

Michigan State University
College of Engineering; Dept. of Electrical and Computer Eng.
ECE 480 Capstone Design Course Project Charter

Sponsoring Company/ Organization: MSU

Contact Information:

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Phone and Best Time of Day to Call:

Background Information:

The goal is to build a safety and data-logging box for the Autodrive vehicle. The box should monitor the health and safety of the vehicle (and log these) as well as taking corrective action to prevent unsafe situations. Unsafe states, such as overheating, excess speed or excess acceleration, wheel skidding, dirty, blocked or malfunctioning sensors, etc. should be detected and appropriate action taken.

Business Case:

- Explain why is this an attractive opportunity for your company to pursue now.
 - Safety is a key component of any autonomous vehicle, and is a major portion of the Autodrive competition. This project seeks to address safety concerns systematically and provide a mechanism for corrective action if any unsafe state is encountered.
- Describe the discontinuity creating the competitive opening in the marketplace that makes this project timely. (Competitive action, Legislation, Regulation, etc.)
 - Availability of new all-electric vehicles such as the Bolt along with drive-by-wire capability provided by GM makes this feasible.
- Explain how this product / service will be positioned as a commodity (low cost to serve) or a differentiated (value priced) offering. Why?
 - A safety box is a potential product that could be installed on any new development vehicle to enable safe operation.
- Outline the competitive barriers to marketplace entry the Design Team needs to take into consideration.
- What is the hypothesized basis of for a sustainable competitive advantage?

Project Intellectual Property Considerations:

- Will the student Design Team be required to sign a Non-Disclosure Agreement?
 - Yes – all members must already be part of the Autodrive team.
- Will the Design Team be able to post their work on the course web site?
 - Yes

- Will the student Design Team be working with technology contained in pending patents not yet granted?
 - o No
- Can the electronic design be shown, but the embedded software protected?
 - o No

Opportunity Statement:

- What **clearly defined Customer Problem** you hope to solve with this project?
 - o Create a safety requirements document that outlines all the hazard and vehicle health issues. Determine which can be monitored and logged, and what corrective actions can be taken. Build a hardware + software box that operates independently of the vehicles computers that can monitor the vehicle systems, as well as give commands and/or shut down components of the vehicle.
- Does this problem exist now, or in the future?
 - o The problem exists now to support the Autodrive competition in May 2018
- Who is the customer?
 - o The Autodrive Team. Results will be delivered to the team.

Deliverables:

- Describe what is to be delivered at the end of the semester.
 - o Working software and hardware to enable autonomous vehicle driving.

Goals:

- Describe what success will look like at the end of the semester.
 - o Hardware + software system that solves the Customer Problem.
 - o Will be assessed by simulating hazard conditions and observing the box's response.

Scope:

- The project consists of a hardware box plus software plus connections to the vehicle. The box should monitor and record vehicle properties, and be able to give commands when unsafe or unhealthy situations arise.

Constraints:

- List all constraints on the project team.
 - o The team will consist of Autodrive team members
 - o The Autodrive competition requirements should guide the team in deciding what capabilities to include.

Cost for Sponsorship: \$4000

Project Team: (Completed once semester begins)

Name	Responsibility

Faculty Advisor: (Assigned by ECE Dept . based on project requirements) ____
Hayder Radha _____