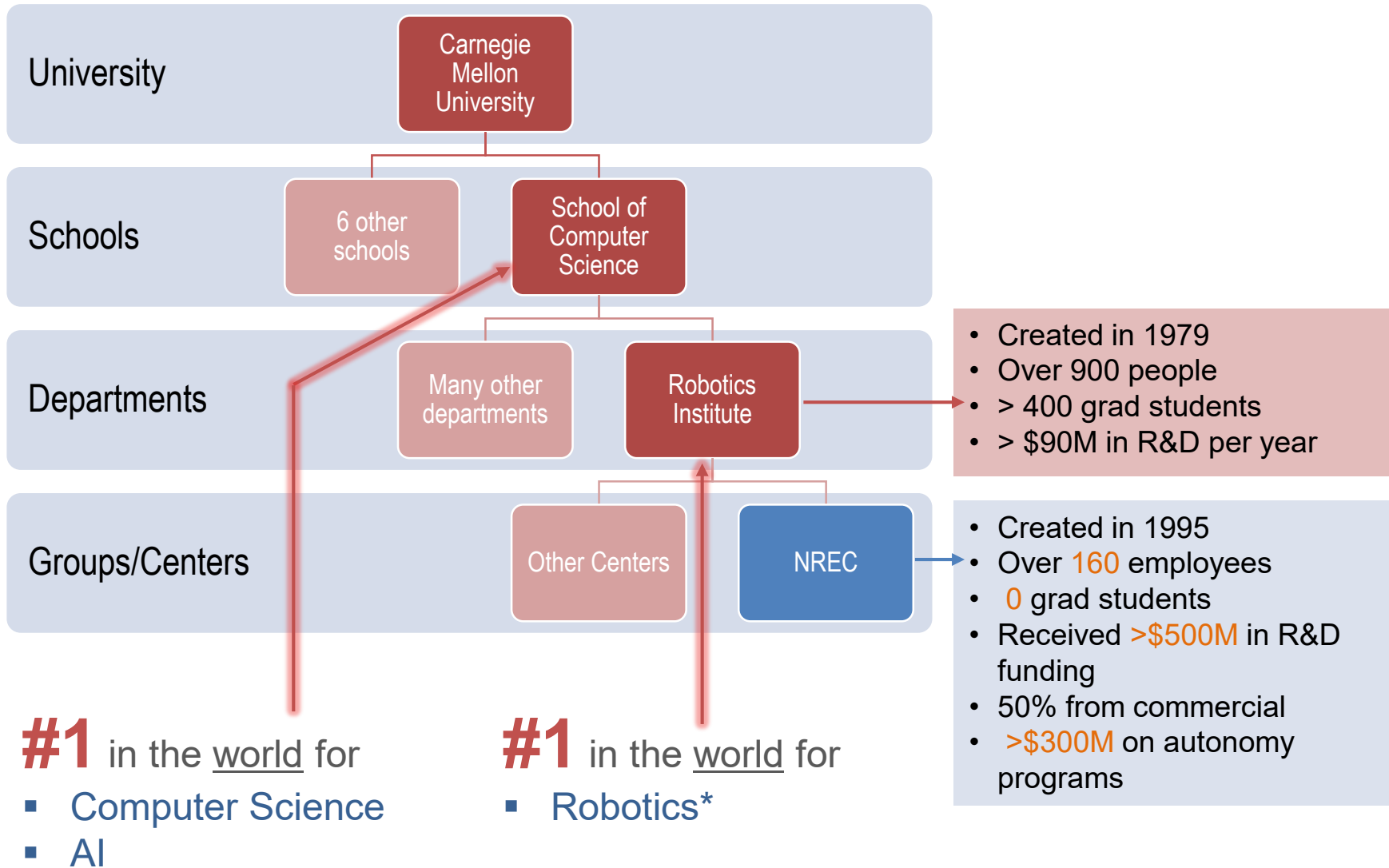


NREC Facilities

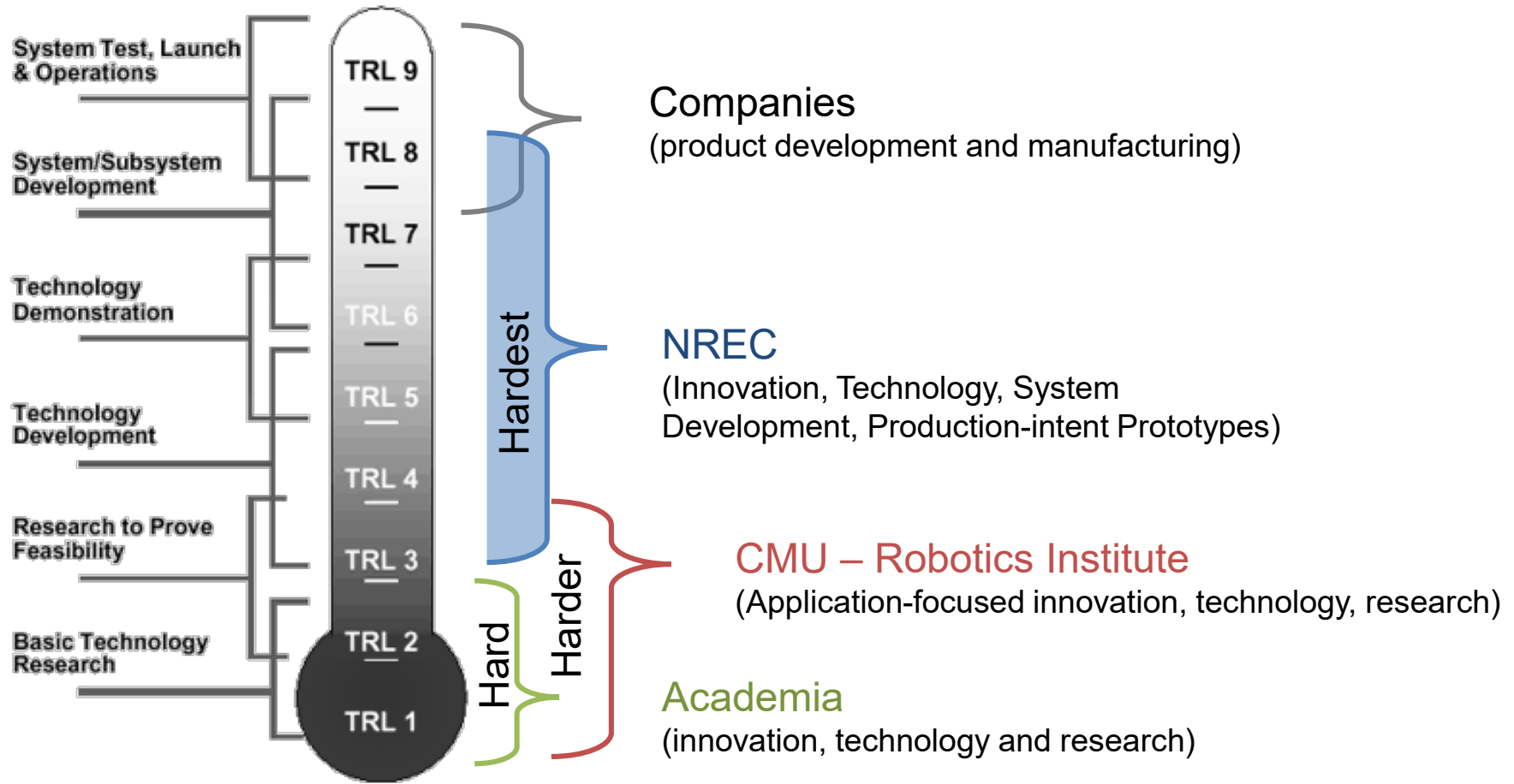
Former steel foundry built in 1898



NREC and CMU



Innovation and Engineered Solutions



Technology Readiness Level

NREC is the only robotics group in the world that combines **academic innovation** and pre-production **system development**

NREC Expertise



Motion Planning & Execution



Unmanned Vehicle Design



Positioning



Collaborative Robotics



Mapping



System Integration & Testing

COMPLETE SOLUTIONS



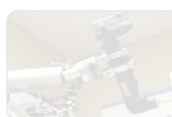
3D Range Sensing



Operator Interfaces



Electro-Mechanical Design



Manipulation



Image/sensor Processing



Machine Learning

We have **experts** in each area of robotics related to **intelligent mobile robots** in structured and **unstructured** environment

Sample Relevant Projects

Oil Platform Inspection

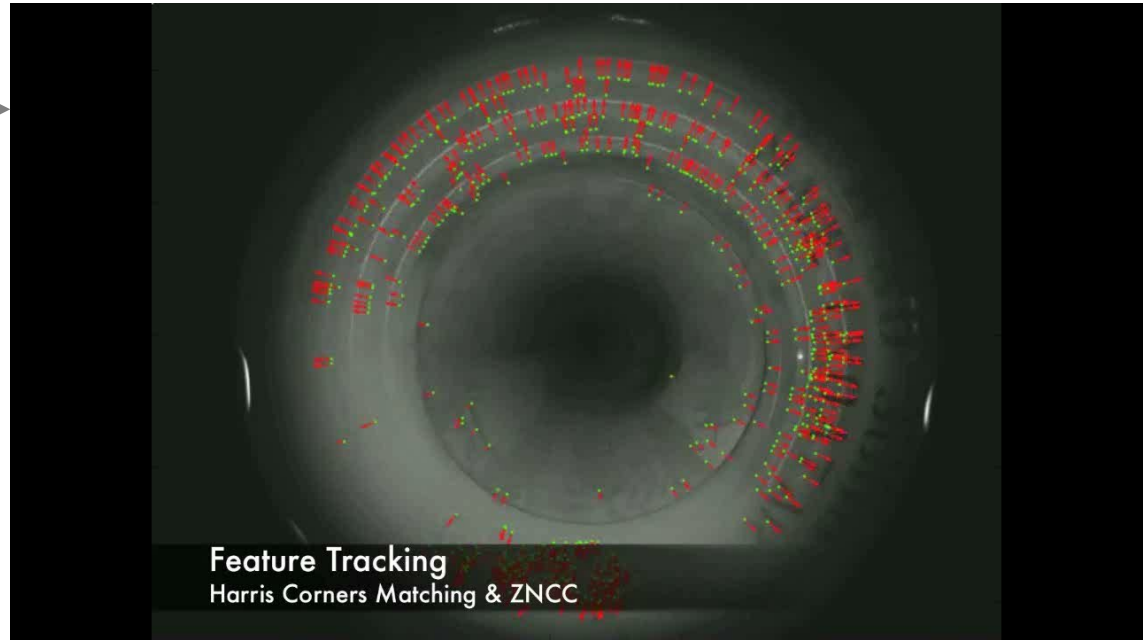


Oil Platform Inspection



Pipe Inspection

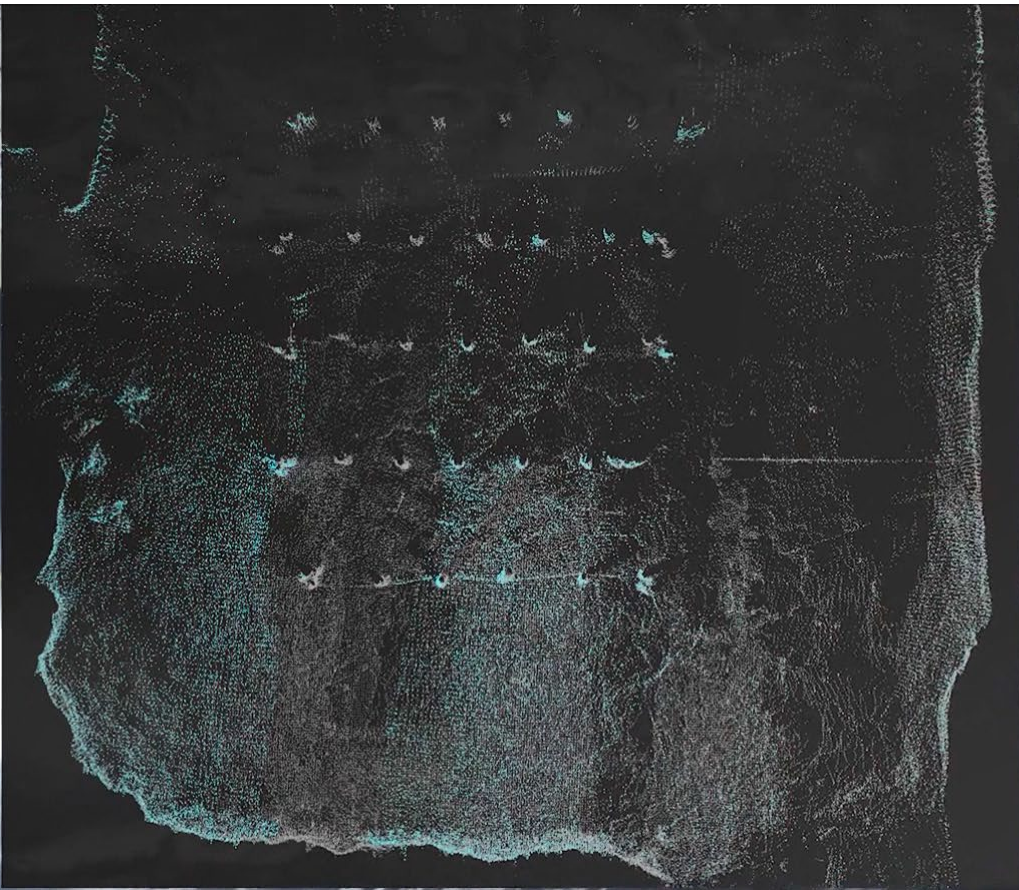
LNG Pipe Inspection



Slurry Pipe Inspection



3D Mapping



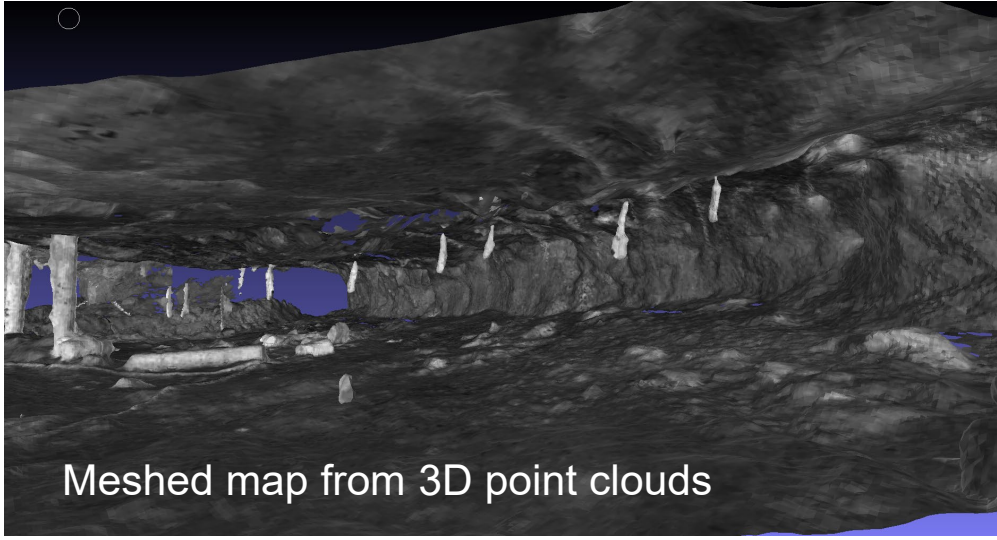
4x Actual Speed

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3D Mapping

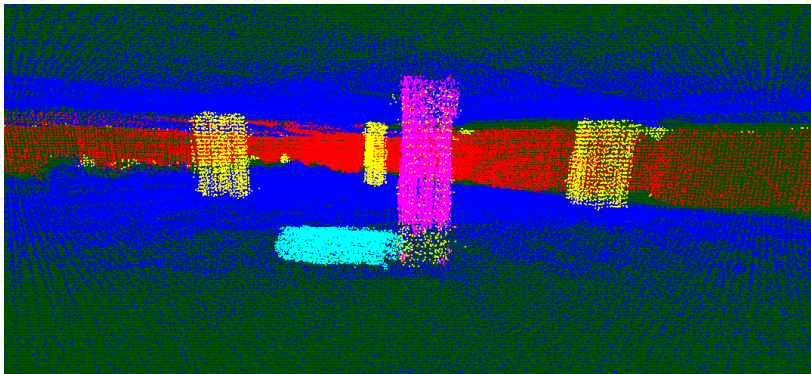


Camera snapshot

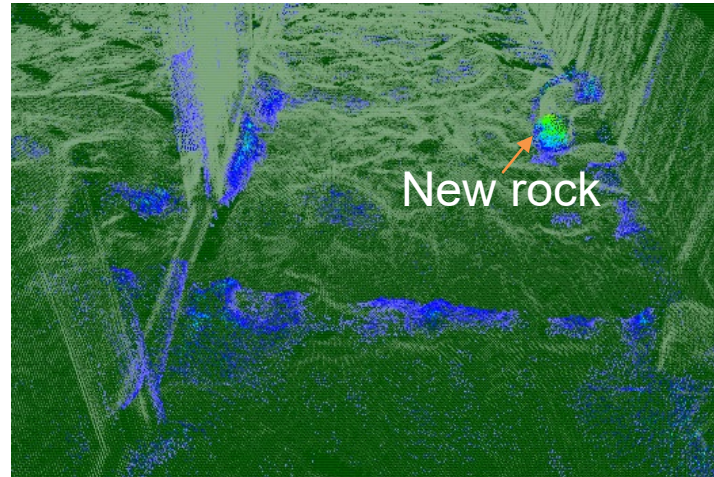


Meshed map from 3D point clouds

Change Detection



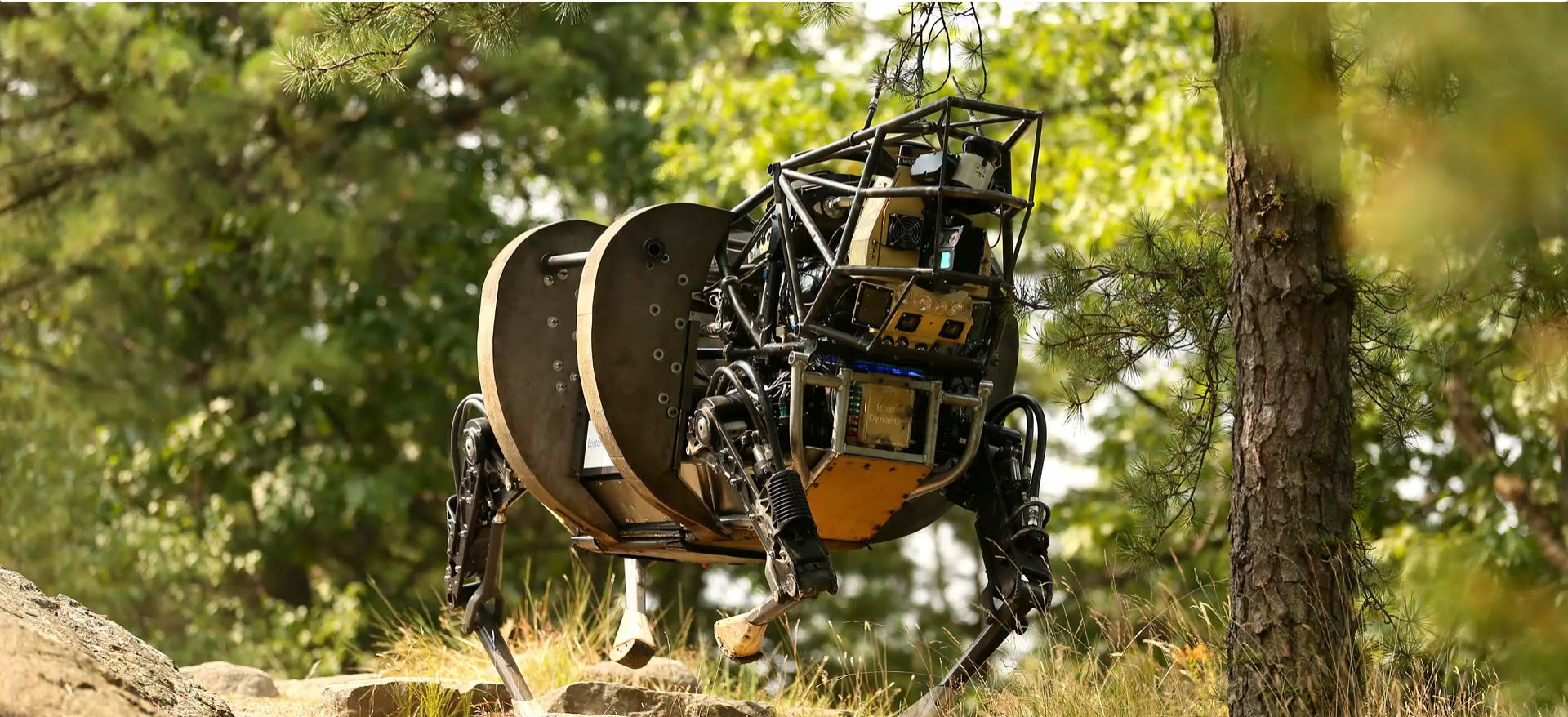
Fallen post



New rock

Perception and Planning for Legged Robot

LS3 Perception



3D Teleoperation

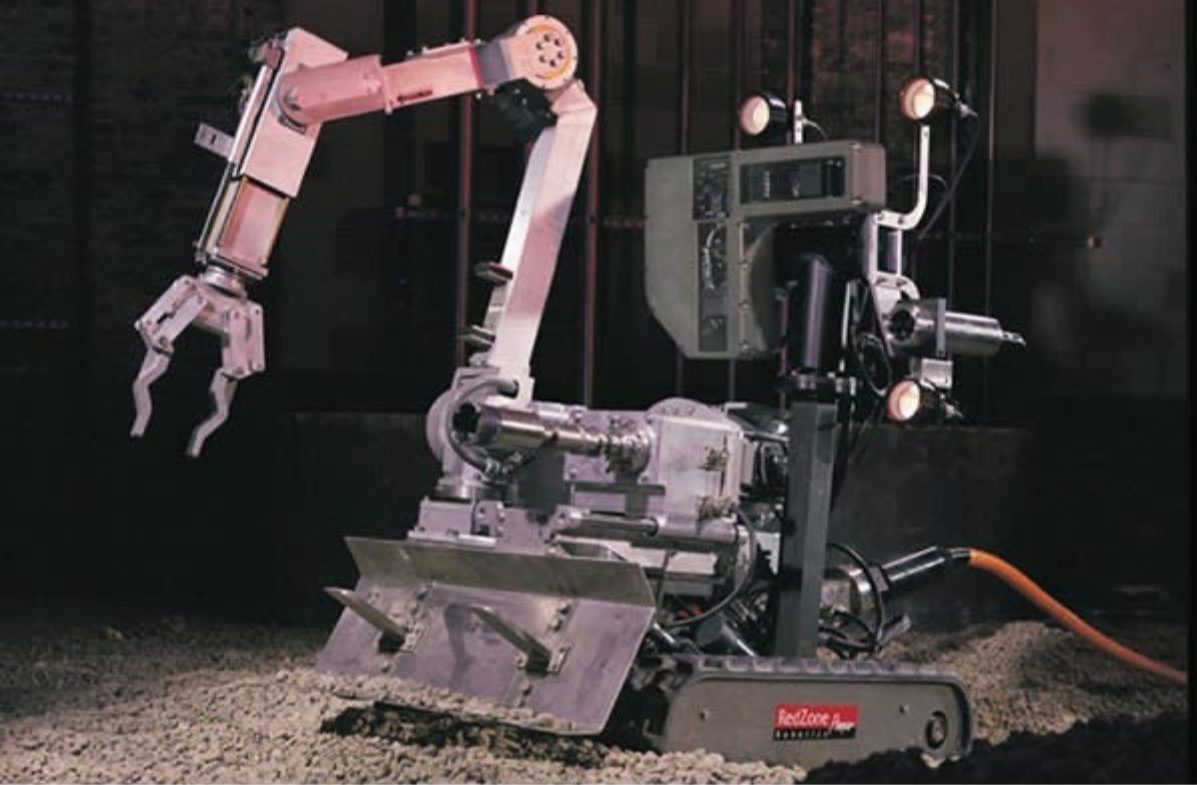


Personnel Pose

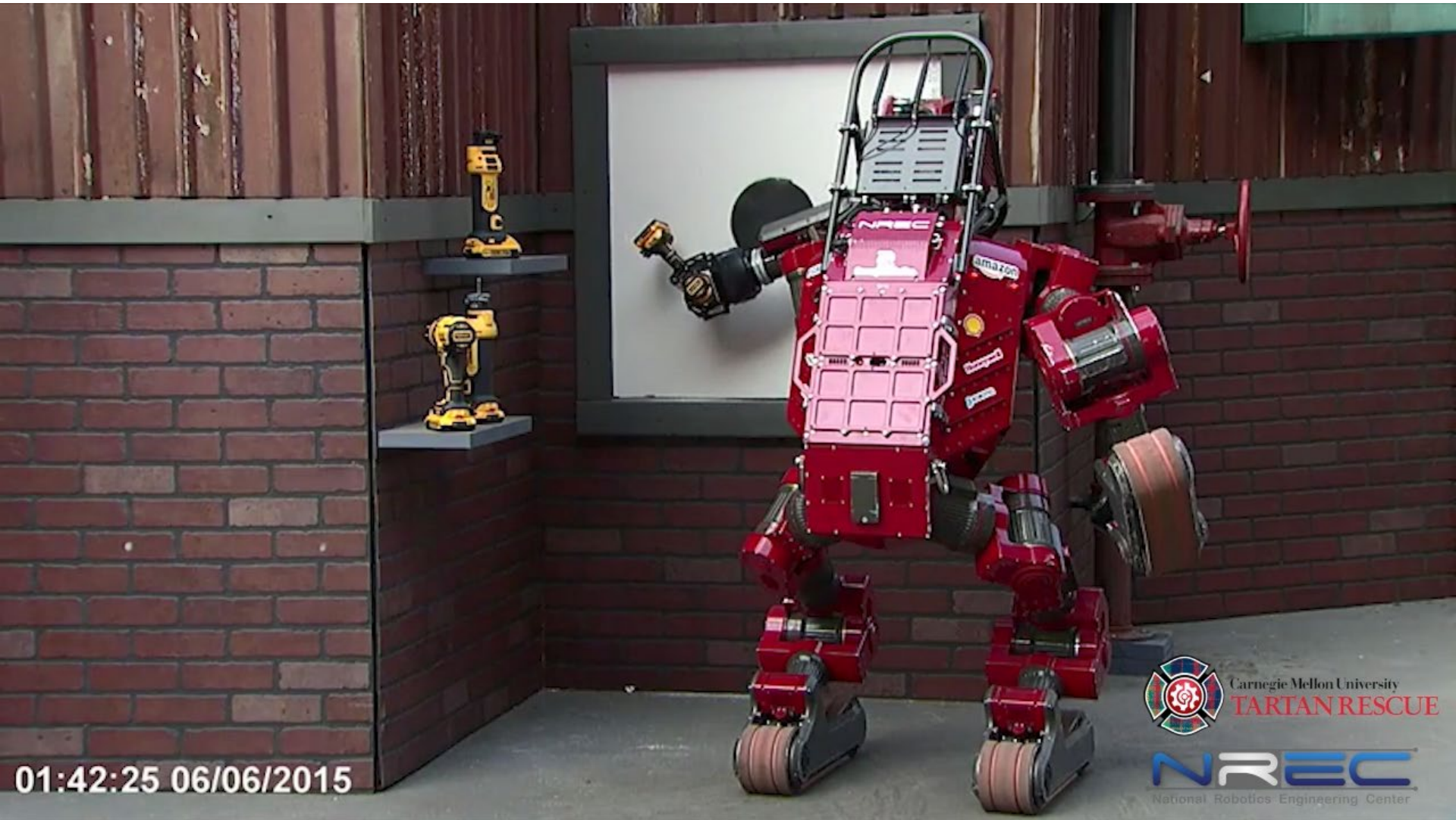
**NREC's wearable tracking system can help you navigate where GPS can't.
Blue line = Actual system data. (System tracks left foot.)**



Chernobyl Inspection



Disaster Response



01:42:25 06/06/2015



Laser Coating Removal System

