

## **Sleep Lab Monitor - Progress Report 3**

2/7/09-2/13/09

### **Project Title:**

A combined Thermistor, Pressure, and CO<sub>2</sub> device for use in the Sleep Laboratory

### **Team Members:**

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### **Client:**

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### **Advisor:**

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### **Problem Statement:**

There are three measurements taken from each breath during polysomnography. The following devices are used: a thermistor to detect temperature difference between inhaled and exhaled air, pressure sensors that show a flattening pressure profile during upper airway narrowing, and CO<sub>2</sub> sampling tubes to sense End Tidal CO<sub>2</sub>. These three measurements are taken from two different devices placed under the child's nose, with two prongs going into each nostril. This method can be inaccurate if a nostril was to become obstructed, and each device may not sample from both nostrils as well as the mouth. Moreover, the current apparatus may be uncomfortable for the child as well as insecure on the child's face. This could cause a disruption of sleep and a possibility of the devices becoming unfastened during the night. To solve these problems, the goal is to design and develop a prototype that combines these three measuring devices into one apparatus that samples from both of the nostrils as well as the mouth, and attaches to the child in both a durable and comfortable fashion.

### **Reinstatement of Team Goals from Last Week:**

1. Prepare our testing procedure for our current prototype
2. Set the date for our prototype testing
3. Have team meeting to solder connectors on and test our prototype with portable data acquisition device
4. Continue background research

### **Summary of Team Accomplishments:**

1. Contacted several companies about 1.5mm safety lead connectors
  - a. Grass Technologies was contacted and the safety connectors are not sold individually
  - b. Braebon was contacted and did not return calls
  - c. Plastics1 was contacted
    - i. The connectors are \$2.69 with a \$45 minimum order
    - ii. The connectors cannot be sold without wire already attached
    - iii. Company suggested another type of compatible connector and sending free samples
  - d. Tharksons was contacted about the 10k bare bead thermistors and no response has been made
2. Team Meeting, Monday February, 9<sup>th</sup> in the instrumentation lab
  - a. A voltage divider circuit was assembled on a breadboard with a 30kohm resistor and our thermistor circuit
  - b. Using a usb labjack, we obtained a sampled voltage vs. time graph using labview on a laptop
3. Client Meeting, 3:30p, Wednesday, February 11<sup>th</sup> UW Hospital
  - a. E-mailed Linda over at the sleep lab to set up a lab visit for Wednesday, February 25<sup>th</sup> at 1:30p
  - b. Has a metal clip to use while soldering to prevent damage to thermistors
  - c. Testing Procedures to Perform on our own and at sleep lab
    - i. Compare performance of different thermistors by looking at waveforms
    - ii. Compare performance of thermistors at different positions on the face (5mm away, 10mm away)
    - iii. To test CO2 dilution, we can obtain measurements at room air and breathing out of various openings
  - d. Technicians are putting together list of pediatric sleep labs
    - i. We will contact them to assess the demand for our product

### **Statement of Team Goals for Upcoming Week:**

1. Finalize date and time for lab visit with Linda
2. Solder thermistor connectors onto prototype
3. Receive sample connectors and test with existing equipment
4. Write more detailed testing procedures to use at sleep lab

## **Project Schedule**

1/23/09-1/30/09: First client meeting, background research for modifying current prototype  
1/31/09 – 2/6/09: Perform background research  
2/7/09 – 2/13/09: Background research, modification alternatives  
2/14/09 – 2/20/09: Continue to brainstorm for modification ideas, test current prototype  
2/21/09 – 2/27/09: Work on design and choose design modification alternatives  
2/28/09 – 3/6/09: Complete Mid Semester Presentations  
3/7/09 – 3/27/09: Develop modifications and build new prototype  
3/28/09 – 4/24/09: Test modified prototype  
4/25/09 – 5/1/09: Complete and give Final Presentation, submit notebooks and paper

## **Team Difficulties:**

Client cannot attend sleep lab visit date and time.

## **Expenses:**

None

## **Activities and Individual Accomplishments:**

Team Meeting (2-9-09)-2: Used a portable system (labjack and laptop) to graph voltage vs. time of current prototype  
Client Meeting(2-11-09)-1: Discussed lab procedures, and contacting other labs about the demand for this product  
  
Nicole – 3: Contacted Grass technologies and Braebon, scheduled lab visit, background research  
Jason – 3: Set up labjack and LabView on laptop to test current prototype, background research  
Lindsey – 3 hours: Contacted Tharksons about their small thermistors, background research  
Robyn – 3 hours: Contacted Plastics1 about connectors, background research

**Total hours for this week: 15**

**Cumulative hours to date: 37**

<b>Sleep Lab Monitor Gantt Chart Spring 2009</b>												Completed:			
												In Progress/Planned:			
	1/23	1/30	2/6	2/13	2/20	2/27	3/6	3/13	3/20	3/27	4/3	4/10	4/17	4/24	5/1
Background research	Completed	In Progress	In Progress	In Progress											
Test Current Prototype				In Progress	In Progress										
Client Meetings	Completed		In Progress		In Progress	In Progress				In Progress			In Progress		
Meetings with Professors/Tech															
Brainstorm design		In Progress	In Progress	In Progress											
Design Modification alternatives/mat				In Progress	In Progress										
Midsemester presentation					In Progress	In Progress	In Progress								
Finalize design ideas							In Progress								
Ordering materials							In Progress	In Progress	In Progress						
Construct modified prototype								In Progress	In Progress	In Progress					
Test modified prototype & Materials									In Progress	In Progress	In Progress	In Progress			
Plan final poster presentation													In Progress	In Progress	
Write final paper												In Progress	In Progress	In Progress	
Final advisor meeting															In Progress

