

Adjustable wave tube stand for Acoustic Reflection Technique

Week: November 9th – November 16th

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Team: Ryan Carroll – Team Leader
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Andrew Bremer – BWIG
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Problem Statement

The Vocal Tract Development lab (VT Lab) plans to compare anatomic measurements secured from Acoustic reflection technology (ART) - also known as acoustic pharyngometry – in the upright and supine position with measurements secured from imaging studies (MRI & CT).

Currently, researchers in the VT Lab need to hold the wave tube in their hands which is presenting variability in the data. It is difficult to hold the wave tube at the same angle during each trial within subjects and across subjects.

Hood Laboratories, the company who manufactures AR technology, has no plans to offer an adjustable stand.

VTLab is requesting for the BME team to design and build a steady stand for the ART wave tube. The stand should be adjustable so that it may be used by individuals of different ages -- young children to adult. Also, the stand must allow the patient's head to remain in a standardized position in the upright and supine position. Another important criterion is that the stand/unit should be easy to clean and disinfect.

Last Week's Goals

- Optimize stand (Details listed below)
 - Place markings for measurements
 - Stand has many moveable parts, most are unnecessary. Lock off these unnecessary parts.
- Meet with client to present roughly completed interface, and stand. At this meeting we will bring the rubber straps and gripping lining so we can physically place the wave tube in the holder to make sure everything is going smoothly. This will also allow for us to make measurements for the rubber straps
- Within the next few weeks these all need to be completed as well.
 - Connect rubber straps

- Place gripping lining (or purchase more if necessary).
- Devise a connection between the interface and stand
- Ideally, the stand will be complete before Thanksgiving.

Accomplishments

- Tested Caviwipes with interface material. After roughly a 25 minute test trial, the test side showed no physical changes or evidence of erosion when compared to the control. In fact, the test side had more grip than the other side.
- Cut the HDPE block roughly to size in the machine shop.
- Purchased hardware for interface connection. Machined hardware to work with stand. Everything works completely fine here. After the interface is finished the hardware will be screwed into the interface and the stand and interface will be one whole unit.

This Week's Goals

- Face Interface.
- Mill out interface to obtain U-shape.
- Router the sharp edges for smooth finish.
- Drill holes and connect hardware for interface.
- Connect rubber straps to interface.
- Connect gripping material.

Difficulties

Team Effort

Team Member	Accomplishments	Time (Hrs)	Running Total (Hrs)
Ryan Carroll	Progress report, Interface piece work, Team meeting	3.0	28.5
Ben Engel	BSAC, Interface piece work, Team meeting	3.0	28.5
Jeremy Glynn	Client contacts, Interface piece work, Materials testing, Team meeting	3.0	28.5
Andrew Bremer	Website, Interface piece work, Team meeting	3.0	28.5

Project Schedule

TASK	SEPT			OCT				NOV					DEC			
DATES	14	21	28	5	12	19	26	2	9	16	23	30	7	14	21	28
WORK																
Brainstorming	█	█	█	█	█					█						
Research	█				█	█	█	█								
Designing Prototype		█		█		█			█	█						
Selecting Prototype						█	█									
Obtaining Materials						█		█	█	█						
Building Prototype									█	█						
Testing Prototype										█						
Modifications																
DELIVERABLES																
PDS		█	█		█											
Mid-Sem. Report							█	█								
Mid-Sem. Presentation						█	█									
Final Report																
Final Presentation																
Weekly Reports	█	█		█	█	█	█	█								
Notebooks	█	█	█	█	█	█	█			█						
MEETINGS																
Team Meetings	█	█			█	█			█	█	█					
Client Meetings	█	█		█					█							
Advisor Meetings		█		█	█	█			█							
BSAC Meetings		█	█		█		█		█							
OTHER																
Web Page					█	█	█		█	█	█					
Special Lectures			█						█		█					

Expenses to Date:

- **MB1 Boom Stand** – \$34.98
 - Purchased by Ryan Carroll on 10/12/2007
 - GearTree.com
 - Paid by Credit
 - Status: Shipping
- **Rubber Belt Strap** - \$9.49
 - Purchased by Ryan Carroll on 10/17/2007
 - Shentech.com
 - Paid By Credit
 - Status: Received

- **UHMW Polyethylene Sheet - \$39.29**
 - Purchased by Ben Engel on 10/30/2007
 - McMaster.com
 - Paid by Credit
 - Status: Shipped
- **Interface Hardware (Screws, Mounting Brackets, ect.) - \$8.00**
 - Purchased by Ben Engel on 11/15/2007
 - Local Hardware Store
 - Paid by Credit
 - Status: Received

Total: \$91.76