Stabilized mast head mounted sailboat marine camera

This project is in cooperation and partnership under a gift with Teledyne FLIR located in Goleta.
Teledyne 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.

Teledyne FLIR 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 thermal cameras to many industries like airborne, marine, land, border surveillance, tactical goggles and security cameras.

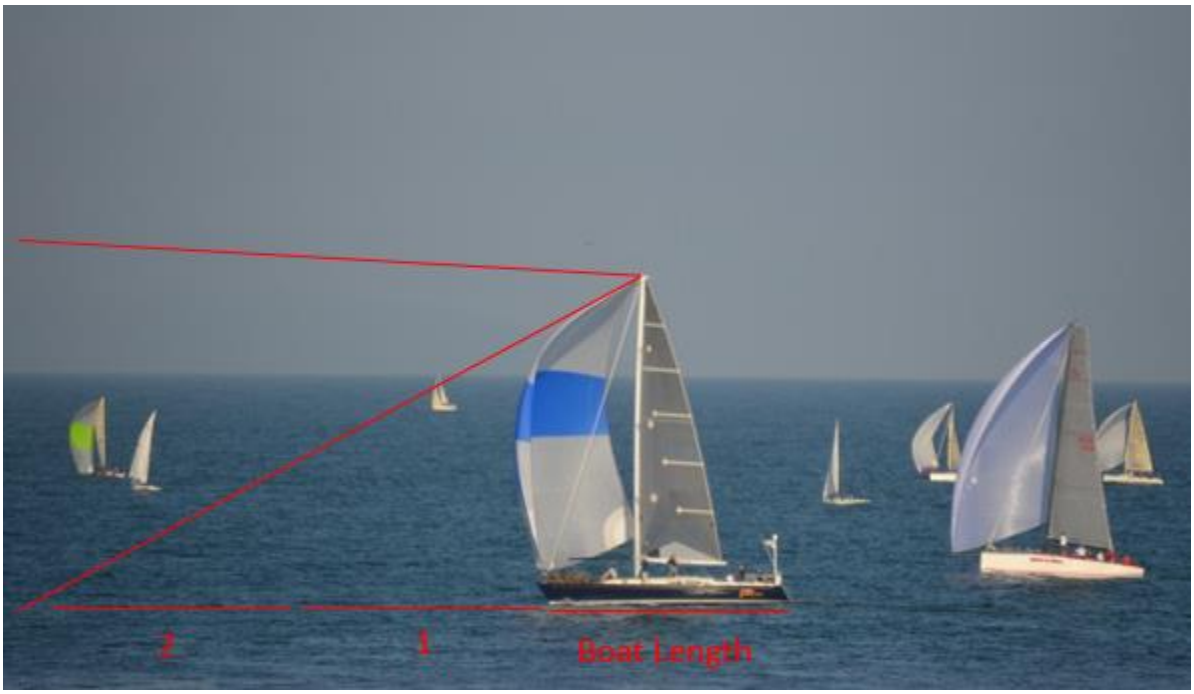
The division in Goleta employed 100 engineers which 40% are ex UCSB students.
They have 5 internships active at all time.

Project Description

Statement of the Problem:
The #1 reason for sailboat collisions is because the skipper cannot see behind the sails.

Solution Concept:

Designing a mast head mounted camera that will provide visibility in front of the boat.



The mechanical project consists of incorporating a supplied Flir and a visible camera as well as 3 electronics boards into a custom marine waterproof enclosure and mounting brackets designed by the students. The student will need to design an internal dynamic mechanical roll compensation system using motors and gyro to keep the camera horizontal in all time. The design will need to take high volume manufacturing under consideration. Industrial design look and feel is important. Thermal analysis will need to be performed to properly manage the thermal source inside the enclosure.

The electrical project consists in designing an energy efficient circuit that supports a microprocessor and IMU (Inertial Measurement Units). The IMU combines a gyroscope with an accelerometer in one system-in-package (SiP). It enables real-time motion detection, as well as optical image stabilization (OIS). The team must select the electrical components, create the schematic, design the circuit board by placing the components based on the electrical requirements. Produce and assemble the board. Design interface cables between motor and controller board. Generate microprocessor code to keep the camera always horizontal independently of the mast motion.

Student Requirements: Team participants will be required to

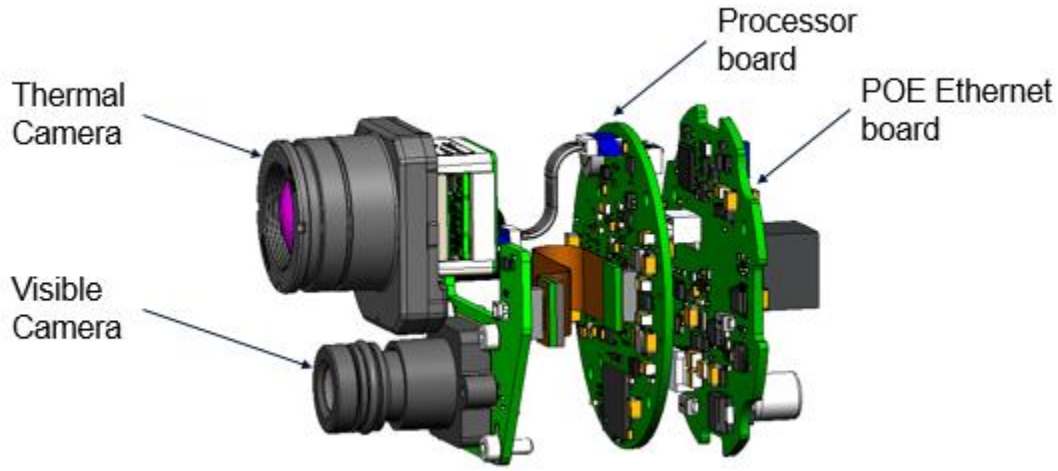
- Sign non-disclosure forms with Teledyne FLIR to limit outside disclosure of certain proprietary information relating to supplied thermal cameras
- Sign agreements that provide Teledyne FLIR with access to any intellectual property developed during the project

Participation in this project may include site visits to Teledyne-FLIR facilities, for which **United States citizenship** is required.

Ideal Student Qualifications:

- Mechanical engineering with emphasis on thermal analysis and consumer product design
- Electrical engineering with emphasis on embedded processing, sensor interface, and circuit board design.
- Embedded software.

Assets Provided by the Company:



- Flir thermal and visible cameras
- Flir camera processor board and power over ethernet power board
- Access to mechanical, electrical, and systems engineering expertise as required
- Access, on as available basis, to environmental test facilities at Teledyne FLIR

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