**Project Title:** Sensory Substitution Device for Hearing Impairment

**Team Members:**

Jack Page – Co-Team Leader  
jdpage@wisc.edu

Jimmy Fong – Co-Team Leader  
fong@wisc.edu

Matthew Valaskey - BWIG  
mvalaskey@wisc.edu

Becky Jones – BSAC  
rebeccajones@wisc.edu

Ryan Thome – Communicator  
thome@wisc.edu

**Client:**  
Veronica H. Heide, Au.D.  
Audible Difference  
vheide@audible-difference.com  
608.273.3036

**Advisor:**  
Mitchell E. Tyler, P.E., M.S.  
Dept. of Biomedical Engineering &  
Dept. of Ortho-Rehab Medicine  
University of Wisconsin - Madison  
metyler1@facstaff.wisc.edu  
608.265.3756

**Problem Statement:**  
The goal is to design and develop an auditory substitution device that through the use of vibro- or electro-tactile stimulation can substitute for regional frequency hearing loss. We will continue the work from last semester, mainly focusing on integrating vibro-transducers into the system in order to prepare the system for laboratory trials.

**Statement of team goals:**

1. Create problem statement  
2. Create first draft of PDS
3. Begin to research and develop design ideas
4. Continue the design project
   a) Research all possible background information.
   b) Research existing and design alternatives
   c) Brainstorm for all possible solutions
   d) Meet with experts to gain ideas about possible solutions
   e) Develop possible design solutions
5. Choose final three design solutions
6. Develop final three solutions
7. Create Power point presentation
8. Finish mid semester report, PDS
9. Discuss possible final design alternative
10. Finalize Design
11. Build and test prototype
12. Present final design & poster

Project Schedule

1/26 – 2/2  Choose project, assign roles, meet with client
2/3 – 2/9  Draft first version of PDS, preliminary design ideas to improve prototype
2/10 – 2/16  Continue research and write PDS
2/17 – 2/23  Decide on design alternatives, brainstorm ideas
3/23 – 3/2  Work on design
3/3 – 3/9  Work on presentation and report, mid-semester oral presentations
3/10 – 3/16  Write and hand in written report, PDS, and notebooks
3/17 – 3/31  Work on design
4/1 – 4/8  Spring Break and continue to work on design
4/9 – 4/25  Work on Design, plan tests for the prototype
4/26 – 5/4  Work on final poster, presentation and report. Test the prototype and present to client. Give final poster presentation

Last week’s goals

1. Gather materials for project (i.e. possible adhesives, circuit components).
2. Research and design circuit schematic for new transducers.
3. Get into the lab before the end of the week to test the frequency and amplitude response of the new transducers.
4. Start editing the mid semester report.

Summary of Team Accomplishments:

1. Tested the new vibrating motors in the lab with different voltages and different frequencies (DC and AC).
2. Tried to introduce the vibrators into the existing circuit.
3. Brainstormed ways to change the old circuit to incorporate the new motors.
4. Continued to think of different ways to attach the new disk motors to the skin.
Statement of Team Goals for Upcoming Week:

1. Figure out how to change the existing circuit to make it work with the new vibrating motors.
2. Continue testing the motors with different inputs and circuit designs.
3. Research further into adhesives and ways to hold the vibrating motors against the skin of the user.

Team Difficulties:

1. Integrating the vibrating motors into the existing circuit.

Activities and Individual Accomplishments:

Team In-class/lab meeting (1 hour)
Wednesday night meeting – further testing of the vibrating motors (1.5 hours)

Jimmy 1.5 hr Researched ways to fix the circuit to make it work well with the new vibrating motors
Matt 1.5 hr Researched and brainstormed ideas to fix the circuit
Ryan 1.5 hr Tested motors with original circuit, researched circuit changes
Jack 1.5 hr Wrote progress report, researched motor specs, tested motors
Becky 1.5 hr Researched male vs. female sound processing and how to compensate for the changes, worked with the new vibrators

Total hours for this week: 20.0 hrs
Cumulative hours to date: 143.0 hrs