



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

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Florida International University

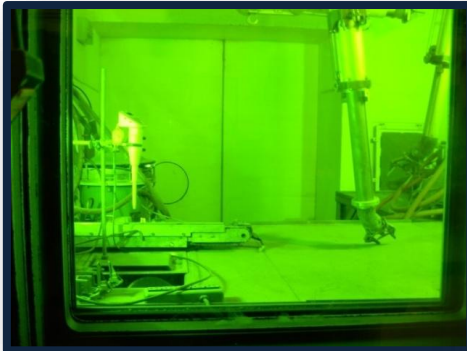
A vibrant, 58,000 student-centered public research university located in Miami, Florida.

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

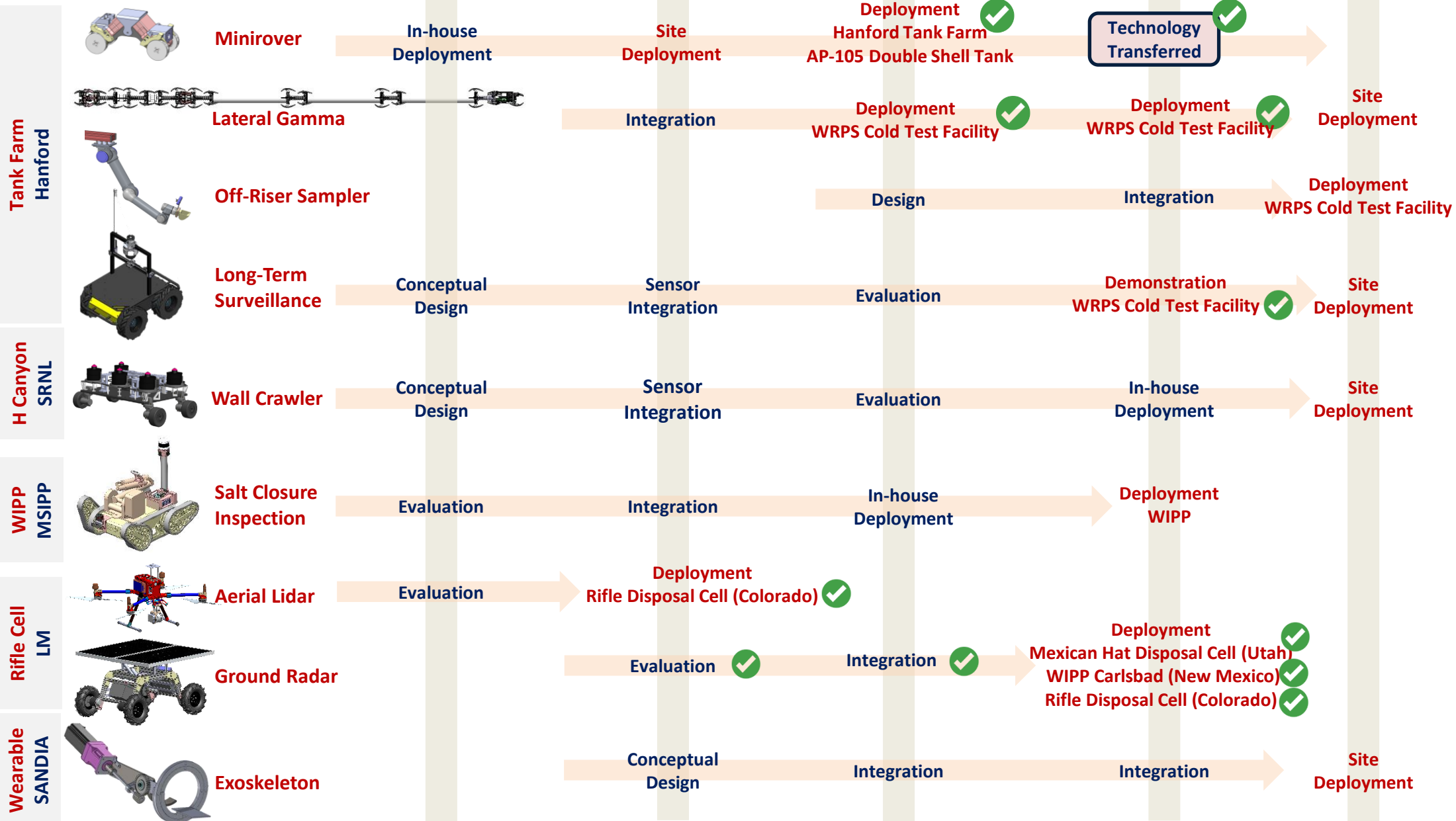
2020

2021

2022

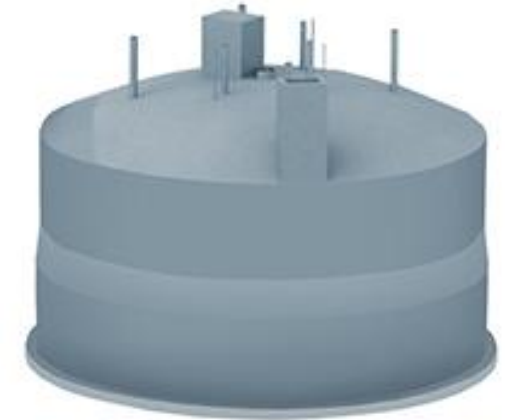
2023

2024





Hanford's Tank Farm



177 TOTAL
TANKS

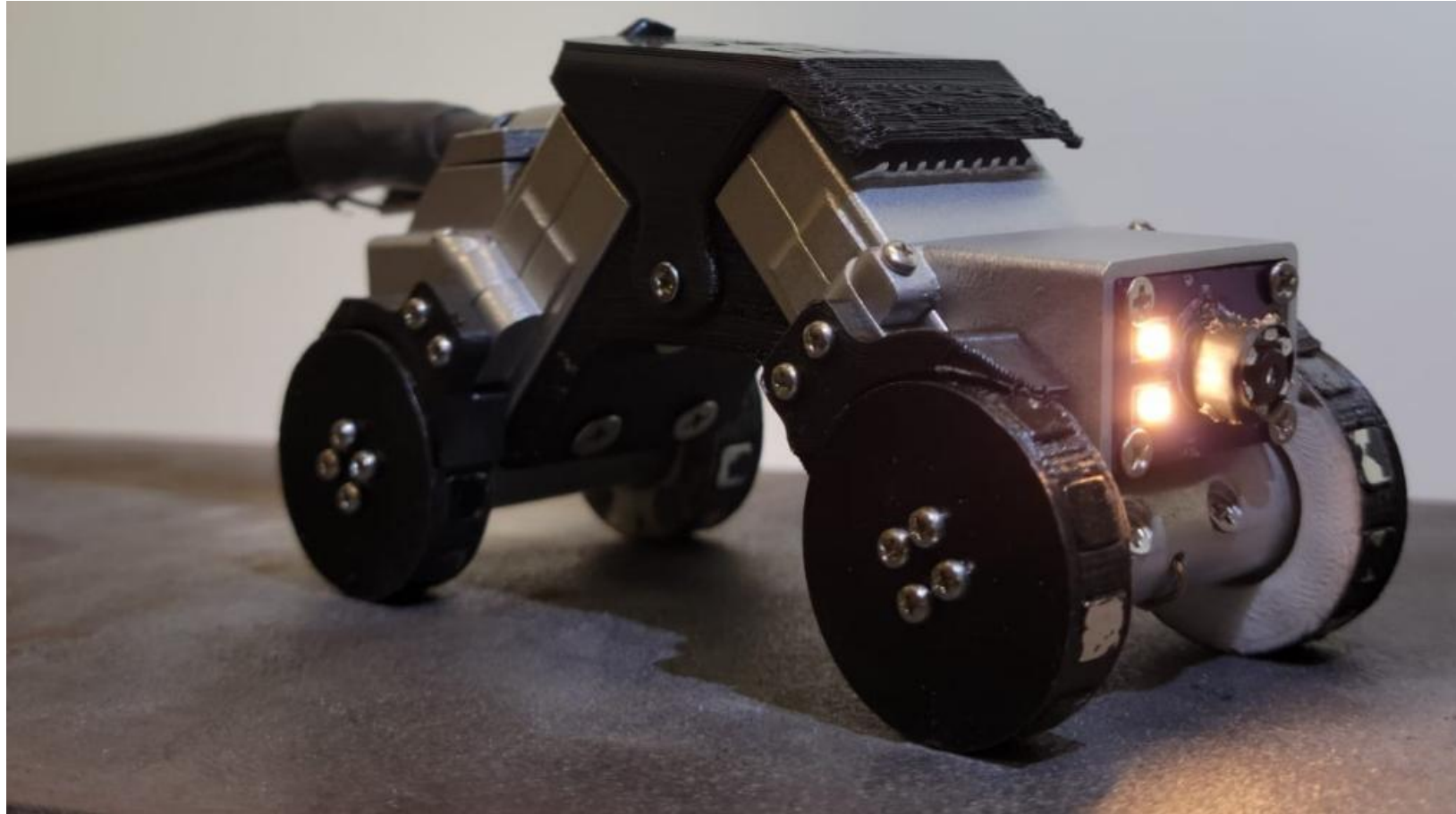
149 SINGLE-SHELL TANKS
Constructed 1943-1964

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

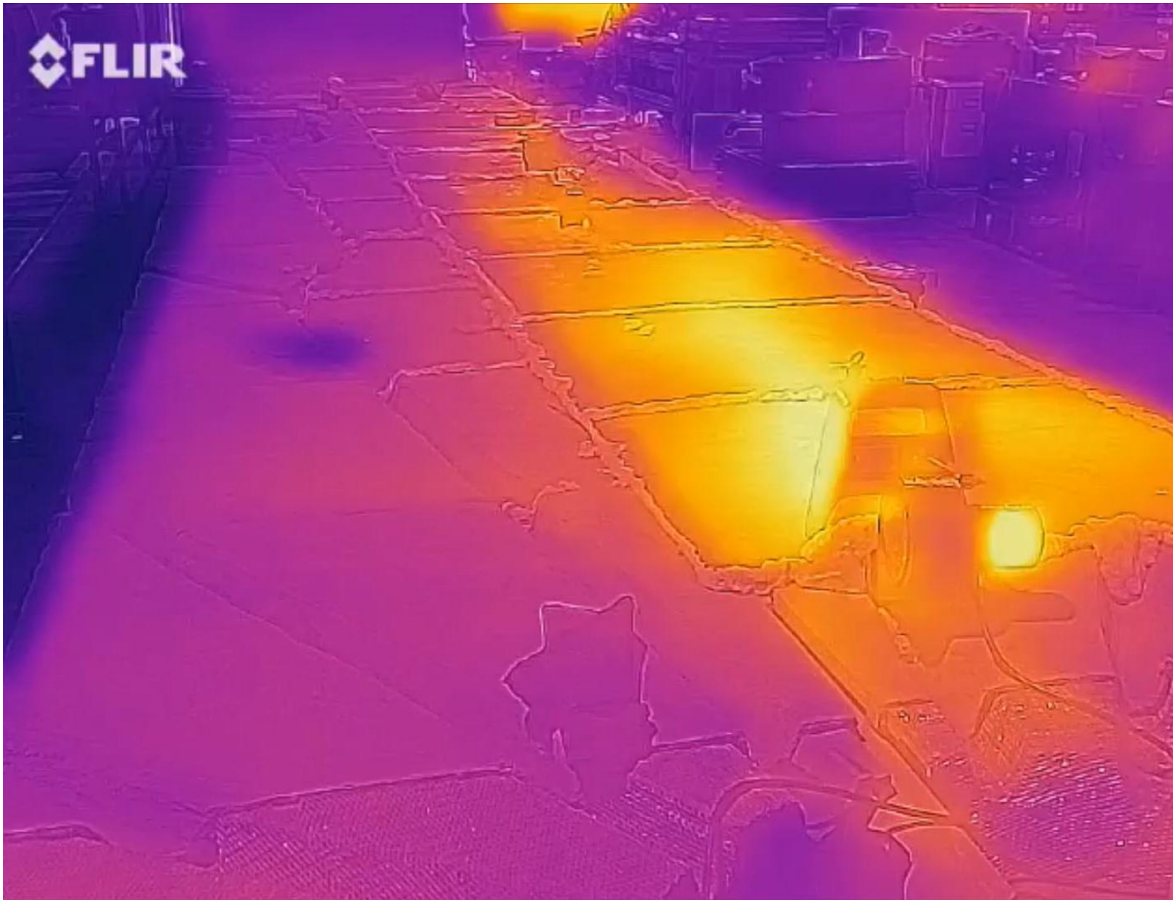


Control Box
Game Controller





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 – March 2022



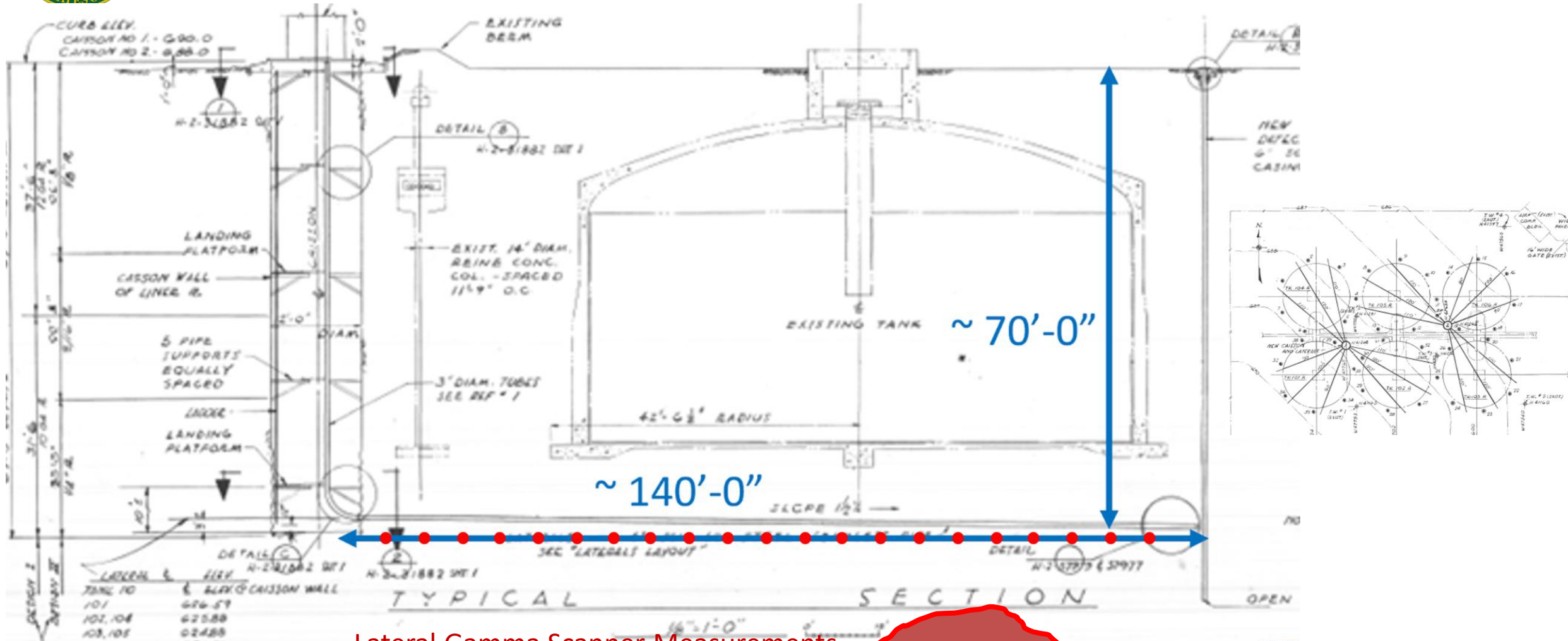


AP-105 Double Shell Tank Deployment – March 2022





Single Shell Tanks Lateral Gamma Scanner Automated Inspection



Lateral Gamma Scanner Measurements



Single Shell Tanks Applications WRPS Cold Test Facility Deployment



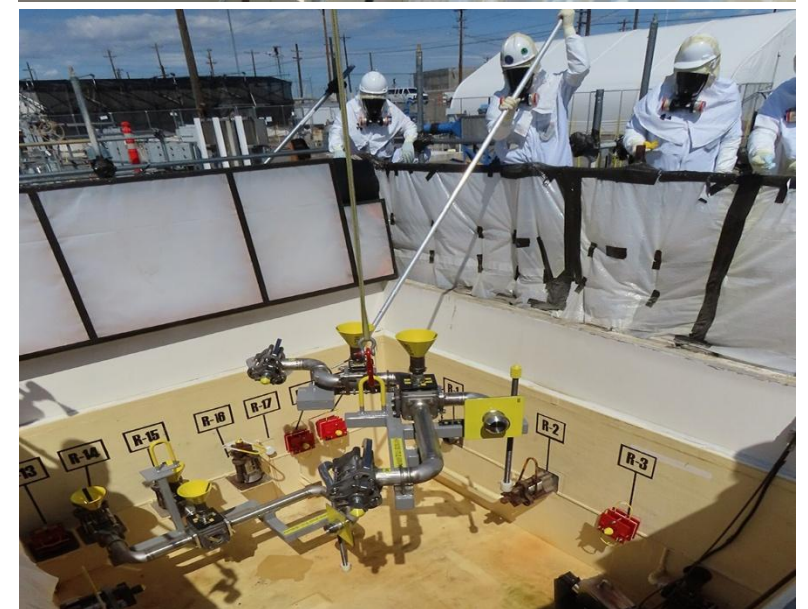


Field Site – WRPS Cold Test Facility – Summer 2023





Hanford Site Pit Area



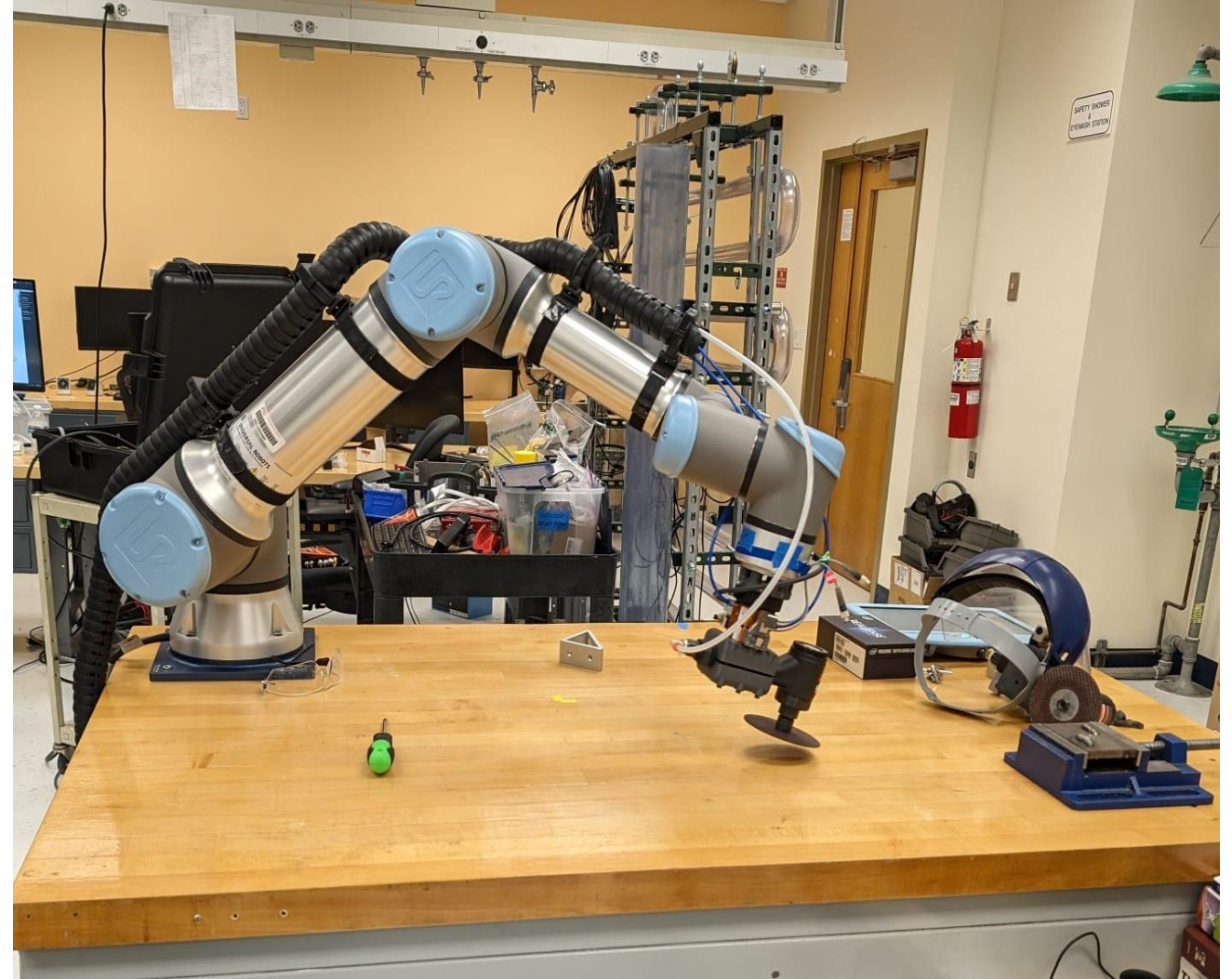
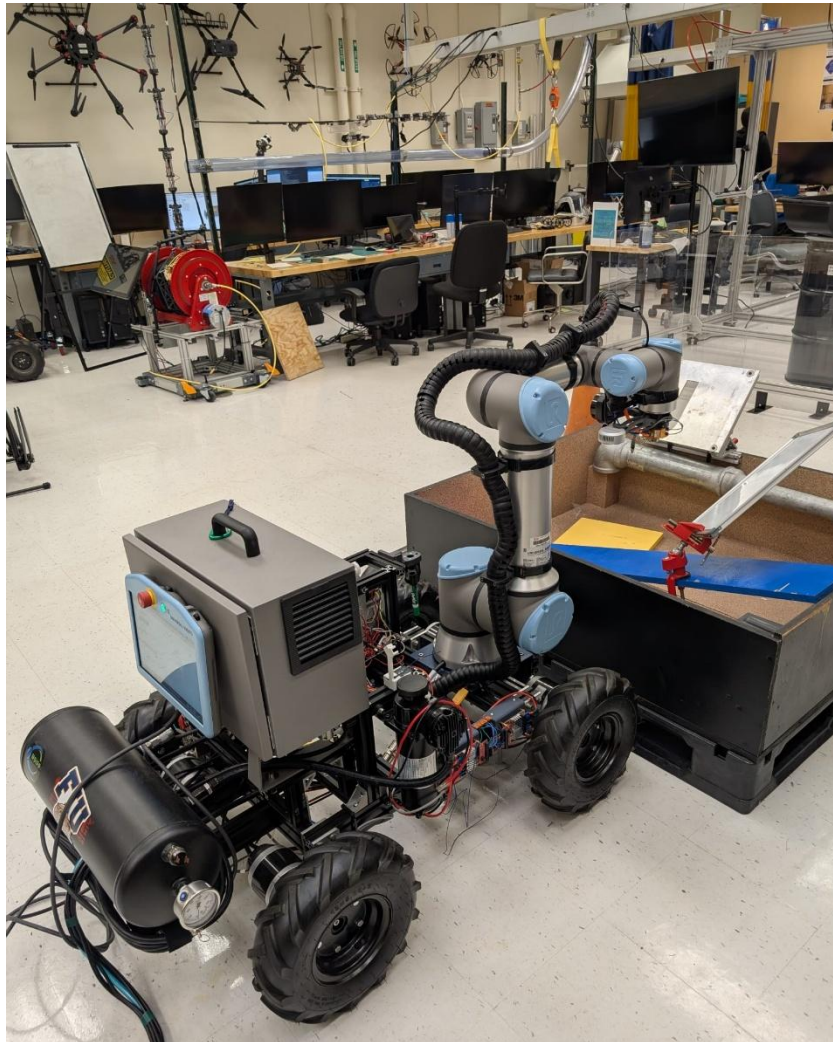


Hanford's Pit Area Repairs





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





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

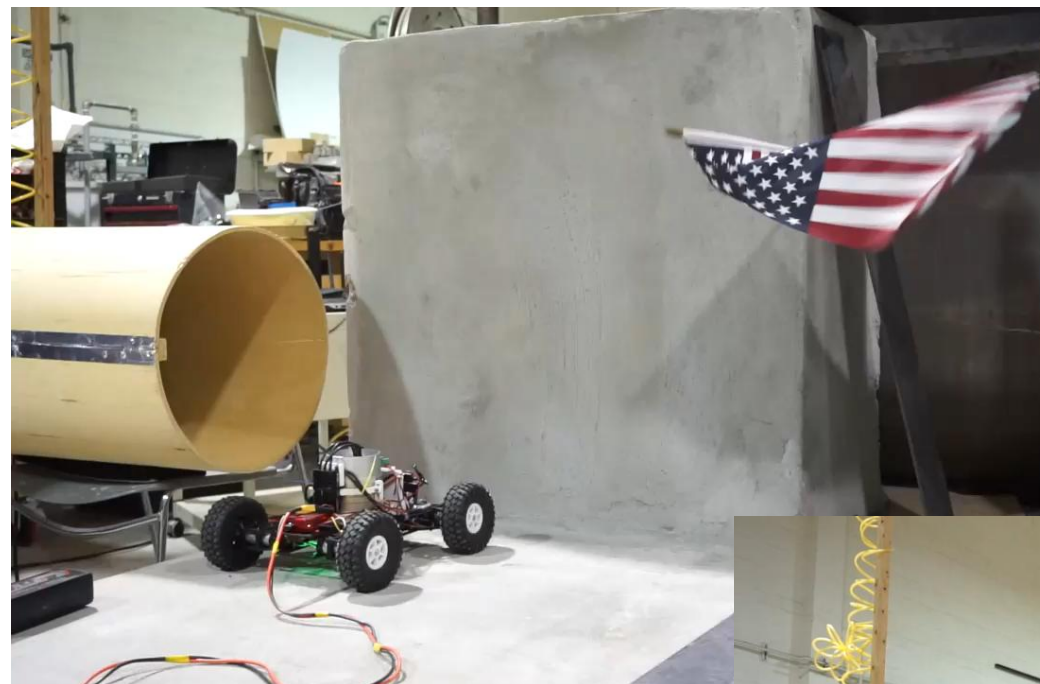
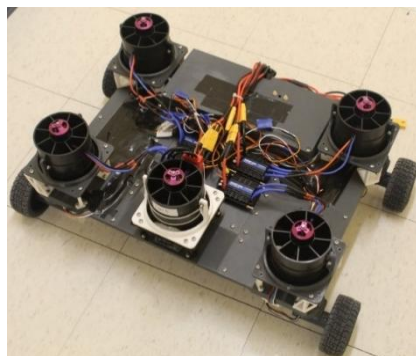
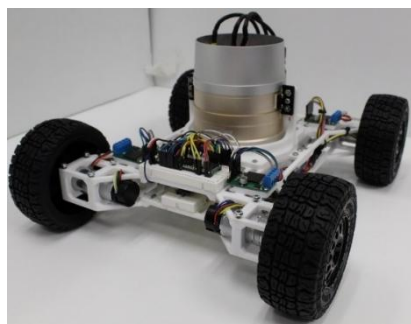
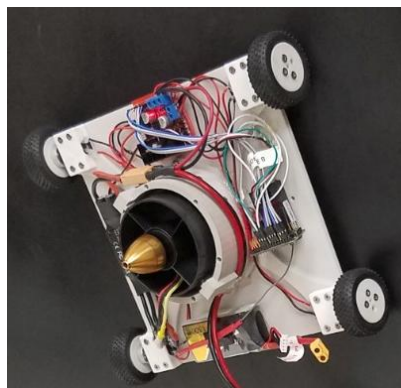


SRS H-Canyon Concrete Wall Repair





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

