

**HIGH LEVEL WASTE/WASTE PROCESSING**

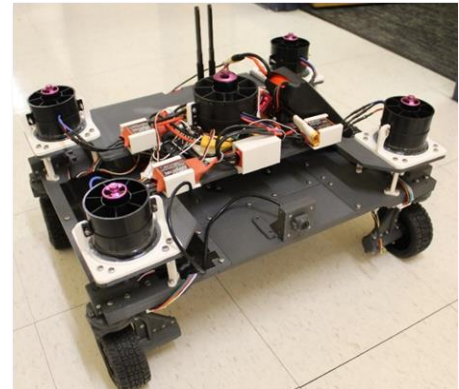
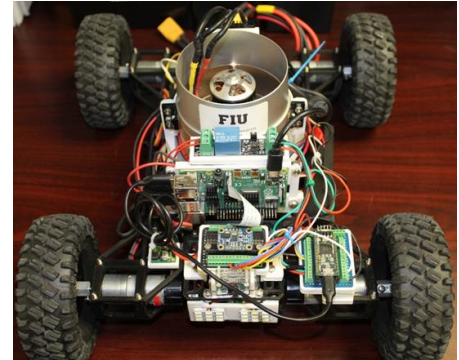
**Technology Development & Deployments of Robotic and Remote System Tools  
in Support of DOE EM’s Mission**

**Technology Description:**

**Technology Name: Wall Crawler Robotics Platform**

The wall crawler is a robotic platform able to climb curved and flat surfaces. The system is used for the inspection and repairs of non-metallic surfaces. ARC staff and students are working on the adaptation of a spraying mechanism that will allow the platform to autonomously apply coating on radiologically contaminated surfaces. The versatility of the platform allows it to be retrofitted with different sensors to perform NDE inspections of areas that can be reached by traversing a nonmagnetic surface.

**Status:** The wall crawler has been tested on multiple small-scale mockups that replicate the surface topology of the H-Canyon tunnel at SRNL. Based on conversations with coating manufacturers, the wall crawler has been redesigned to carry a heavier payload which will be composed of the nozzle for coating deployment and the tether and coating transport lines. Currently, vector thrust units are being tested with the goal of implementing them onto the wall crawler unit for increased performance, maneuverability, reduced material wear and energy consumption. A large scale mockup of the H-Canyon tunnel will be constructed at FIU to test the wall crawler in order to make the necessary improvements for a summer 2024 deployment at a cold testing facility at SRNL.



FIU’s Wall Crawler

**Technology Name: Robotic Platforms with Plug and Play Tools for Inspections and Repairs**

FIU is leading the efforts on robotic system design for the surveillance, maintenance and repairs of DOE facilities. The project is entitled “Development of a Robotic Remote System with Plug-and-Play Interchangeable Components for Inspection and Repairs of DOE Facilities and Repositories,” and includes participation from Florida International University, Argonne National Lab, Savannah River National Lab, DOE EM TDO, DOE ORP, and the end user, Washington River Projection Solutions in Richland, WA. The system is being integrated to perform inspections and repairs at DOE’s Hanford Farm Tank’s Pits.

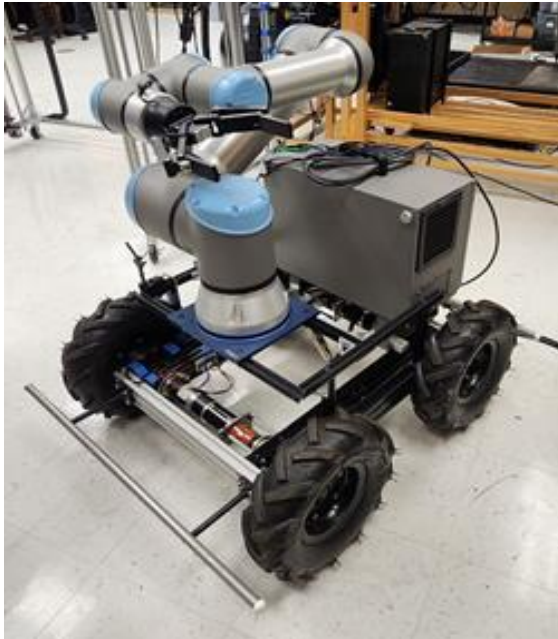
The robotic platform is being developed to assist in the inspection, maintenance, and repair of DOE facilities across the Complex. The platform has been designed and manufactured at FIU and it is used as a transportation mechanism to adapt robotic arms, sensor packages, radiation detection, and sampling and repair tools such as drills, cutters, grinders, and spraying/coating mechanisms. For this specific application, the platform has been coupled with UR16e dexterous robotic manipulators.

**ABOUT**

*Since 1995, the Applied Research Center at Florida International University has provided critical support to the Department of Energy’s Office of Environmental Management mission of accelerated risk reduction and cleanup of the environmental legacy of the nation’s nuclear weapons program. ARC’s research performed under the DOE-FIU Cooperative Agreement (Contract # DE-EM0005213) can be classified as fundamental/basic, proof of principle, prototyping and laboratory experimentation.*

**Project Contact:**  
Dr. Leonel Lagos (PI)  
Ph: (305) 348-1810  
Email: [lagosl@fiu.edu](mailto:lagosl@fiu.edu)  
10555 W. Flagler Street, EC 2100  
Miami, FL 33174  
[arc.fiu.edu](http://arc.fiu.edu)

**HIGH LEVEL WASTE/WASTE PROCESSING**



**Robotic Platform with Plug & Play Tools**

**Status:** During the week of May 8, 2023, the team visited DOE’s Hanford site. The purpose of the meeting was to engage with engineers from Washington River Protection Solutions (the project end-users), discuss the technical requirements for the robotic platform, and identify the Plug-and-Play interchangeable tools and technology deployment requirements. In addition, FIU hired 5 STEM minority students to work on this research project. During the next few months the team will continue developing a working prototype for FIU’s in-house test and evaluation scheduled for early 2024.

**Technology Name: Boston Dynamics – SPOT**

FIU’s SPOT is an agile mobile robot that navigates terrain with unprecedented mobility, allowing you to automate routine inspection tasks and data capture safely, accurately, and frequently. The four-legged robot will be used in several sponsored research and student projects including inspections, characterization, repairs, and data collection tasks.

**Status:** A Trimble X7 high quality LiDAR is being integrated into the SPOT to conduct inspection of facilities. In addition, various types of sensors (including radiation sensors) are being researched for potential integration and deployments. It is envisioned that the system can also be used for emergency response in case of accidents.



**FIU’s Boston Dynamics SPOT**