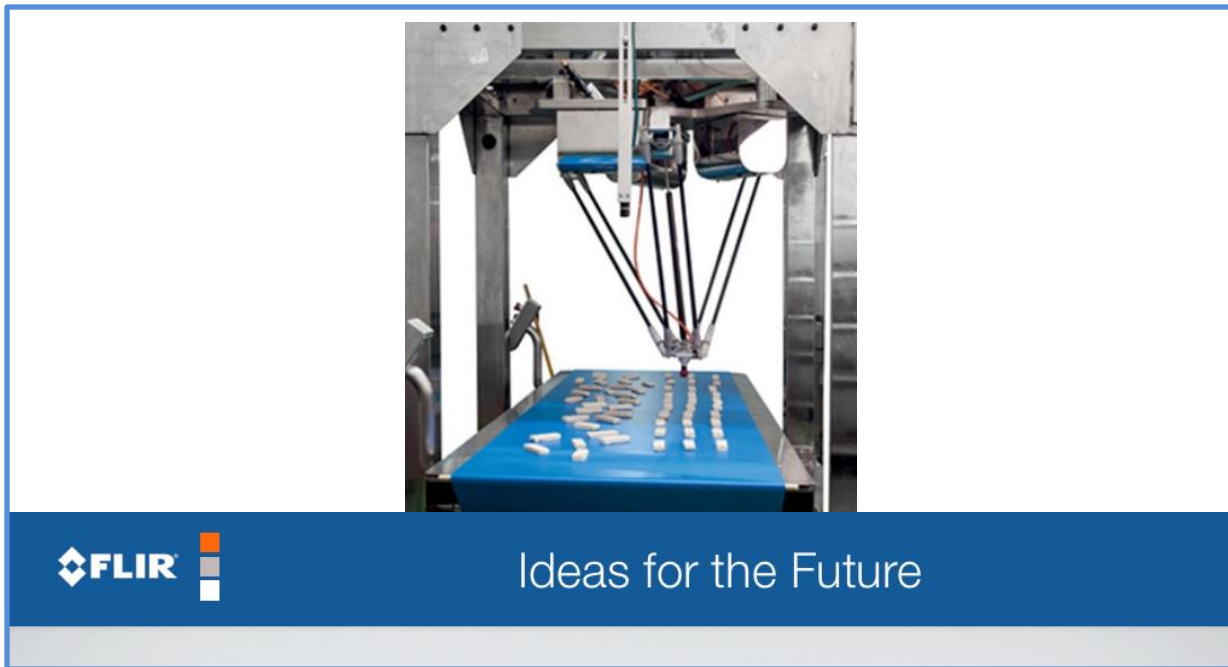## *High Precision Manufacturing Robot – FLIR*

This project is in cooperation with FLIR Systems located in Goleta. FLIR Project Lead – Marcel Tremblay

This project is intended as a multi-disciplinary project that will include 1 ME team and 1 EE team of students.

FLIR Systems, Inc. is the global leader in Infrared cameras, night vision and thermal imaging systems. Our products play pivotal roles in a wide range of industrial, commercial and government activities in more than 60 countries. Pioneers in the commercial infrared camera industry, the Company has been supplying thermography and night vision equipment to science, industry, law enforcement and the military for over 30 years. From predictive maintenance, condition monitoring, non-destructive testing, R&D, medical science, temperature measurement and thermal testing to law enforcement, surveillance, security and manufacturing process control, FLIR offers the widest selection of infrared cameras for beginners to pros.

Project Description

Statement of the Problem:
Need to place 800 metal screens that are 4.5mm diameter into a 30mm long tube of 4.55mm diameter. Requires high precision placement. The screen-filled tube is used as a gas filter and is currently assembled by hand.

Solution Concept:
Design a robot system using innovative concepts that will place the screen at a very high precision. The system will need to sort the screens in the first step for the robot to pick them up one by one using a machine vision system provided by Flir. The robot will then insert them flat into the tube.

The mechanical project consists of developing the entire robot concept and make one working prototype. Students will need to use engineering static and dynamic motion equations as well as doing structural FEA analysis to properly design the systems. Tolerance analysis is also critical for a high precision system like this one.
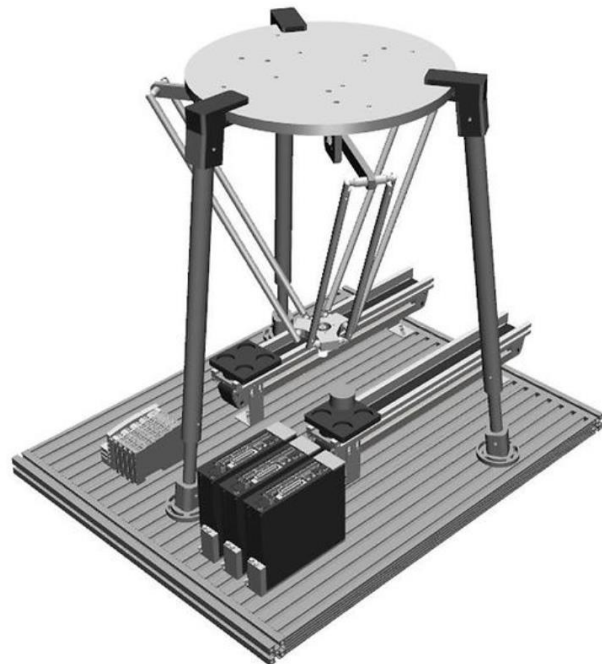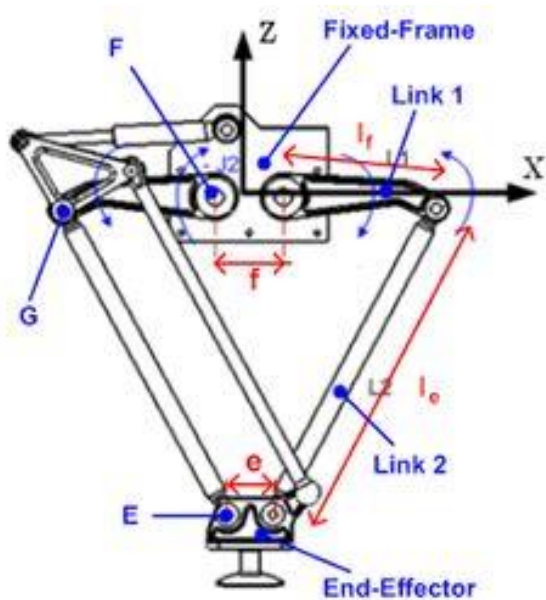
The electrical project consists of designing a system that will drive the robot motors based on image analytic of the vision camera. Create a PC control interface. Design the electrical power, signal and video cable harness.
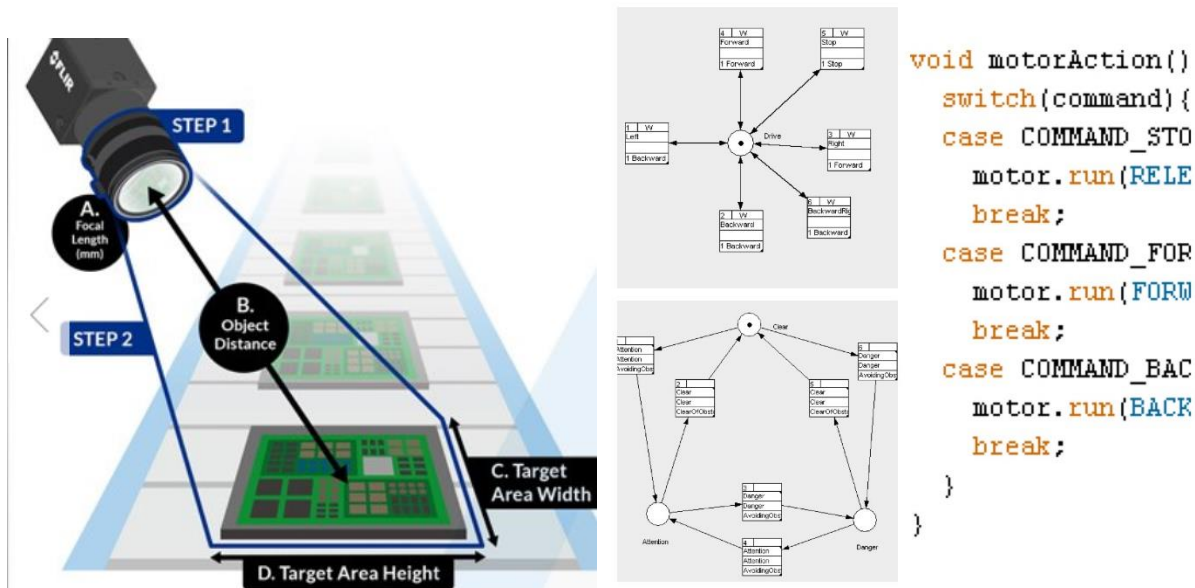
Student Requirements: Team participants will be required to;
- Sign non-disclosure forms with FLIR to limit outside disclosure of certain proprietary information relating to supplied thermal cameras
- Sign agreements that provide FLIR with access to any intellectual property developed during the project
- Be an USA citizen or have a green card.

Ideal Student Qualifications:
- Mechanical engineering with emphasis on robotics
- Electrical engineering with emphasis on robotic systems
- Analytic development with emphasis on video systems.

Assets Provided by the Company:
- Flir machine vision camera
- Access to mechanical, electrical, and systems engineering expertise as required
- Access, on as available basis, to environmental test facilities at FLIR

Company Web Site**:** www.FLIR.com