Our goals for next semester are lofty but attainable. We need to complete a PCB layout and send the design in for manufacturing. GUI frames must be updated, as well as registering ISR and threads. All of our source code must be thoroughly tested before production of our product.

The PCB layout will be accomplished using Protel 99SE. The bulk of the PCB layout will be adapted from schematics provided by Digi. The boost supply circuit that was designed this semester will be added to the existing power supply and thoroughly tested using Protel and PSpice. A Controller Area Network (CAN) port will be developed and tested under Protel. The interconnect between the LCD and embedded processor will be finished and implemented on the board. By E-Days our production board will have a CAN, Ethernet, and 2 Serial ports. The board will also include 4 quadratures, 2 push buttons and an 8 position switch soldered to the board. The LCD will be connected to the new 9 volt power supply and connected into the embedded processor. We will also have to design and order a new enclosure to protect and support the LCD and hardware. A finite element heat analysis will be simulated to ensure that there is adequate cooling for the power dissipated from our production model. If fans are required they will be added on one of the 5 volt traces and mounted to our box enclosure.

On the embedded software development side of our project we must adapt our existing interrupt service routines and threads to work with Labview’s Elemental I/O. The network thread must be adapted to Drivven’s proprietary network protocols. Once the network thread has been modified to communicate with an engine controller we will be able to implement a batch routine that will query and update the engine controller at a desired frequency. In addition to completing the low level I/O we must finish coding the rest of our GUI frames. This includes developing a list display as well an array display. These frames as well as the configuration frame will be the hardest to design because they require highlighting of variables. The list and array displays will also have to highlight the engines current operating position for the user. We will also need to adapt our current GUI frames to work with Labview’s display frames. This task will be especially difficult because Labview is a fairly new program to all of us and we have not had to actually program using it. It will require a large amount of research on all of our parts.

The final goal for next semester will be testing. Anyone that has written large, extensive programs knows that testing is the most time consuming out of all of the processes of code design. Because our device is controlling an expensive engine, it is important that there are not glitches that cause an incorrect variable to be sent to the engine controller. If this were to happen, the engine could be put in a catastrophic situation, endangering the workers. Neither
the senior design team nor Drivven want to be responsible for the outcomes of a faulty device. Our testing will include variable limits, time needed to transmit the signal from the device to the engine controller, and the use of invalid inputs. We will compile a list of error scenarios with our advisor and systematically test every one individually and then in combination.

Next semester will require extensive collaboration between our team members to arrive at our end goal. Our hardware designer will have to become familiar with the source code to effectively test our device. The software engineers on our team will need to help and understand the board layout and its possible sources of error, to effectively program protection routines. Overall next semester will lead us all to become more robust engineers in our respected fields. The coming semester will be an invaluable source of experience and provide a unique skill set for an entry level position in either software or hardware design.