Memorandum

Alex Toombs EE - 41440 Spring 2013

**To**: Dr. Schafer

**From**: Light Bike

**Date**: Monday, February 18, 2013

**Subject**: Progress Update 5

1. For our fifth design review, we have continued to achieve our primary goals as we refine our crude systems into components that will make up our final project. The current sensor and voltage reader are coming together well, with more research and parts needed for the current source to become fully operational. The battery charger/reconditioner system from Optima has been ordered and should be arriving shortly. Parts needed for the current sensor and voltage reader systems were ordered last Wednesday from Digikey and should be arriving shortly.
   1. Jake and Mike have continued to work on refining the current sensor. We ordered several parts via a collective Digikey order, which should be arriving in the next few days. Additionally, Mike ordered a few DAC chips from Microchip as free samples, and he will begin learning I2C after they arrive in order to interface them with our microcontroller.
      1. Implemented voltage read from analog pins of PIC32 microcontroller. It now works with the UART, displaying the correct output to PuTTY
   2. Pat and Alex have continued to look into different ways to achieve linearization of a MOSFET I-V curve, and if the IRLZ34N is the best way to achieve what we want. Several designs (see designs 1, 3, and 4 [here](http://electronics.stackexchange.com/questions/56772/micro-controller-controlled-current-source)) use op-amps, sometimes in conjunction with transistors in order to better control the output without relying on linearization of plot. Could use op amp like [this](http://www.ti.com/general/docs/lit/getliterature.tsp?genericPartNumber=opa549&fileType=pdf), although max allowed current is only 9A. Better options? Otherwise, we created a voltage-controlled current source with one IRLZ34N, sinking to the motor.
   3. Ben has started delving into schematics and examples found of the motor controller. Additionally, he has begun to look into ways to interface an LCD display to show charging percentage to the user.
2. For next week, Mike and Jake will continue to work with I2C in order to interface the DACs with the microcontroller, assuming the Microchip order comes in time. Pat and Alex will implement a voltage-controlled MOSFET current source using the IRLZ34N FET currently available, and continue to look into high current amplifiers. Ben will look at how exactly our batteries need to be hooked up to the motor controller, as well as how best to display charge percentage to the LCD.