

Electrical and Computer Engineering Technology Department Heads
Association:

MiniGrant Sponsorship Application for Project

Project Title:

Departmental Honors Thesis Project: ECET Honors Robotics Exploration

Project Director:

Student: Joshua Galloway

Advisor: Assistant Professor Daren R. Wilcox

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Abstract:

The ECET Honors student Joshua Galloway will attempt to develop a prototype for an autonomous landmine and unexploded ordinance (UXO) seeking robot. The system is to provide functionality including: locating metallic landmines within a defined area/environment, marking the location of said landmines, and avoiding destruction of the robot. The main goal is to construct the robot on an inexpensive platform, which could be used by under-developed nations in their humanitarian de-mining efforts. In addition, the project will afford the student the opportunity to explore the field of robotics, provide experience with mechanical systems, and printed-circuit-board (PCB) layout/production. The project is to be completed by the end of Fall Semester 2008 for submission to the SPSU Honors program for graduation with departmental honors. The research will be documented in an undergraduate honors thesis. It is the hope of the research to identify an inexpensive technology that can be employed by the humanitarian de-mining effort of the more than 100 landmine/unexploded ordinance affected countries in the world (US Department of State Fact Sheet, 2 July 2003).

Justification & Project Results:

Robotics is a growing field in the engineering technology educational community, and has many humanitarian applications. Applications aimed at removing people from potentially hazardous or deadly situations are laudable in their own right, and the purposed project is in keeping with this ideal. The project would benefit the ECET community by increasing awareness of its contribution to potentially life-saving research, and at SPSU in particular, it would open the door for similar projects. Project outcomes should provide a working prototype of the base robotics platform with an identification of

the most appropriate technology for inexpensive detection of mine and mine-like targets as well as significant documentation in the form of an undergraduate thesis.

Anticipated Timeline:

- April 08
Submit proposals to obtain funding and have the HNRS Thesis course entered in the Fall 08 catalog
- June 08
Begin searching for robot chassis as well as contacting appropriate Department of Defense organizations associated with landmine and UXO detection
- July 08
Near completion of the robot chassis, and begin testing mine detection modules
- September 08
Complete chassis and decide on mine detection module to be used in final project; begin development of PIC18 or appropriate microcontroller based embedded system for autonomous action
- October 08
Produce one-off PCB and begin project synthesis followed by testing
- November/Dec 08
Complete prototype and generate undergraduate thesis for documentation

Anticipated Budget:

Small robotic chassis (x3): \$150

Ultrasonic Range Finders (x4): \$150

Actuators (x2): \$300

GPS Unit: \$100

Accelerometer Dual Axis: \$70

Liquid Crystal Display: \$30

Batteries: \$200

Battery Charger: \$80

Integrated Circuits for Control Logic and Power Distribution: \$200

Mine Detector/Sensor: \$100

PCB and Manufacturing Materials: \$100

Approximate Total: \$1480.00

Requested Grant: \$1000.00