LAFAYETTE
ELECTRICAL & COMPUTER ENGINEERING

Formula Electric Vehicle ECE 492 - Spring 2019

System Overview

Introduction

This year's Lafayette Formula Electric Vehicle team set out to build a new electric vehicle that meets all Formula Hybrid rules. The team utilized some designs from previous teams as well as reworked old designs in order to be compliant with Formula Hybrid rules. However, all electrical subsystems were built without disassembling work from previous teams.

While we develop a new Accumulator Management System, we used a MagnaPower TSD100-25/208 power supply to provide high voltage to our system.

Subsystems were individually tested before being integrated with a dynamometer setup to do system wide testing. The dynamometer simulates a load on the motor. This allows us to test full functionality of the system before installing the components on a car. This is especially useful as debugging in a lab is significantly easier than debugging in a car.

Accomplishments

Three major system accomplishments this year are an integrated dynamometer testing room using vehicle electronics, a new motor and motor controller, and a high voltage accumulator management system prototype.

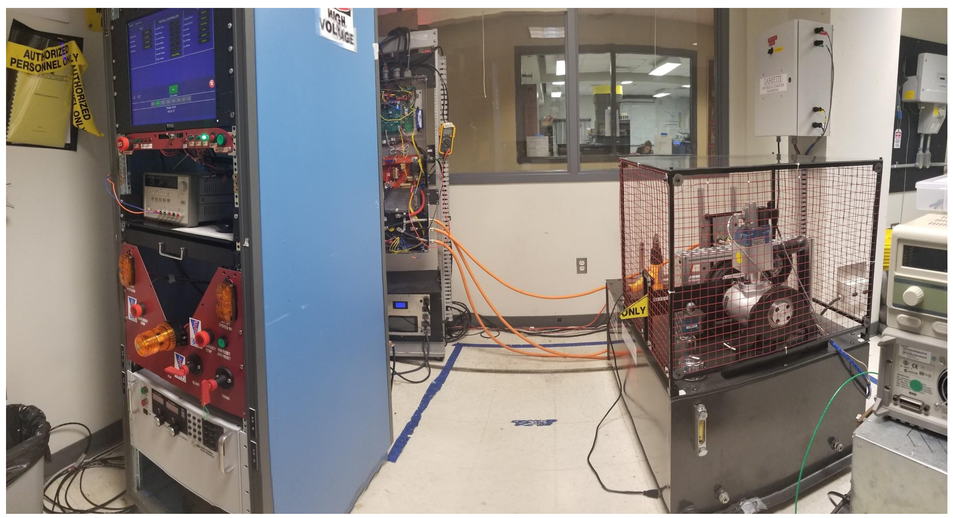
We integrated and tested all electrical components of the vehicle, with the exception of accumulators, on a dynamometer. First, a new data acquisition software was developed and assisted with system testing. We also integrated a Grounded Low Voltage (GLV) subsystem that supplies low voltage (< 30 V) to the rest of the system and manages the safety loop. Finally, the Tractive System Interface (TSI), which interfaces high voltage with the motor controller, was incorporated into the system.

This year we purchased a new motor and motor controller to cut down on vehicle weight. We are now using an EMRAX 208 motor and emDrive 500 motor controller.

In order to accomplish our goal of a rules compliant system, we are designing a new battery management system. The current prototype can read and record cell voltage and temperature. Future designs will implement state of charge and active balancing algorithms.

Meet the Team

Front Row: Katie, Clement, Alex, Hayden, Robson, Tianyu
Second Row: Zian, Sam, Yishak, Antonio, Weston, David
Third Row: Hongbo, Xiaonan, Yuqiu, Adam, Justin, Brian
Fourth Row: Max, Drew, Prof. Nadovich, Nick, Jordan



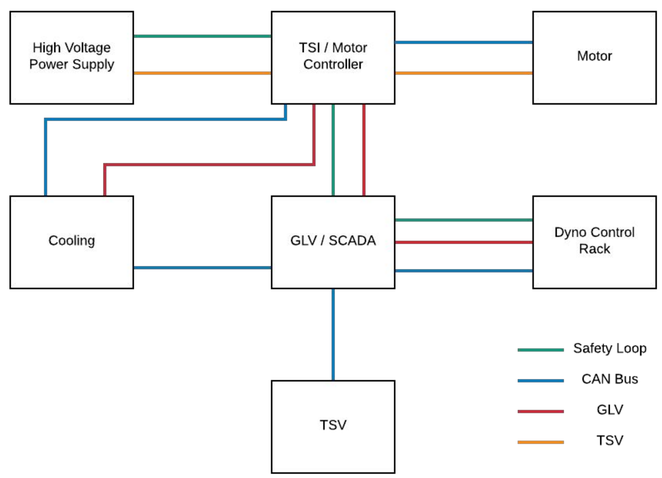
System Diagram

Grounded Low Voltage (GLV) supplies power to the Supervisory Control and Data Acquisition (SCADA), Tractive System Interface (TSI), Cooling, and Safety Loop

Tractive System Voltage (TSV) is interfaced to the motor controller using TSI

System wide communication is via a CAN network

External safety controls are located on the side panels and cockpit



Contact Information

Project Website: https://sites.lafayette.edu/motorsports/
Faculty Advisors: Prof. Chris Nadovich, Prof. John Nestor

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