



Controls, Robotics, and Automation With Respect for Human Interaction

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First, Some Info on Me



- Grew up in Southern Virginia
- Bachelor's from Hampden-Sydney College in May 2002
 - Double Major: Physics and Applied Math
 - 4-year starting pitcher



Grad. School



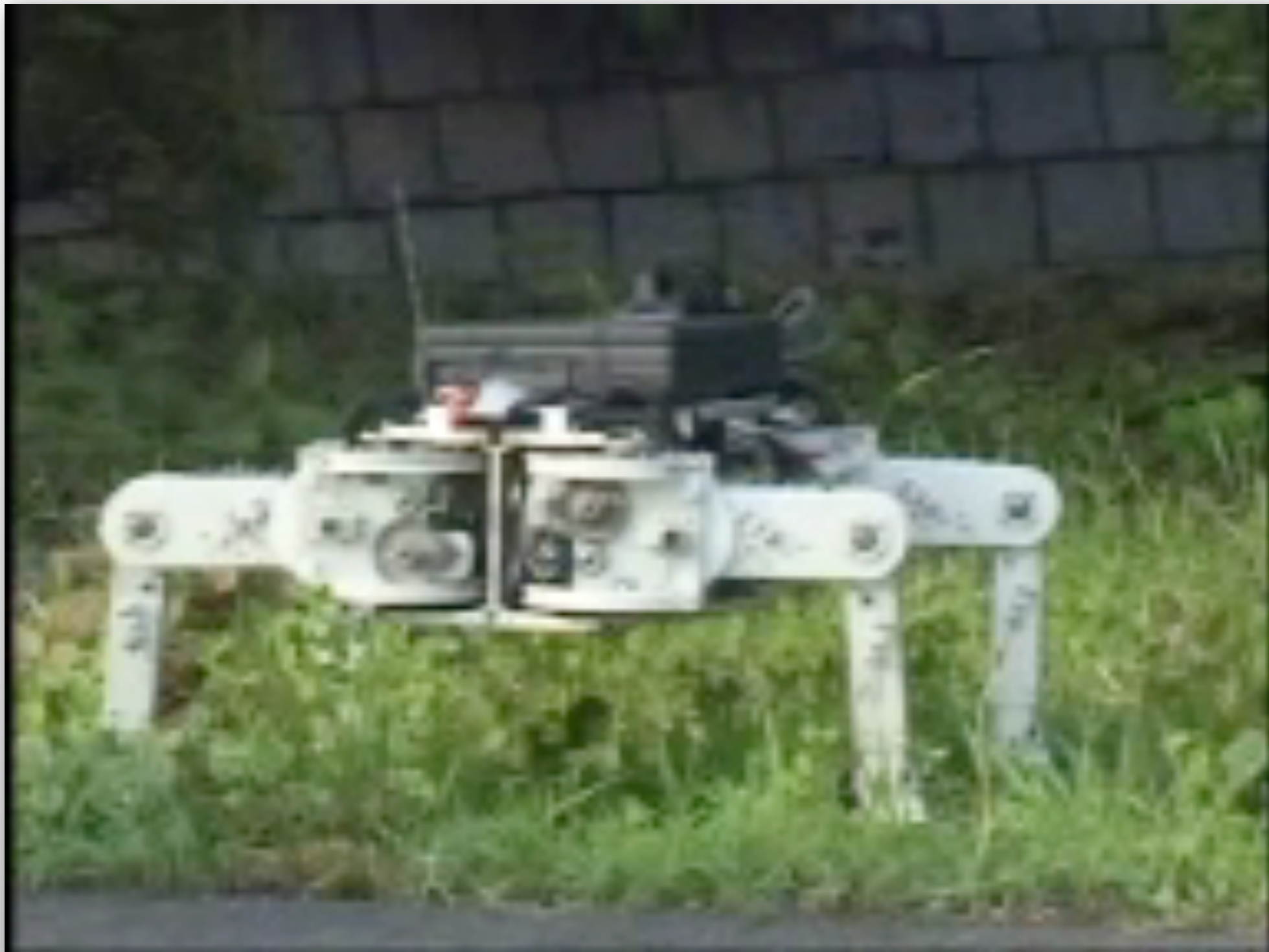
- Graduate School at Georgia Tech
 - Advisor: Dr. William Singhose
 - M.S. in May 2004
 - ♦ Thesis: *Active and Semi-Active Control to Counter Vehicle Payload Variation*
 - Ph.D. in August 2008
 - ♦ Thesis: *Dynamics and Control of Mobile Cranes*



Postdoc



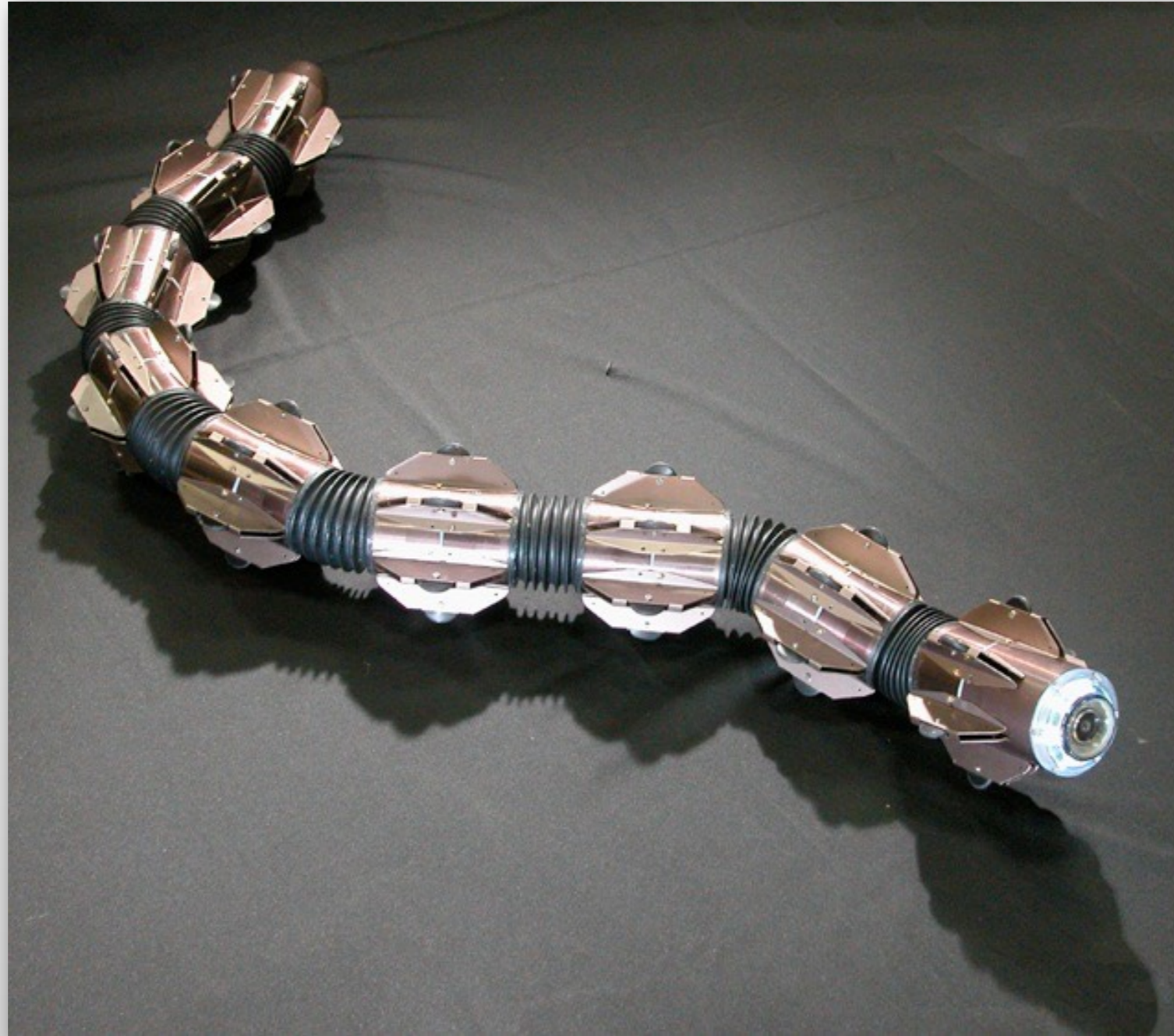
- Tokyo Institute of Technology with Dr. Shigeo Hirose



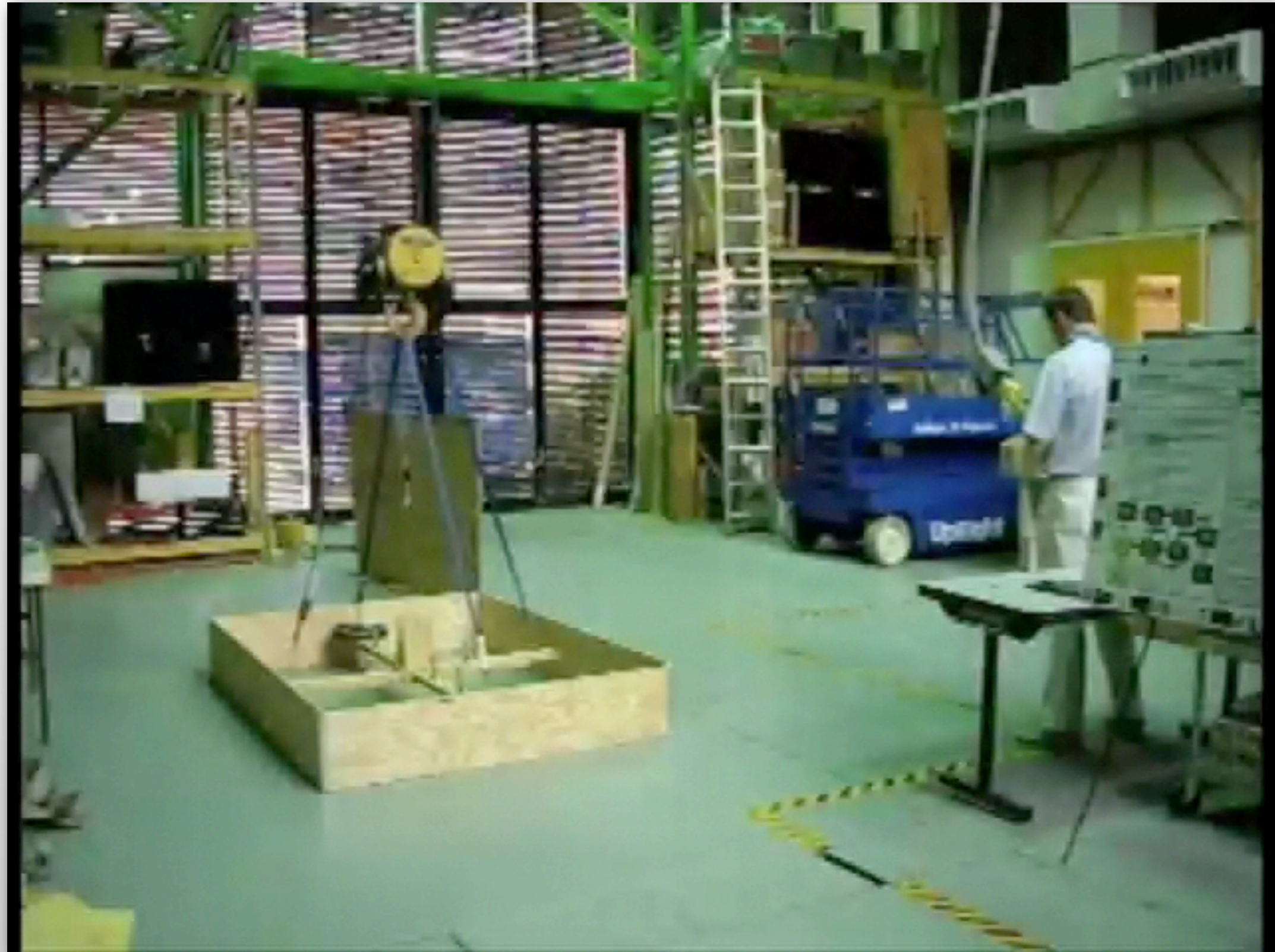
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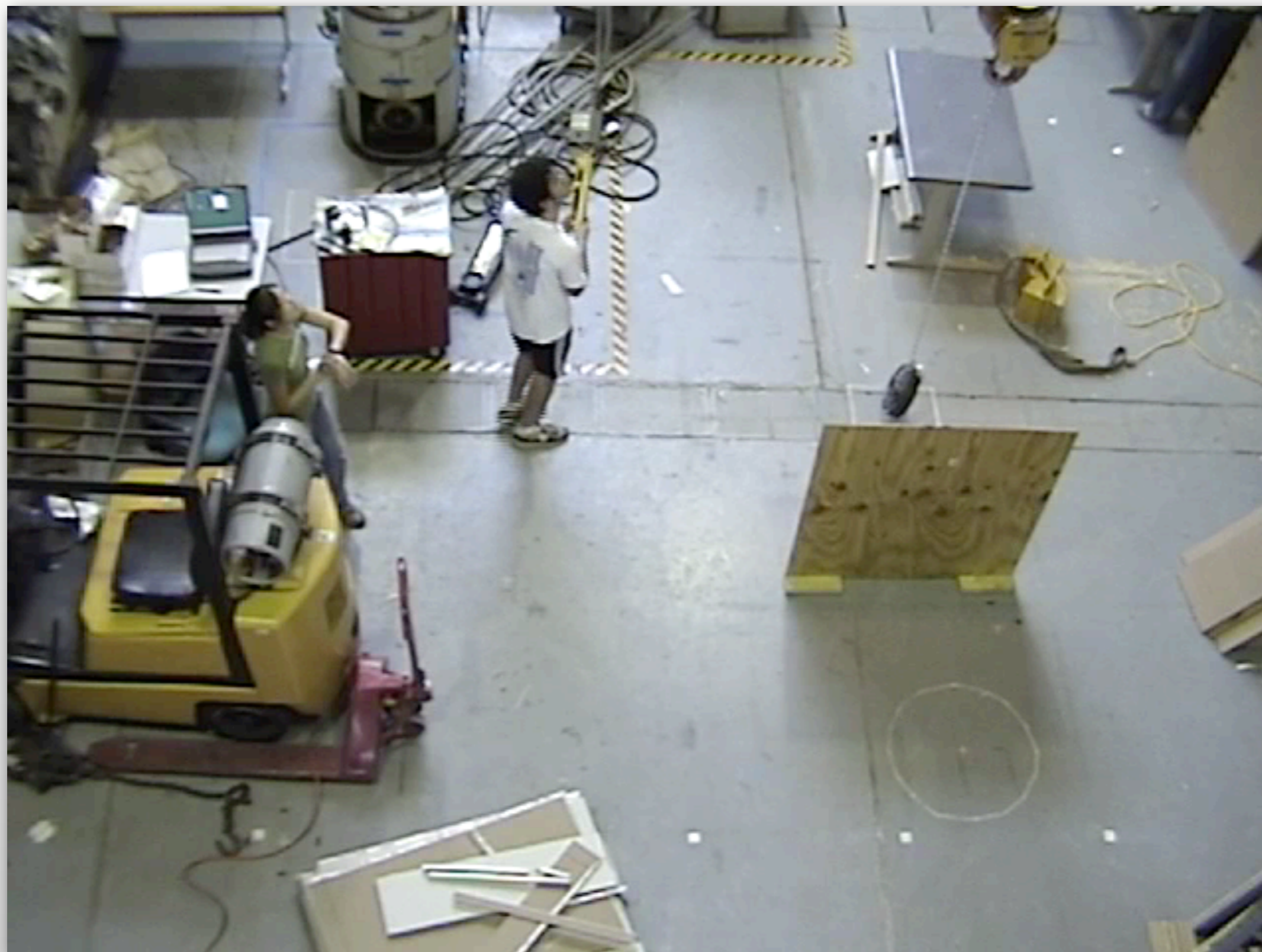
- Tokyo Institute of Technology with Dr. Shigeo Hirose



10-ton Bridge Crane



Example Multi-mode Crane Oscillation



GRYPHON Robot



- Humanitarian Demining



Types of Mines



- Anti-tank mines
 - Large, powerful mines
 - Designed to disable/destroy vehicles
 - Typically high metal content

- Anti-personnel mines
 - Small size
 - Designed to injure people
 - Typically low metal content



Demining



- Military Demining
 - Just clear a path for troops and equipment
 - 100% removal is **NOT** required
 - Primary objective is rapid clearance
- Humanitarian Demining
 - 100% removal is required
 - Speed is minor concern
 - Primary objective is returning land to civilians

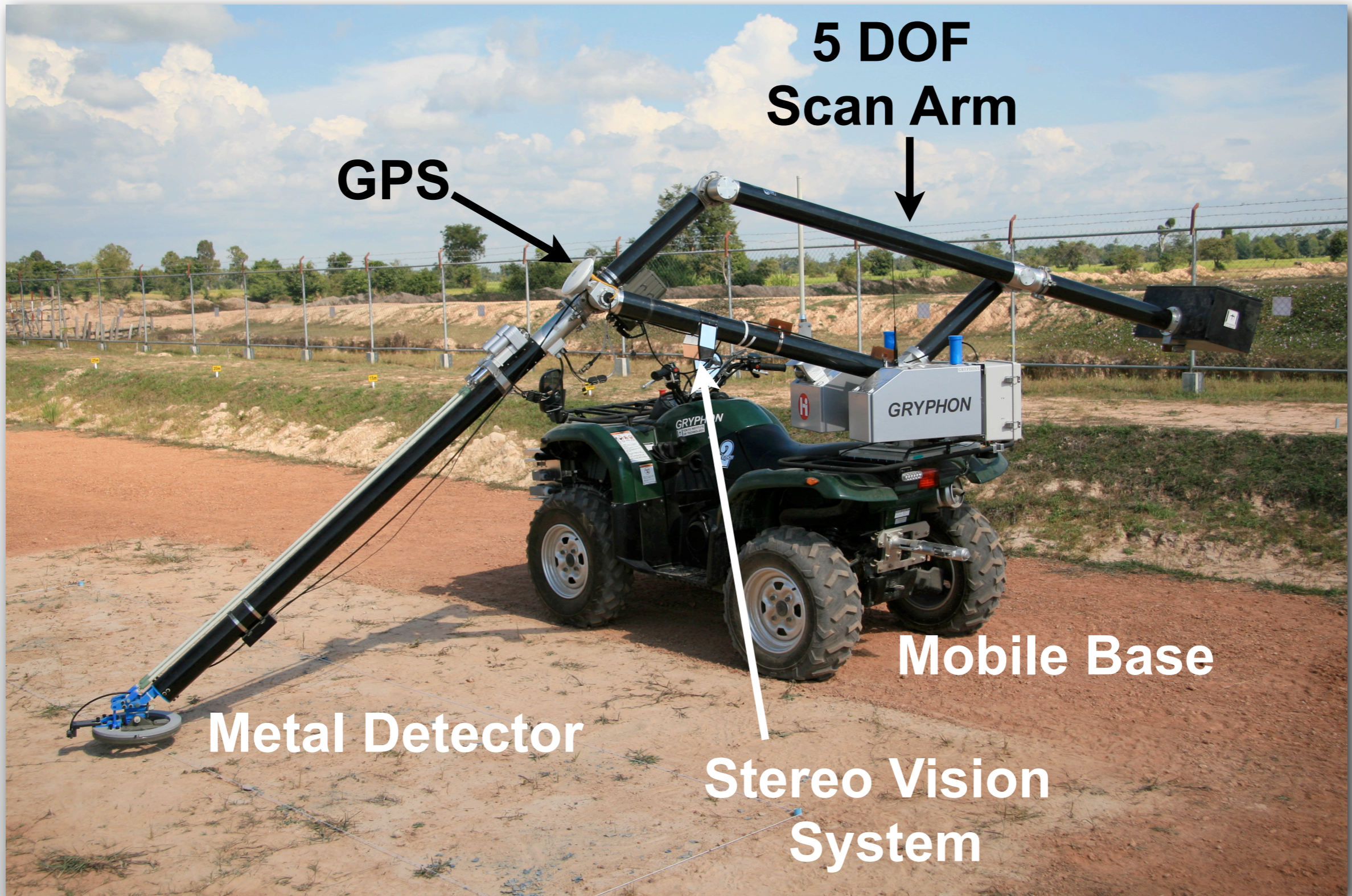
Detecting Mines - Current Methods



- Human operated metal detector
- Animals
 - Dogs
 - Pigs
 - Rats



GRYPHON



**5 DOF
Scan Arm**

GPS



Metal Detector

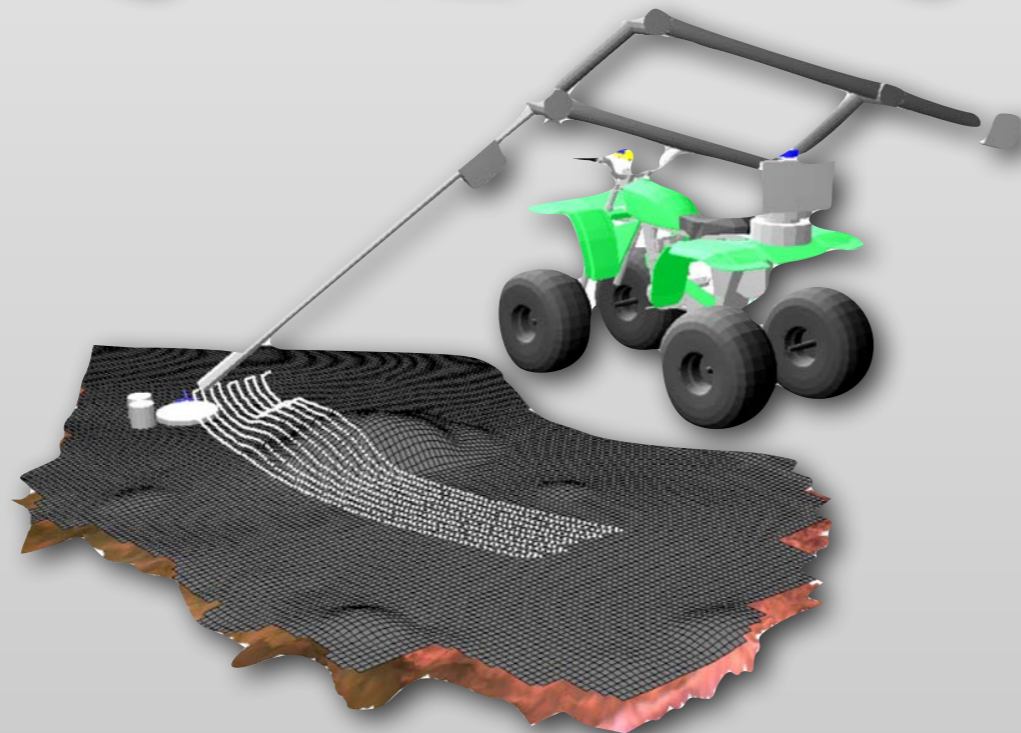
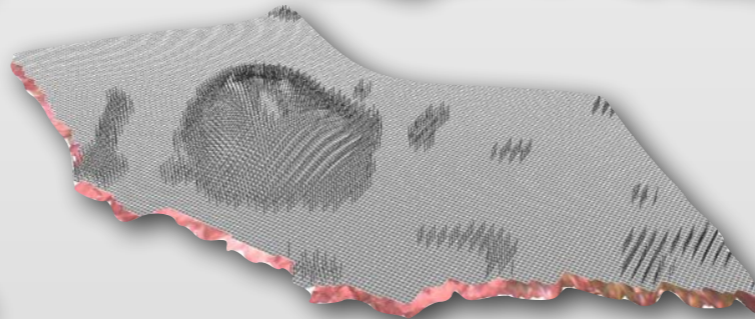
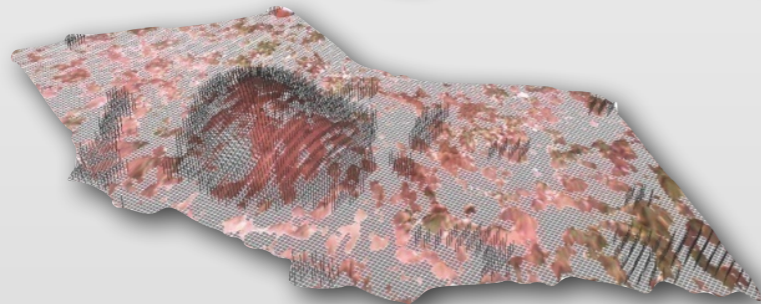
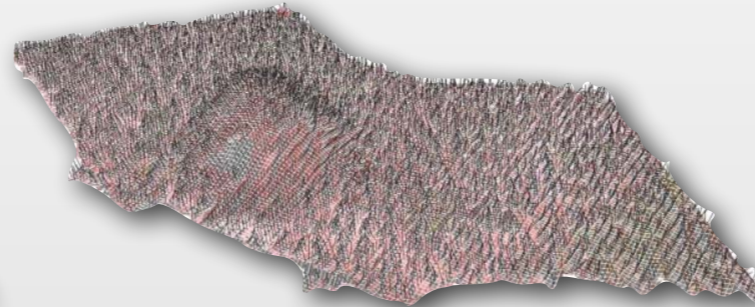
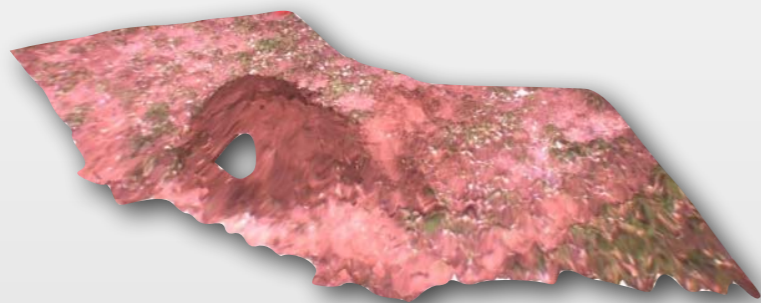
**Stereo Vision
System**

Mobile Base

Mapping the Scan Area



- Stereo vision system
- Generate height field to track



High-voltage Power Lines



- How would you inspect these?



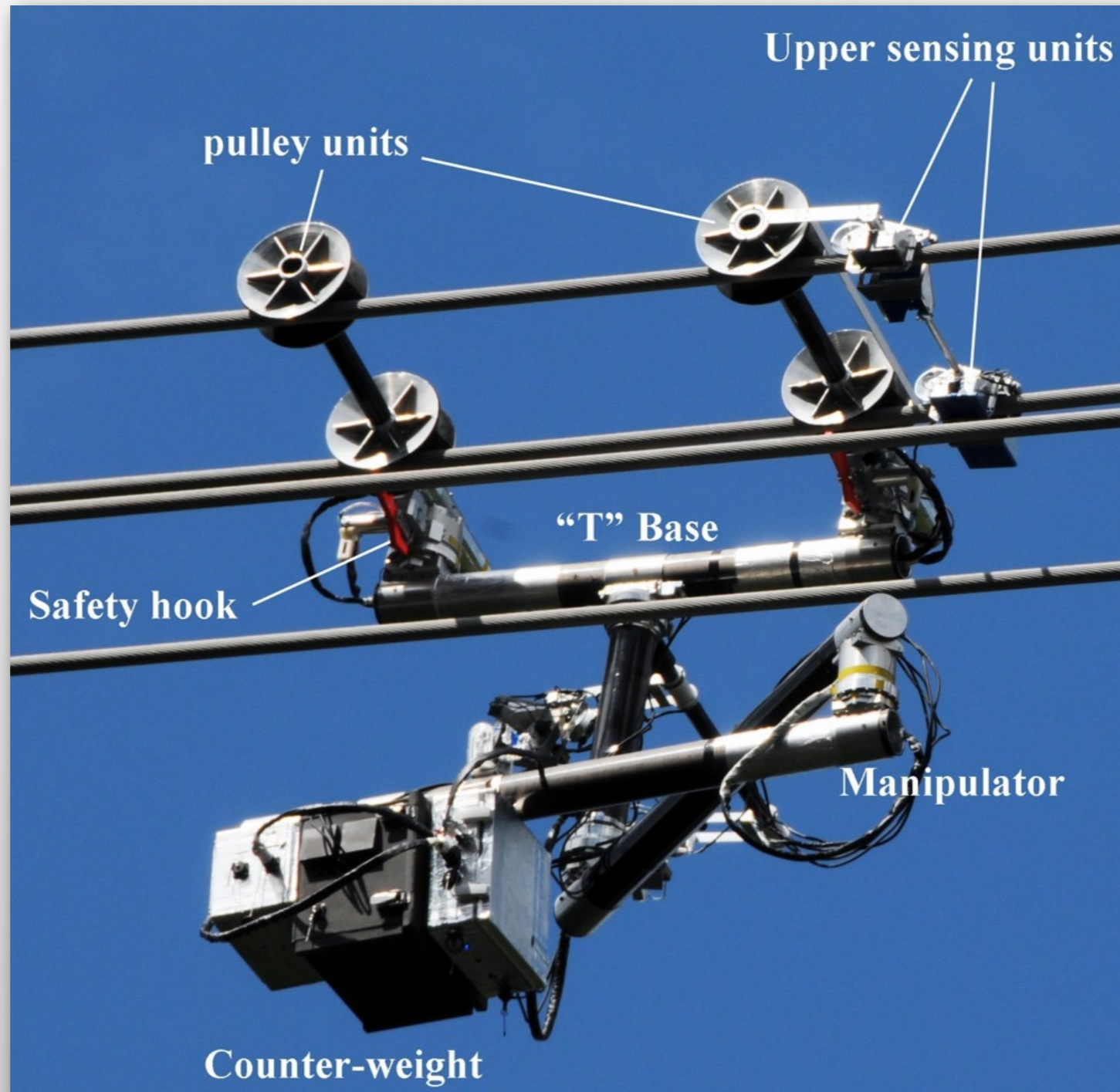
Current State-of-the-Art



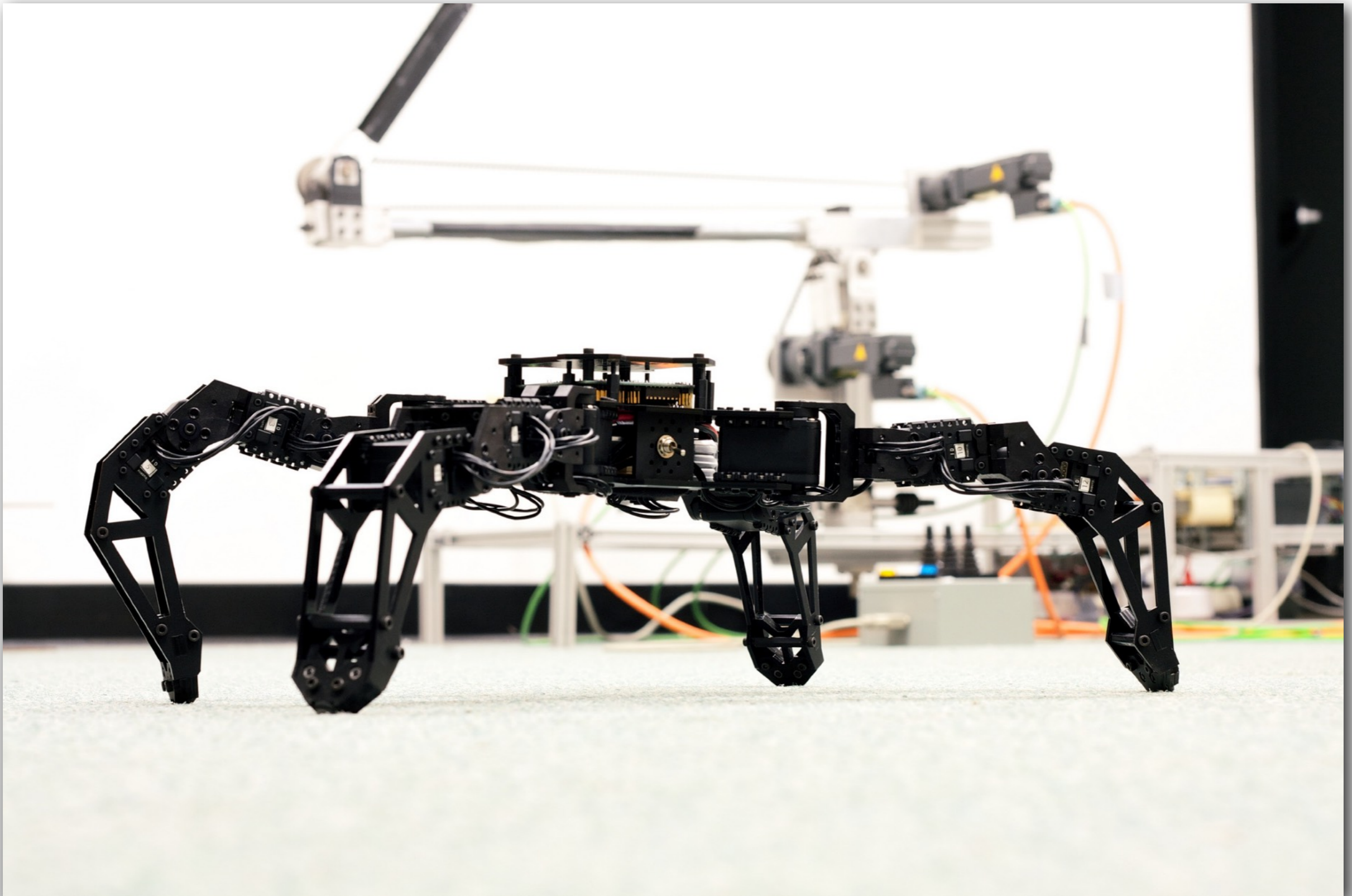
HiBot Expliner Robot



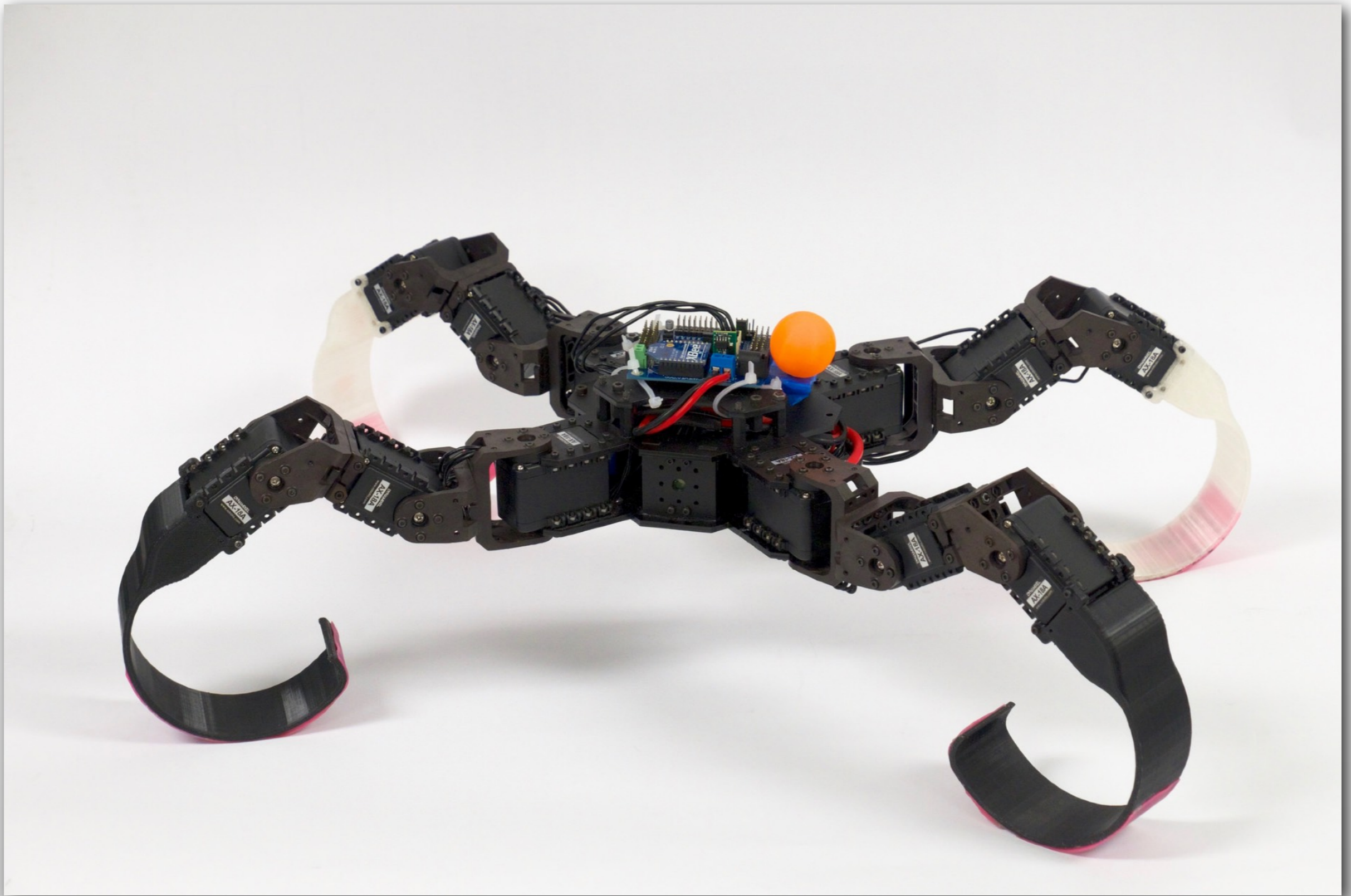
- High Voltage Power Line Inspection and Repair



Walking Robots



Walking Robots



Project Overview



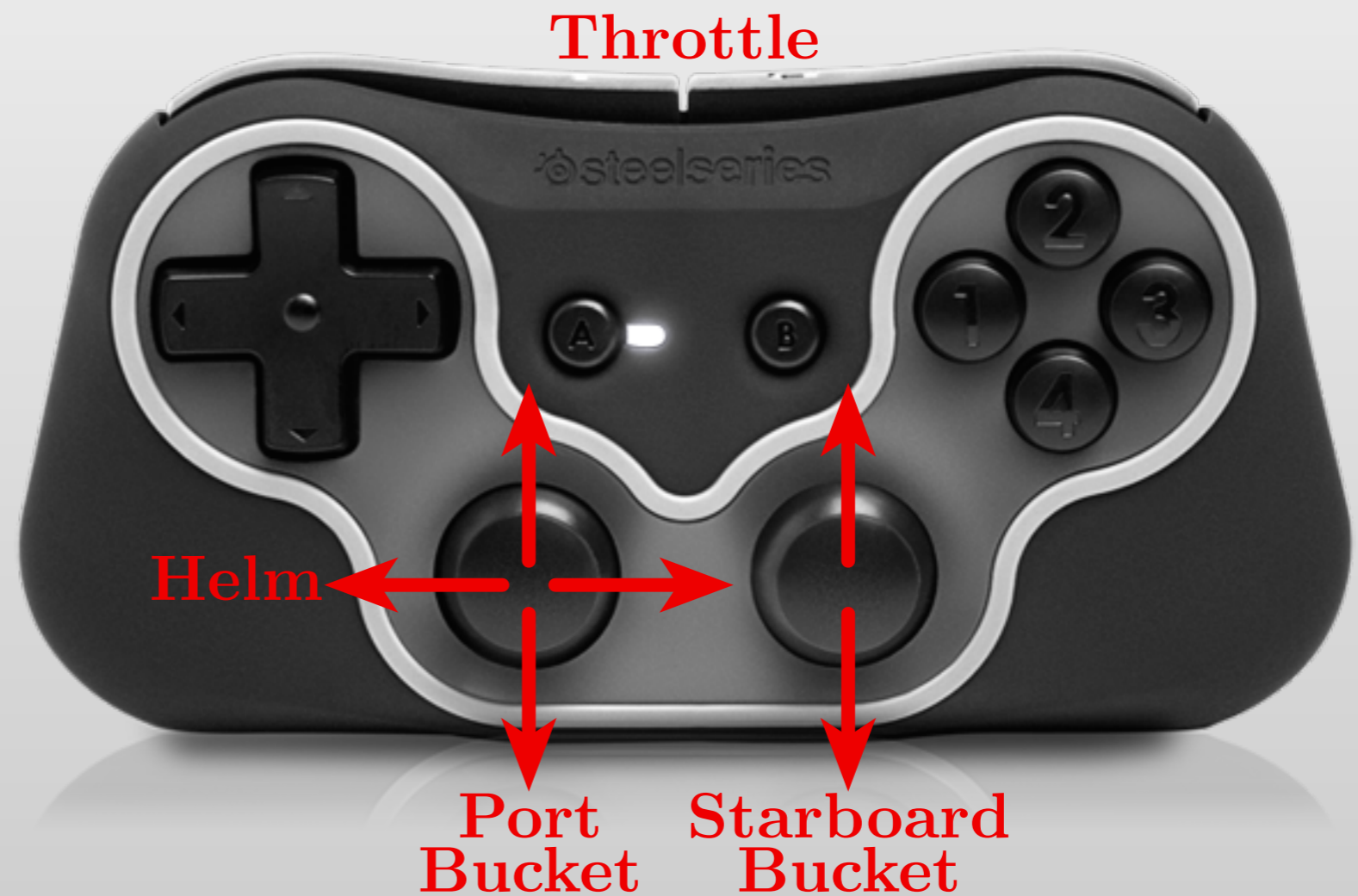
- Worked with Swiftships Shipbuilders, LLC
- Special Forces Boat – The Anaconda



Remote Control



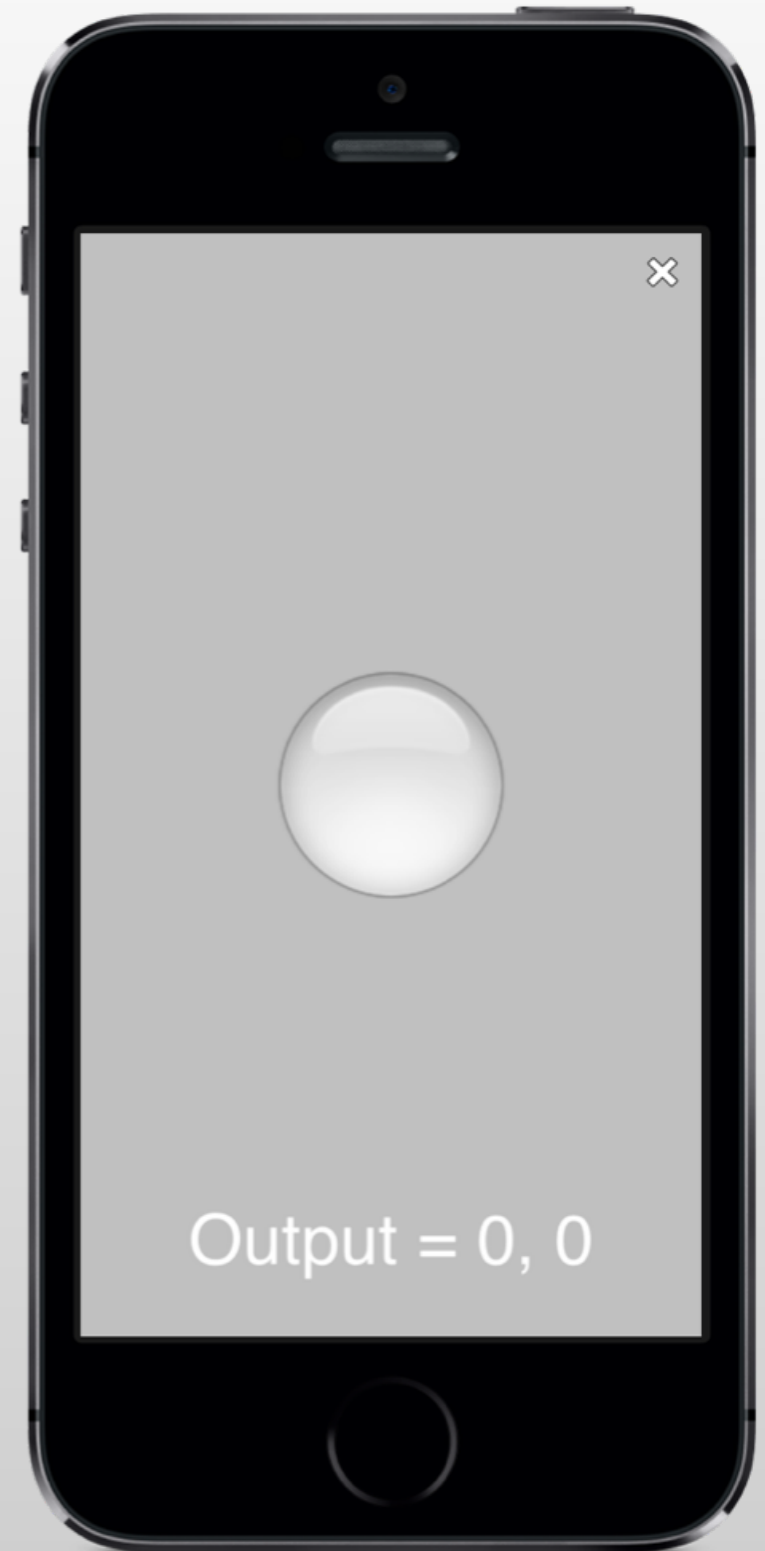
- Gamepad



Remote Control



- Gamepad
- iOS-based remote
 - Joystick
 - Tilt-based
- LEAP Motion Controller



LEAP Motion Control



Just a little while later...



2016 Maritime RobotX Challenge



MCHE201: Intro. to Engineering Design



- Sophomore-level class
- Teach design through robotics projects
- Ends in robotics contest between student teams

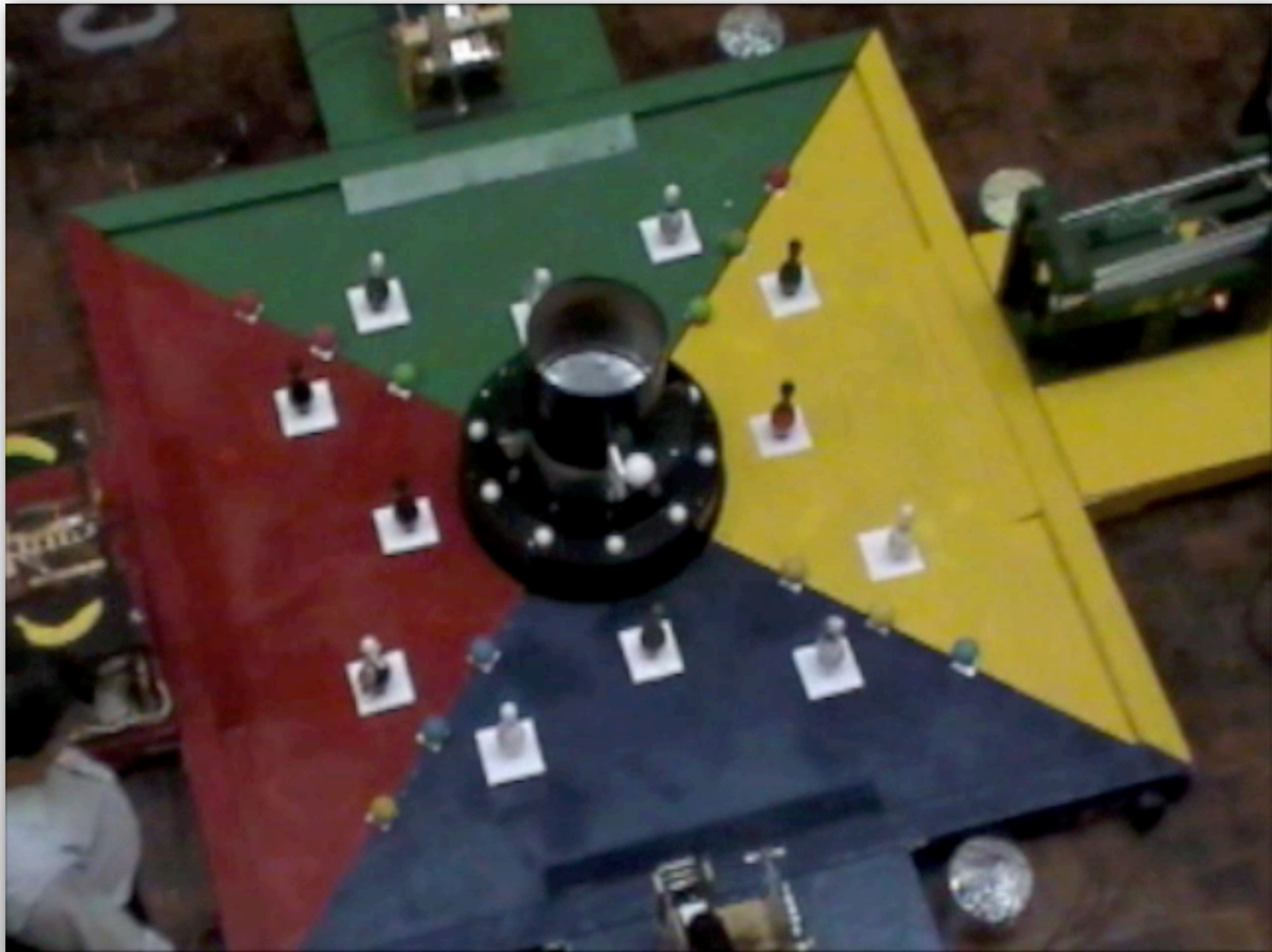
Final Project Kit



- Supported by UL Lafayette Educational Grant and STEP Grants
 - Better motors and driver
 - Solenoid
 - Distance sensor
 - Power Supply
 - Connectors for MCH201 Track
- More this term!



ME2110 at Georgia TEch



MCHE201 – Spring 2015



An Invitation



What: MCHE201 Final Robotics Contest

When: Thursday, April 19th, 5pm – ~8:30pm

Where: Blackham Coliseum



Thank You.