



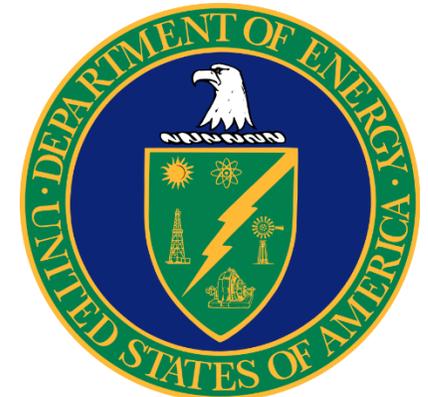
# American Nuclear Society Robotics and Remote Systems Division Webinar

**Development of Robotic Technologies for Nuclear  
Decommissioning  
29 April 2025  
ANS Webinar, USA**



Applied  
Research  
Center

**Leonel Lagos, Anthony Abrahao, Mackenson Telusma  
Florida International University**





## Florida International University

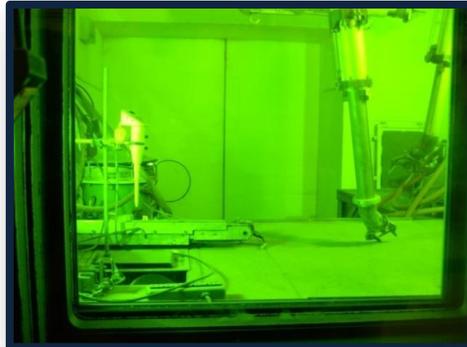
A vibrant, 58,000 student-centered public research university located in Miami, Florida.

Among the largest Hispanic-serving institutions in the U.S. and is designated a Minority-Serving Institution.

As a top-tier research institution, research is a major component in FIU mission.



# DOE Office of Environmental Management (DOE EM) and Office of Legacy Management (DOE LM)



DOE's Environmental Restoration Mission: DOE Office of Environmental Management has over 30 years managing and directing the cleanup of contaminated nuclear facilities across the United States due to the legacy of R&D and production of nuclear weapons (i.e. Nuclear Weapons Complex)

DOE Office of Legacy Management is committed to fulfilling DOE's post-closure responsibilities and ensuring the future protection of human health and the environment



## Technology Roadmap

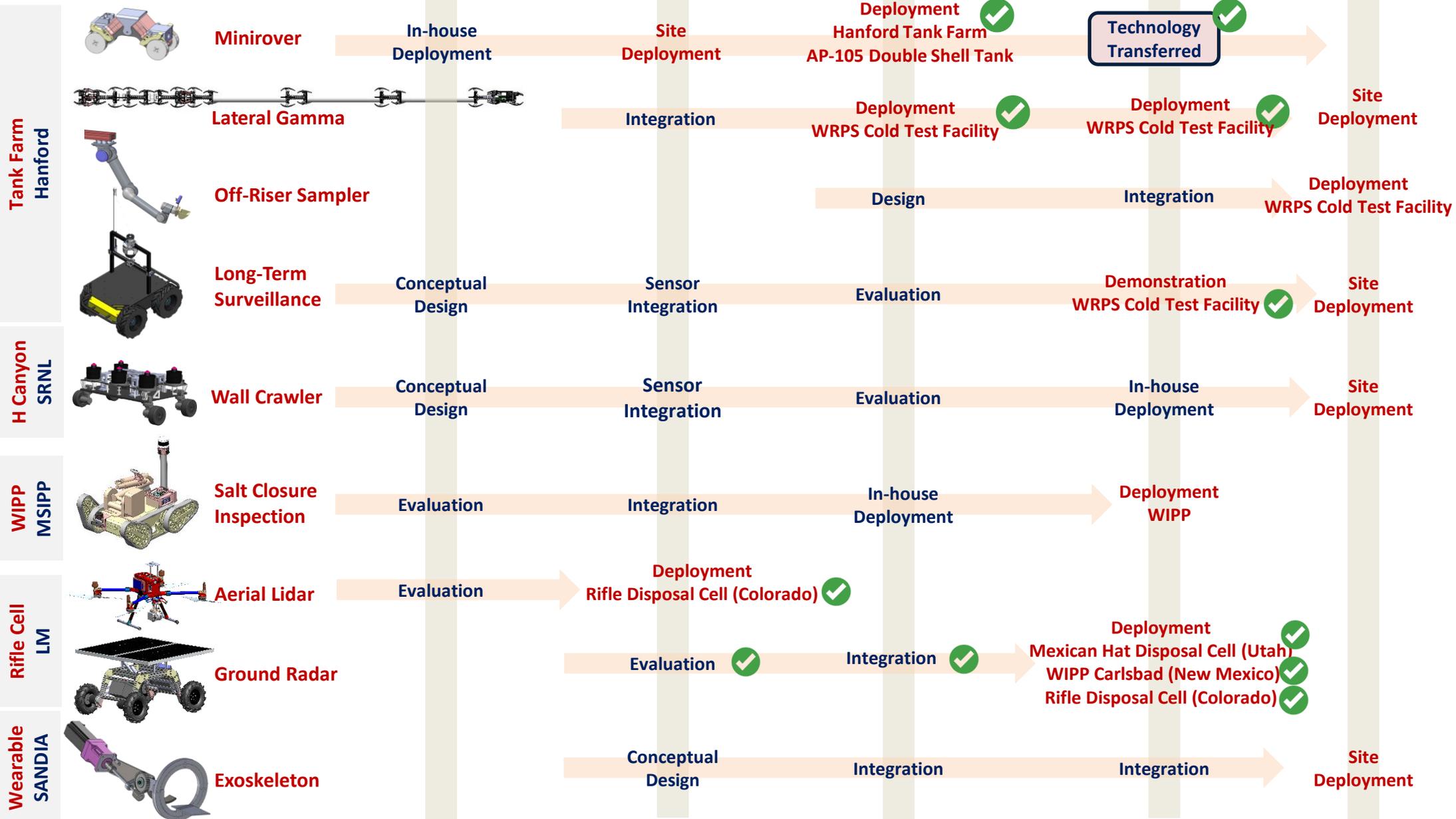
2020

2021

2022

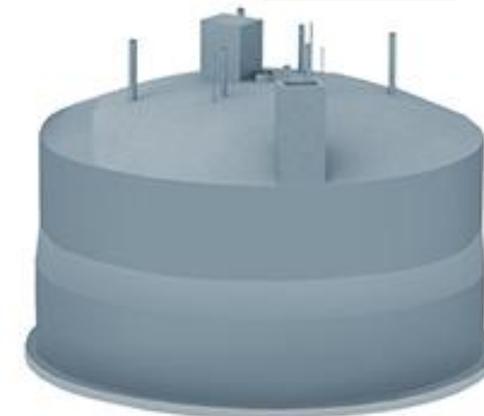
2023

2024





# Hanford's Tank Farm



**177** TOTAL  
TANKS

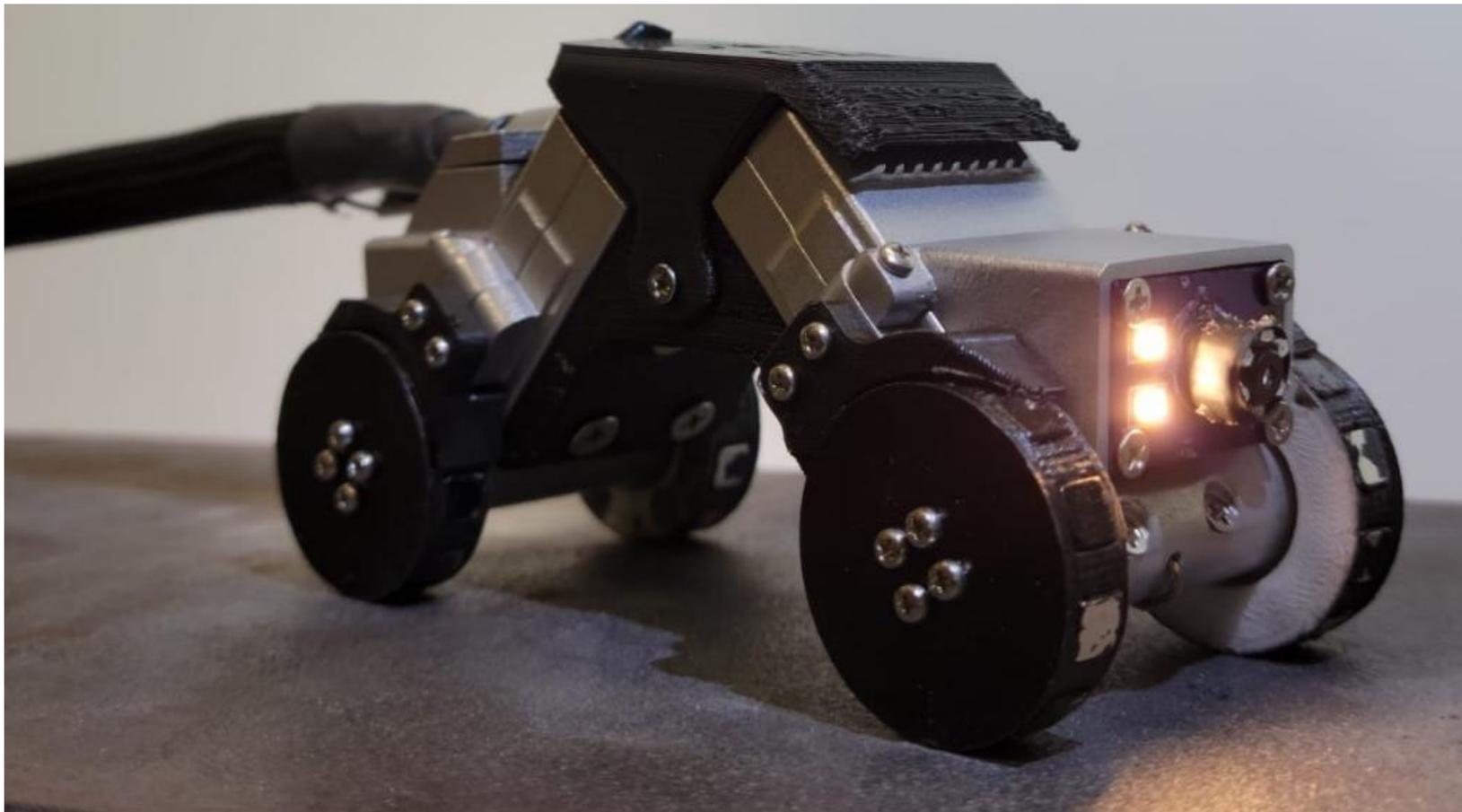
**149** SINGLE-SHELL TANKS  
Constructed 1943-1964

**28** DOUBLE-SHELL TANKS  
Constructed 1968-1986

Hanford site has 56 million gallons of radioactive waste left from the past production of nuclear weapons. The HLW is being stored in underground tanks



# Miniature Rover Inspection Tool for DST Inspections



Aluminum 3D Printed Body  
Patented Flexible Chassis

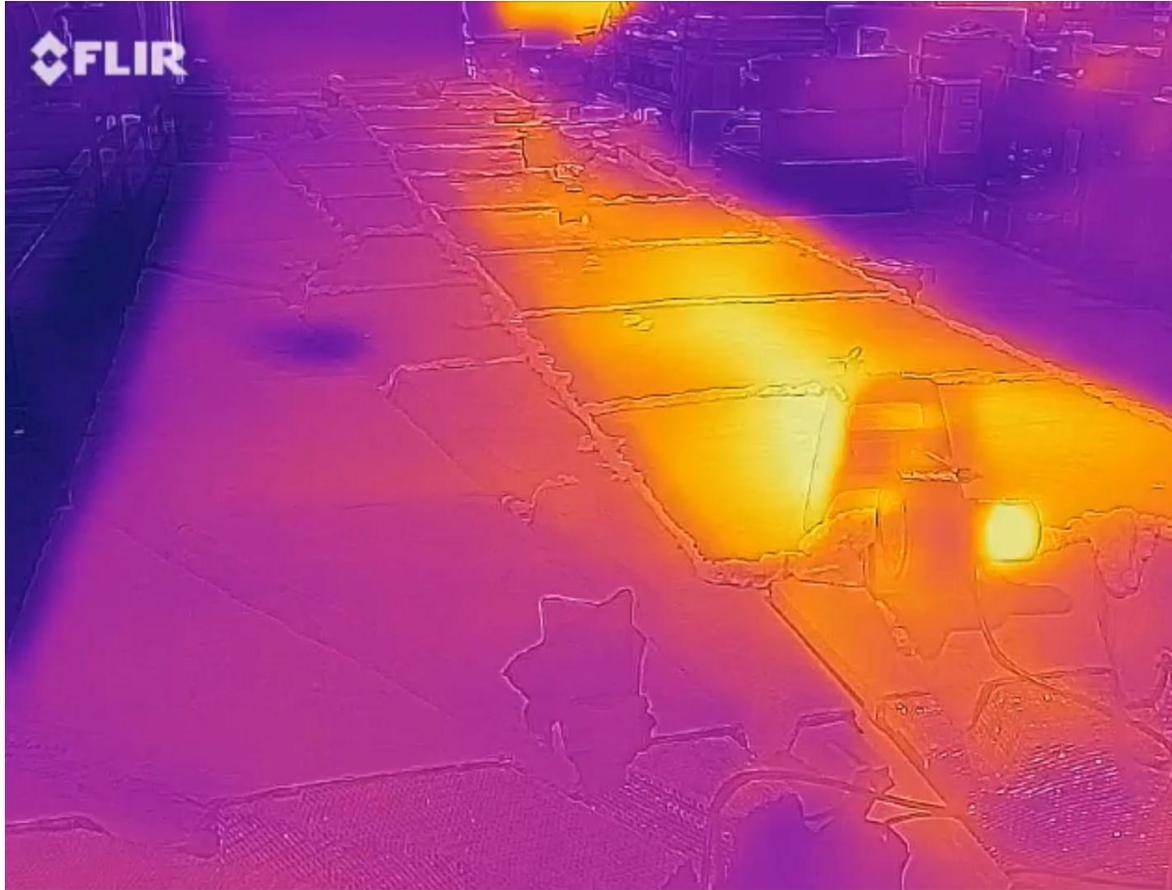


Control Box  
Game Controller





# FIU Test Bed – Hanford Double Shell Tank



Traversing weld seams  
Elevated Temperatures  
Corroded Surfaces

Extensive in-house testing duplicating DOE site conditions

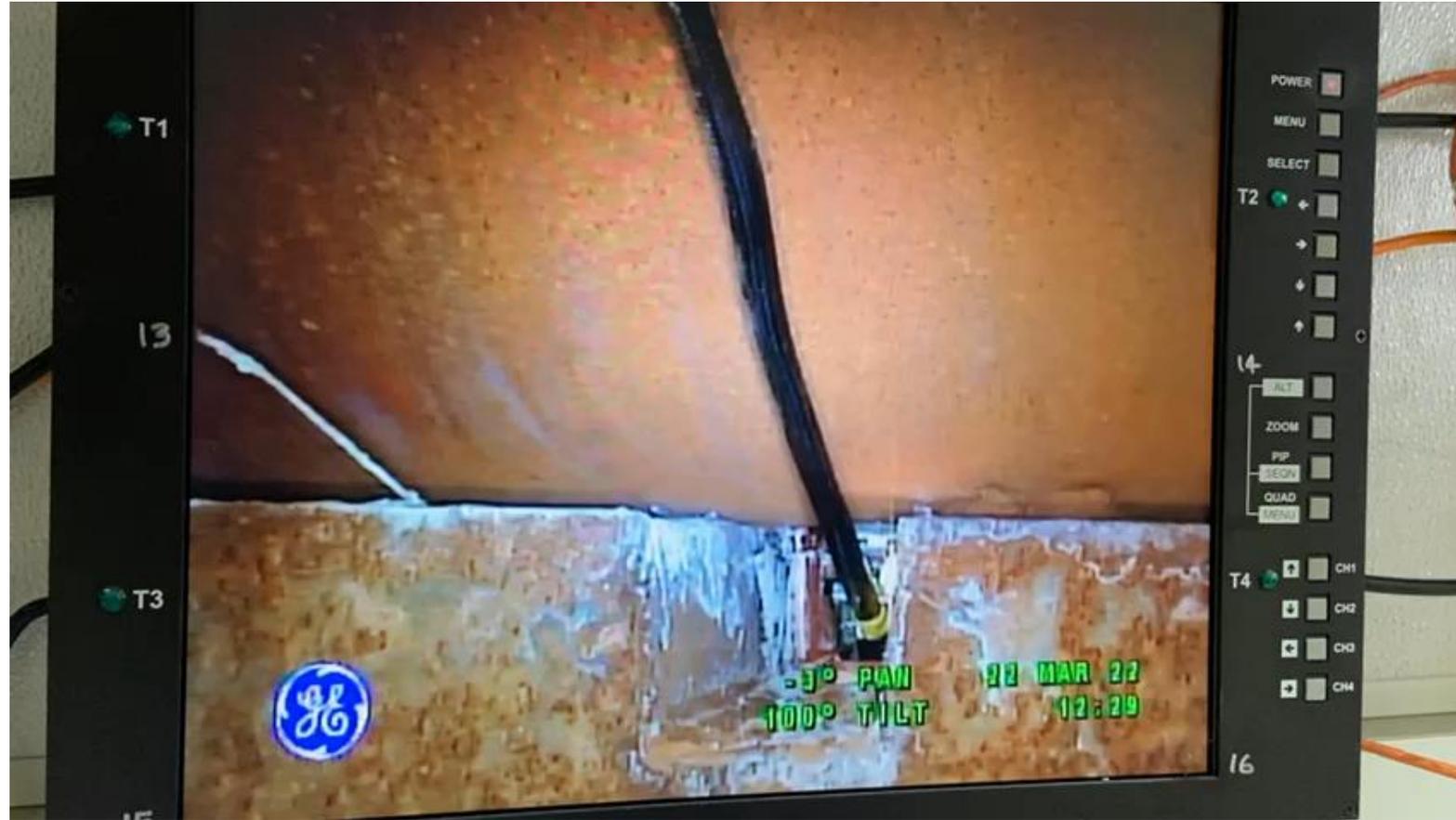


# WRPS's Cold Test Facility Training – Mach 2022





# AP-105 Double Shell Tank Deployment – March 2022







# Single Shell Tanks Applications WRPS Cold Test Facility Deployment

FIU Applied  
Research  
Center

Applied Research  
Center





# Field Site – WRPS Cold Test Facility – Summer 2023



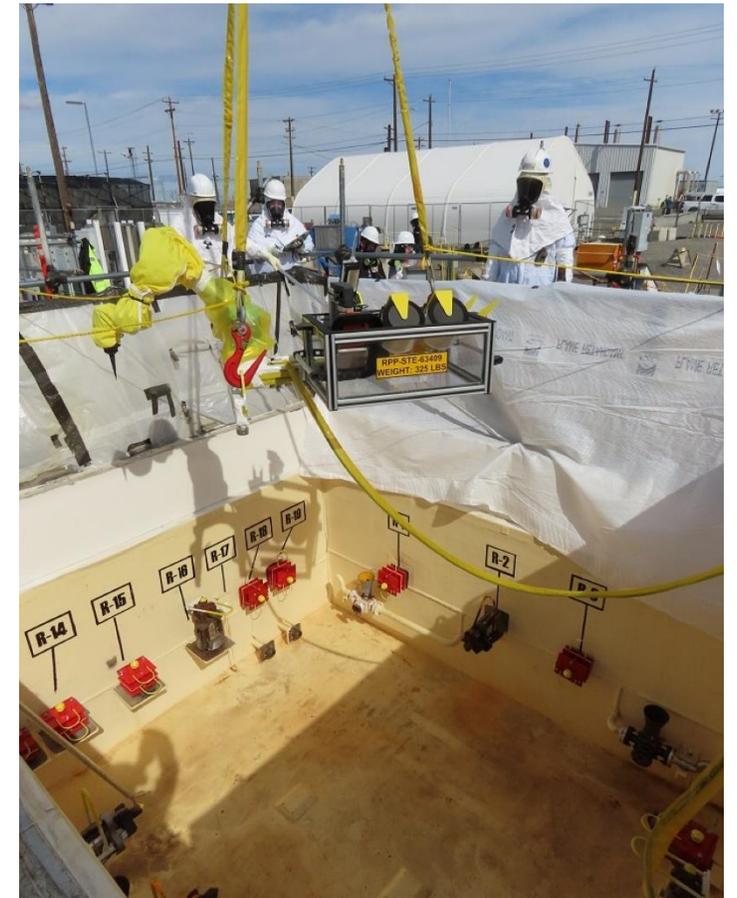


# Hanford Site Pit Area



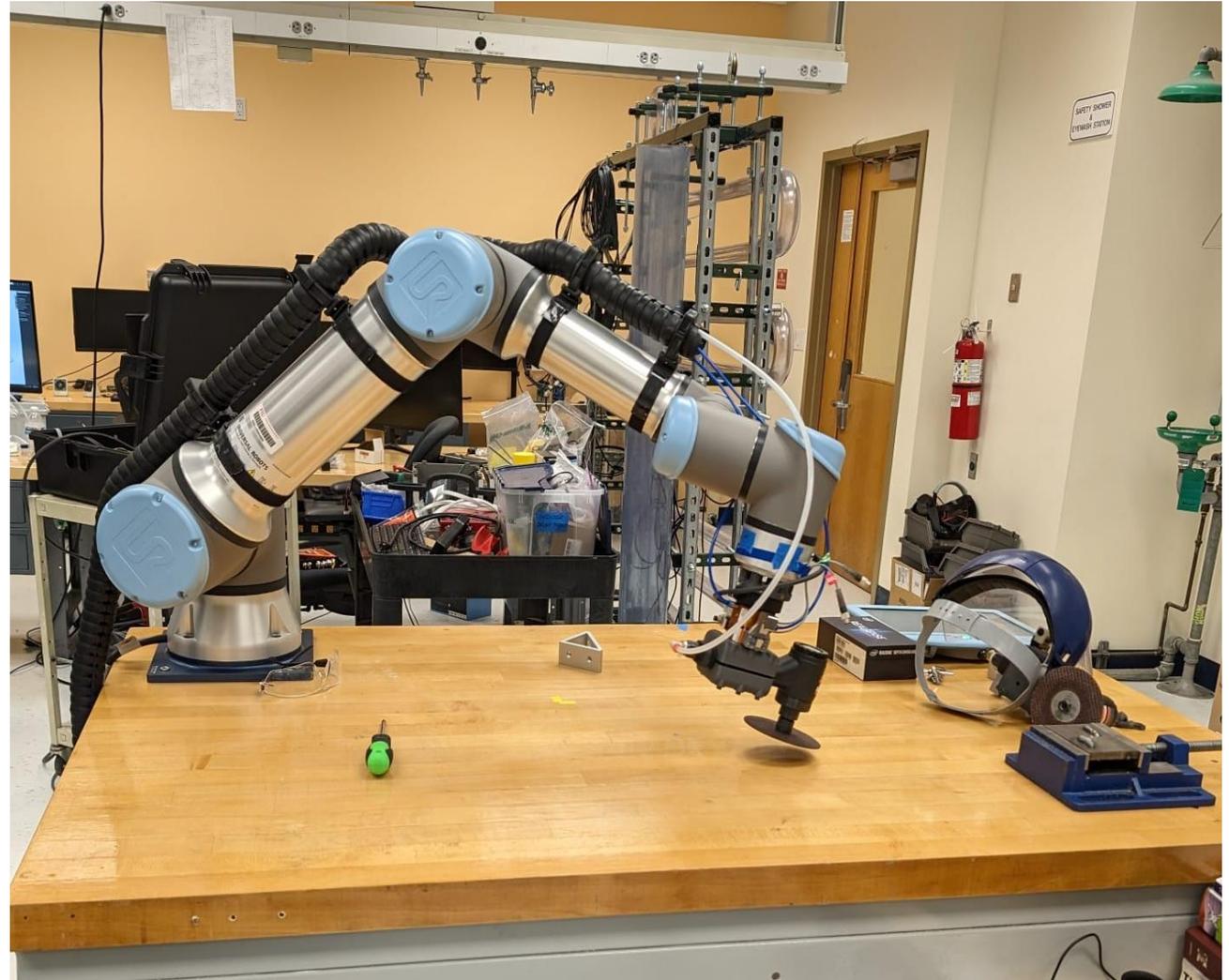
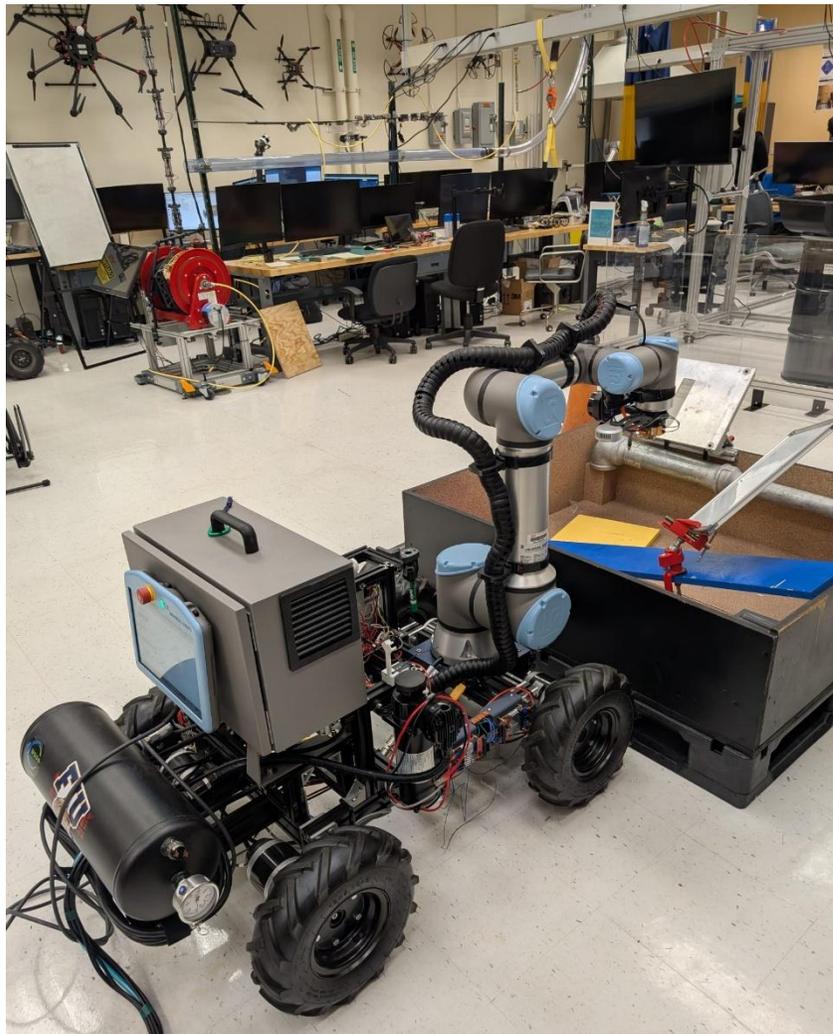


# Hanford's Pit Area Repairs



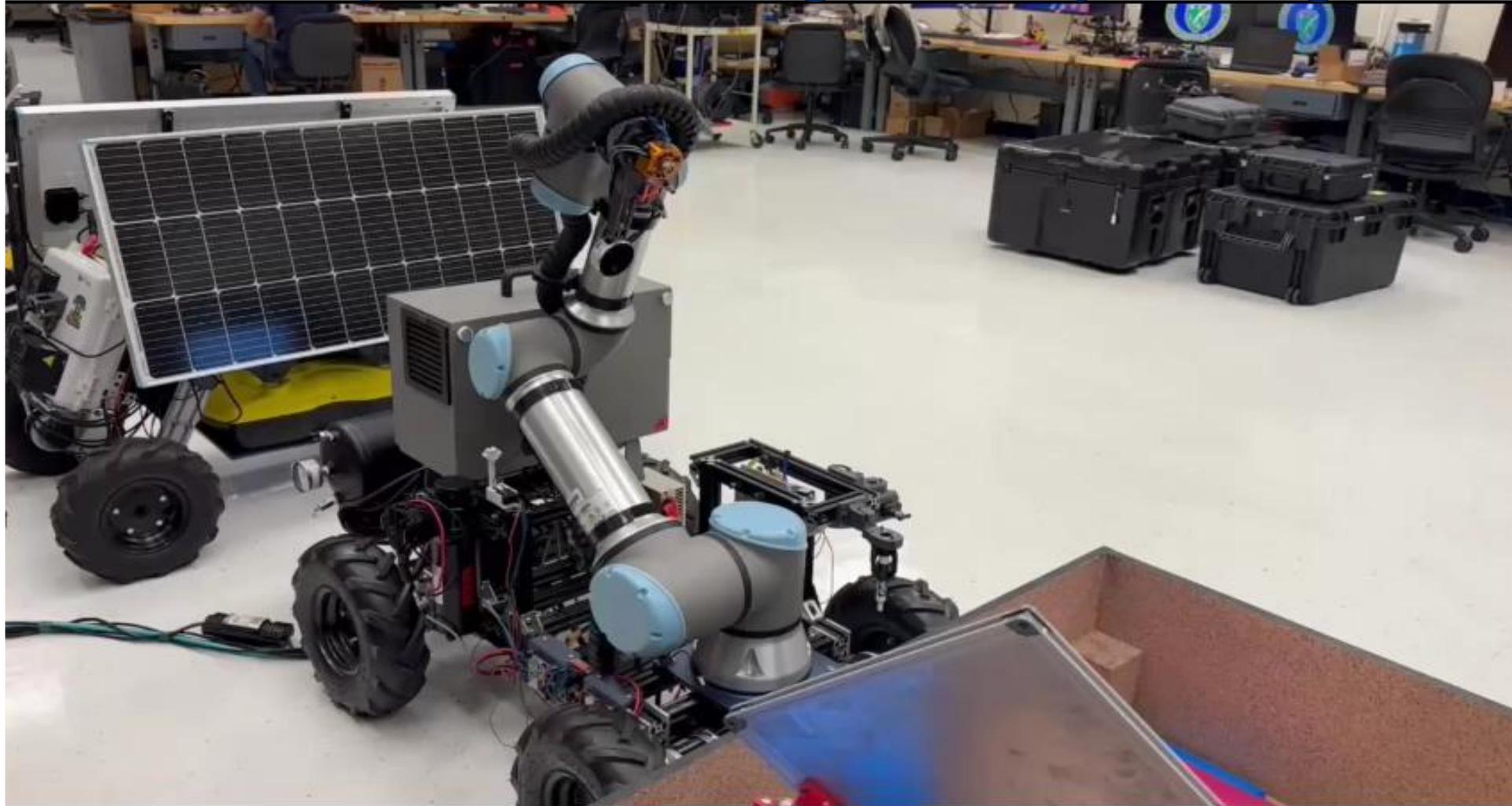


# Semi-Autonomous Repair Using Mobile Manipulator and Plug-and-Play Tooling





# Semi-Autonomous Repair Using Mobile Manipulator and Plug-and-Play Tooling



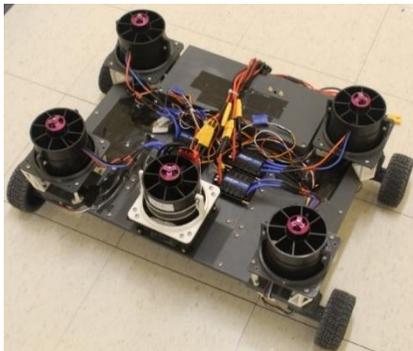
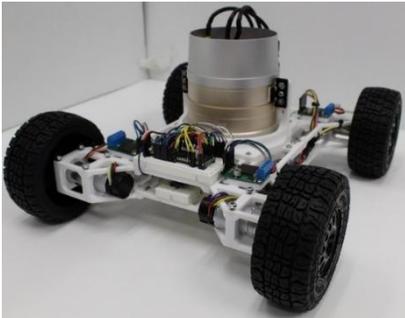
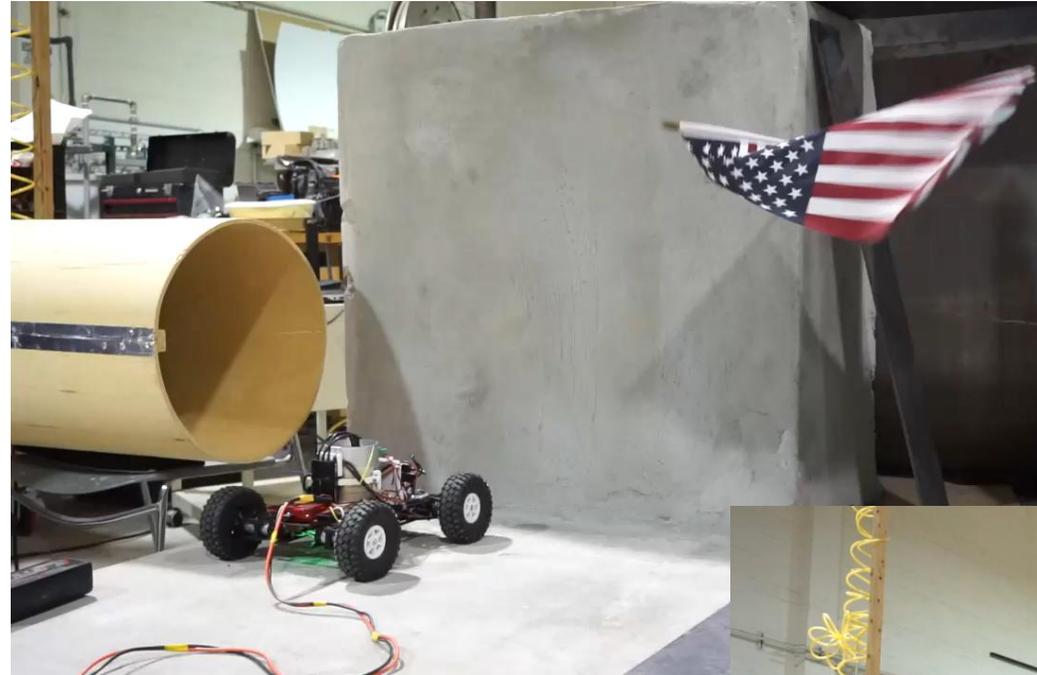
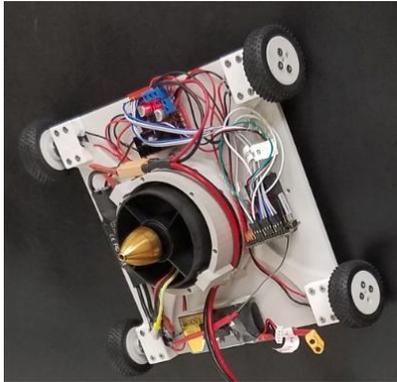


# SRS H-Canyon Concrete Wall Repair

**FIU**



# H-Canyon Concrete Wall Repair Prototype





# Digitalization in Decommissioning

- Facilitates virtual walk downs by developing 3D models and digital environments (Digital Twins)
- Supports the development of VR/AR for training
- Supports the various stages of decommissioning (characterization, inventory, decontamination, size reductions, waste management and disposal)
- Trimble X7 3D LiDAR (Light Detection and Ranging) is used to develop high quality 3D point cloud scans using laser beams
- The SPOT robot is used to navigate indoor/outdoor environments
- Kromek Sigma 25/50 Gamma detector
- Data post-processed by using various software tools (i.e. AutoDesk ReCap, SCENE “video Pro)





# Robot Collaboration





# Q & A



# Thank You

