Autonomous Target Robot

Team Members:
- Anthony Atz
- Erik William Sandelin
- Megan Uozumi
- Huy (Leo) Le Ho

Faculty Advisor:
- Prof. Zak (Zaher) M. Kassas
- Zeinab Shadram, Ph.D.

Background:
The autonomous target robot project is a naval research project. The purpose of the project is to design, program, manufacture, and test an autonomous vehicle that can locate pre-determined GPS coordinates and present a target to the shooter. This is a new project at UCI, and the team is a small group of undergraduate engineering students from the MAE department. We plan to design the robot during Fall quarter, and manufacture and test it during Winter quarter.

Goals and Objectives:
- Design the vehicle chassis and body
- Write a program that directs the car to pre-designated GPS coordinates and presents a target oriented towards the shooter
- Incorporate sensors that detect when the target has been shot
- Manufacture the robot and assemble electronics

Technical Challenge:
- Our design utilizes a vibration sensor placed on the back of the supporting arm for the target that will serve as a means of identifying when the target has been struck. When the amplitude of the vibrations detected is significant, the robot will assume it has been hit, and move to the next set of coordinates.

Future Improvements:
- Sensors on the front of the vehicle that can be programmed to aid in object avoidance would improve on our current design.

Safety Considerations:
- All of the electronics on our vehicle are small and have been placed as far away from the target as possible (especially the battery) to avoid possible damage from incoming projectiles.

Budget Breakdown:
- Chassis (Frame, Tread, Motors)
- Battery
- Sensors
- Electronics
- 3D Printing

Fall
- Define the Problem
- Set requirements for the design

Fall
- Design the Vehicle
- Select components, decide on the layout of the electronics, create a CAD model of the prototype

Winter
- Write the Code
- Write programs to calibrate the sensors on the vehicle and cause autonomous movement

Winter
- Manufacture/Assemble
- Build the vehicle prototype

Winter
- Test
- Perform testing and implement bug fixes

Start up Robot

Input GPS Coordinates

Robot heads towards location

If target is hit on time

Robot raises the target for same time interval for the user to shoot at it. If it arrives at the location...

If target is not hit on time

(If it plays sound) flashes a green light, lowers the target

Moves to the next set of coordinates

If not the best location

If best location

If not the best location

Robot heads towards starting position

(If it plays sound) flashes a red light, lowers the target