Driver Interface for Plug-In Hybrid Electric Truck

Overview
Volvo Group Trucks Technology is a provider of energy efficient and sustainable transport solutions. For this project, students will help design an advanced driver information display for a Heavy Duty Plug-in Hybrid Electric truck that should encourage a more energy efficient usage of the vehicle. The goal is to deliver a functional touchscreen interface to be integrated into the vehicle’s dashboard display.

Objectives
This senior design capstone project had three primary objectives. First, to understand and meet the sponsor’s requirements and expectations and to deliver a tested and verified final deliverable. Second, the team selected and procured a suitable touchscreen tablet, developed driver feedback functions to the vehicle’s ECUs via J1939 CAN, and implement driver input functions delivered by the Software Team. Third, test and verify that the hardware and software work without problems.

Approach
The approach to this design is based upon a few very important technical details. Functionality and scalability were more important than size specifications, which lead us to the Microsoft Surface Pro 2. The product will be primarily deployed in trucks in the Los Angeles area, which require the tablet to be able to withstand heat. Power management was also a big concern and so we procured hardware to work within the power constraints. Lastly, GPS functionality was required for the software solution so an external GPS was purchased.

Outcomes
- Provide the hardware to the sponsor to be able to deploy the software solution on a hybrid truck
- Provide low-level code that interfaced with the hardware
- Abstracted the hardware data code so the data models are hardware independent
- Integrated code with the existing application and helped another team working on this project with code integration
- Provide tools to monitor and test the hardware
- Delivered the final solution in an easy to install Setup package.