

Working Title – “Semi-Autonomous Monitor Fleet – Phase 2”
Technical Directors: Profs Swaszek and Vetter

Summary:

Autonomous and semi-autonomous vehicles have been an important research and development topic for engineers over the past decade; interest in this area has spawned a number of design contests suitable for university teams. Recently cadets at the U.S. Coast Guard Academy (USCGA, in New London CT) have been pursuing projects on autonomous vehicles including an autonomous sailboat. To further develop their vessel and improve their sailing tactics algorithms, extensive testing of the vessel is required. To facilitate this testing, a fleet of boats is desired to track and assess the sailing performance of the sailboat.

The goal of this ELE480/481 capstone project is to aid in the development of such a prototype fleet, extending work already done by a capstone team in academic year 2011-12 (A. Elsen, B. Fain, & B. Kintz). Specifically, they developed a fleet of three (3) motorized platforms equipped with GPS for navigation, web cameras to find a target, a wi-fi link for inter-fleet and shore-side communications, and on-board computers to control each vessel. (While the eventual goal is a water craft, this current fleet is land based.) While functional, the existing fleet implements rather crude inter-fleet control algorithms. The specific goal for 2012-13 is to significantly enhance the autonomous control aspects of the fleet, likely adding sensors to the platforms.

As part of this project, the URI team is expected to interact with the capstone teams at USCGA as well as with students at Connecticut College (also in New London CT) working on artificial intelligence implementations of tracking and tactics algorithms. While most of this interaction will be via electronic media, occasional visits to New London will be scheduled.

Scope of Work:

To further develop a monitor fleet consisting of three vessels:

- by modification of the instrumentation/sensors of the current fleet
- by limited hardware improvements to the current fleet
- by developing coordinated control strategies
- by interacting with USCGA and Connecticut College students throughout the academic year

Skills Needed:

- ELE (1 student) – ability to interface desired electronic hardware (actuators, sensors, computers, etc.; an interest in radio-controlled vehicles would be a plus); arduino experience would be useful
- CPE (2 students) – software development of the control strategies and networking; Linux; XML