

## **Periodic measurement of nighttime weight change while asleep**

**Week:** November 10 – November 16

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**Team:** Kyle Herzog – Team Leader  
Ben Engel – Communications  
Joe Ferris – BWIG  
Eric Printz - BSAC

### **Problem Statement**

We would like to be able to measure this weight change accurately on people who are in hospital beds, and be able to view and record the weight changes over various intervals through the night (such as weighing a person who agrees to lay in bed all night at intervals of every 10-15 minutes). This is important from a research perspective on numerous potential variables that may affect this weight change, such as medications as well as sleep stage changes. We would also use this to potentially track and eventually predict those at higher risk of developing obesity, correlate with body fat measurements, activity, and assess for metabolic changes when we do things to improve/correct sleep problems. There is popular concern in the most recent sleep literature about various sleep stages, insomnia, and their impact on obesity. This scale would likely have to support a hospital bed, which sits on 4 legs, and read at an accuracy ideally around 0.02- 0.05 lbs (many scales on the market record to such accuracy, the more accurate the better). I'm not sure how the zeroed weight of the bed would affect this. Ideally it would be a device we could move to a different bed without too much difficulty (such as in 1-2 hours time), without too complex recalibration.

### **Last Week's Goals**

- Hook wave form generator to ADC
- Hook battery up to load cell
- Hook load cell up to ADC and look for signal
- Special lecture on the machine shop

### **Accomplishments**

- We met last Thursday night to hook a wave form generator up to the ADC. We were able to get a reading on the computer which is very promising.
- We then went to the biomedical lab and hooked up a battery to the load cell and the load cell to the ADC. This produced a change in the reading on the computer, but we were not able to get the load cell to respond to different weights being applied. This could be from 3 different potential causes:
  - The load cell is broken
  - An amplifier is needed
  - More power is needed to operate the load cell
- Eric and Ben will meet with Professor Block on Thursday night to try to troubleshoot and see what the problem is with the set up.
- Friday we went to a special lecture about the machine shop in ECB

### **This Week's Goals**

- Obtain reading from load cell
- Calibrate load cell

### **Difficulties**

- The price of a precise enough load cell continues to be a problem
- The circuitry may be very intricate and require help from someone who is knowledgeable with circuits.
- A prototype may have to be built that does not have the accuracy desired by Dr. Juergens
- The load cell is not functioning properly
- The serial cable of the ADC is not compatible with all computers

### **Successes**

- We have purchased parts to build a prototype
- Purchasing a load cell this early will give us plenty of time to deal with the computer programming and circuitry aspect of the design
- We have begun the process of putting together our prototype.



Team Meetings														
Client Meetings														
Advisor Meetings														
BSAC Meetings														
<b>OTHER</b>														
Web Page														
Special Lectures														

**Expenses to Date: \$83**

- DATAQ computer software: \$25
- Aerocon 44 lbf load cell: \$25
- Digital Scale: \$25
- 9-V Battery: \$4
- Nuts and bolts: \$4