To: Professor Merz

From: Benjamin Nitkin

Subject: IGVC Progress Report

Date: December 4, 2013

This week, the software team shifted from coding to documentation. With the midyear presentation approaching, we worked putting together materials. The midyear presentation has two main components: a public presentation for faculty and students, and a written report on progress thus far. This week, we put both together.

Andrew, Derrick, and I decided to each cover one part of the robot's electrical systems. Andrew's been focusing on hardware, so he composed slides for the robot's sensors. Derrick worked on ROS and the software end of things. I wrote about the basic electrical systems and provided an introduction to the robot's data flow.
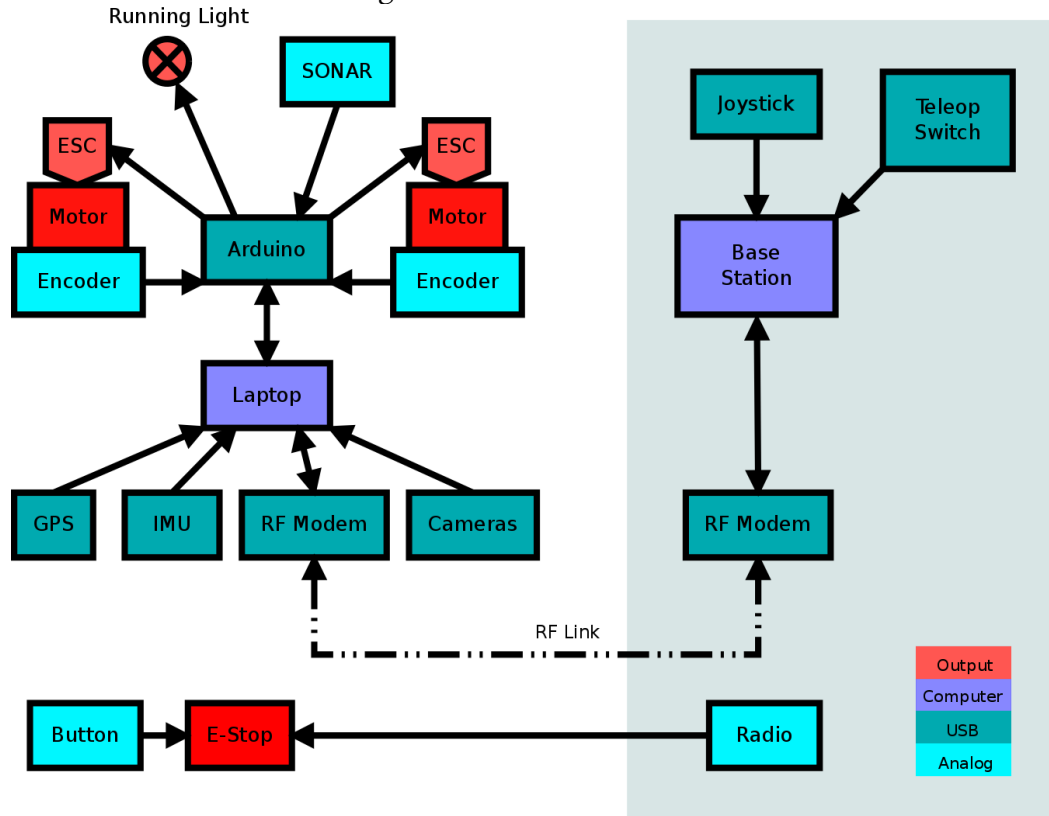
Earlier in the semester, I created a rough wiring diagram that showed how power and data flowed within the robot. It was crude, but effectively conceptualized the electrical design for the team, since few of them had worked with robotics in the past.

For the final presentation, I revised the chart, breaking it into two diagrams: data flow and power distribution. The first shows how the robot's devices communicate, and which direction data flows in. It doesn't mention protocols or voltages or fiddly bits, but it effectively shows how the robot communicates, both internally and with the base station. Notably, it shows the separation between the E-Stop and the remainder of the hardware: even if the main data flow goes berzerk, the E-Stop won't be affected. The power flow diagram is substantially simpler. It shows how the high-power components: fuses, relays, motors, and laptop, are connected.

These two diagrams are used both in the presentation, as a visual aid, and in the written report. In addition to creating these two diagrams, I wrote two sections of the written report: an introduction to the robot, and a walkthrough of the power path. (Although few of the power components have been selected, we know what the power path will look like.)

Both the powerpoint and the final report are currently in draft form; they'll be revised and finalized before Tuesday.

Attachment 1: Data flow diagram

Running Light

SONAR	
ESC	ESC
Motor	Motor
Encoder	Arduino	Encoder

Laptop

| GPS | IMU | RF Modem | Cameras |

| Joystick | Teleop Switch |

Base Station

RF Modem

RF Link

| Button | → | E-Stop | ← | Radio |

| Output |
| Computer |
| USB |
| Analog |

Attachment 2: Power diagram

Battery

Master Power   E-Stop

Main Fuse

Fusebox

ESC

ESC

Running Light

| Left Motor | Laptop | Right Motor |

| Sensors | Modem | Cameras | Arduino |

SONAR

| 24V (BAT) |
| 24V PWM |
| Computer |
| 5V (USB) |