

Robotically Assisted Exoskeleton for Glovebox Operators and Robotic Arm Actuated Glovebox Operations

The Technical Applications Office within the Associate Laboratory directorship for Weapons Production at Los Alamos (ALDWP-TAO) and the Arizona State University (ASU) with the assistance of the WP-TNT program managed by TechSource International are developing technology and personnel pipelines to aid LANL's plutonium mission space. As a part of this effort, two senior design projects sought to find solutions for reducing worker ergonomic injuries associated with manipulating objects within a glovebox and in loading waste materials into a waste drum. The two projects are the Robotically Assisted Exoskeleton for Glovebox Operators and Robotic Arm Actuated Glovebox Operations.

Robotically Assisted Exoskeleton for Glovebox Operators

This team was tasked with designing a wearable robotically assisted exoskeleton tailored for glovebox operators. The goal was to develop a device that minimizes the muscle strain associated with glovebox tasks, ensuring operators can work efficiently and comfortably.

Exoskeleton Project success was achieved through:

- Exoskeleton's seamless integration with the user
- Ease of wear and function
- Complete, fully functional design (simulated and actual)
- Focus on ergonomic features and portability
- Series of tests performed to demonstrate success criteria

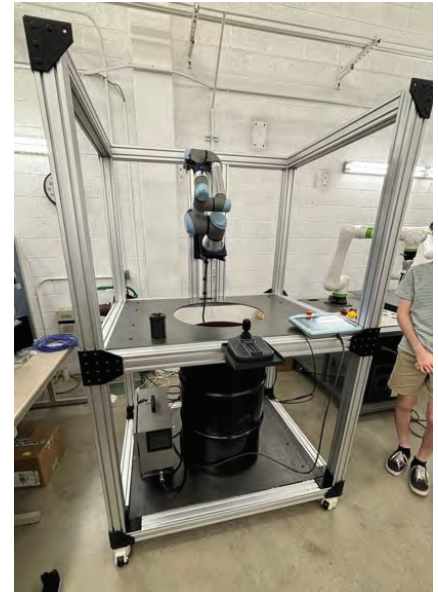
Robotic Arm Actuated Glovebox Operation

The goal of the Robotic Arm Actuated Glovebox Operations project was to assist glovebox operators at Los Alamos National Laboratory by implementing a device into a glovebox as a proof-of-concept capable of manipulating (for final examination and verification) and disposing of objects into a waste drum.

Robotic Arm Project success was achieved through:

- Consideration of prototypes and several design reviews
- Improvements leading to final design of robotic arm and glovebox
- Complete, fully functional design (simulated and actual)
- Series of tests performed to demonstrate success criteria

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Glovebox with robotic arm mounted.



Student's arm with bowden cables.



Robotic arm and glovebox.

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