Automated Leak Test

Kaman Fuzing and Precision Products is one of the largest ordnance-based manufacturers in the United States. To keep up with increased demand and to improve efficiency, Kaman is attempting to automate an outdated manufacturing process. One of the products that the Middletown Facility produces is the JPF (Joint Programmable Fuze). Kaman’s goal is to automate a building process of the JPF system by utilizing a helium leak test to verify the integrity of welding completed earlier in the assembly.

To do this, our team needed to integrate the current equipment (helium mass spectrometer) with a more modern robotic arm produced by Universal Robots (UR5). This approach involved the use of a PLC (Programmable Logic Controller) to remotely start and read data from the mass spectrometer. The PLC was also used to interface with the sensors placed throughout the system, and remotely signal to the UR5 robotic arm. The UR5 Robotic arm is in charge of moving the testing piece from a starting point to the mass spectrometer, then after the test is complete move the part to the area designated for a successful test or the area designated for a failed test.

Our project is a joint project with the Mechanical Engineering department. We had to work with two Mechanical Engineers, Ronnie Fierro and Nate Baker, and interface our design with their design in order to make the fully automated cell. Their part of the project consisted of building an apparatus that creates a vacuum seal so the leak test can be done properly. The design of the new apparatus includes safety features to ensure safety of the test operators.

In conclusion, we thank Kaman, the ECE and ME departments for this invaluable experience. We learned a lot working throughout this project and will be able to use the skills we learned in future endeavors.