

## Continuous Monitoring of Asthma Control Progress Report 10

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**Advisor:** Dr Chris Brace

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**Date:** Friday, March 31st - Thursday, April 6th

### Problem Statement

Asthma patients often do not experience the the symptoms of asthma exacerbations, such as coughing, wheezing, and increased respiratory rate, for up to 2 days after it has begun. In severe asthma patients, where the exacerbations are more frequent, prolonged detection can lead to more serious symptoms, longer recovery times, and extended tissues destruction. These severe asthma patients only account for 5-10% of all asthmatics, but they account for a disproportionate amount of health-care costs, hospital admissions, doctor visits, and emergency services. By creating a device that can detect the symptoms of an asthma exacerbation earlier, the patients could be more promptly notified to start their asthma action plan (AAP). This could potentially save significant amounts of time, money and resources while also reducing the effects of the exacerbation.

### Restatement of Previous Team Goals

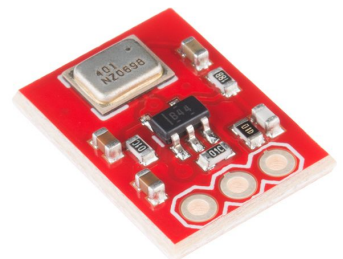
- Meet with client to discuss the prototype and testing
- Continue testing on the device
- Add data storage to the LabVIEW code
- Finalize the design for the shirt/mechanism for holding the device
- Print additional casings

### Summary of Team Role Accomplishments

- Luke (BSAC) - Attended Biweekly BSAC meeting.
- Tim (Leader/ Communicator)- Setup client meeting. Worked on/ submitted the progress report.
- Kelsey (BWIG/ BPAG)- Picked up 3D printed piece from the shop. Uploaded progress report to website.

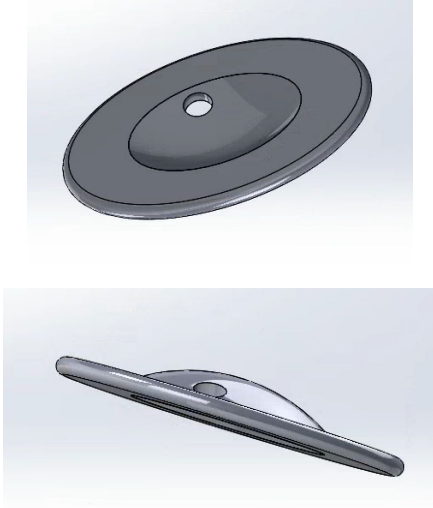
### Summary of Design Accomplishments

The team decided on an encased microphone design. First, it will feature a 3D printed casing in order to make the design slimmer/more ergonomic. In addition, the microphone be completely enclose in the new casing. The reduced bulk will increase patient comfort and enable the device to be more easily integrated into a shirt. The team will use the same microphone as last semester: Sparkfun MEMS Microphone Breakout- INMP401



(ADMP401). The idea behind this is that we know that microphone has worked well and it should be compatible with our code written last semester.

Casing Solidworks Images



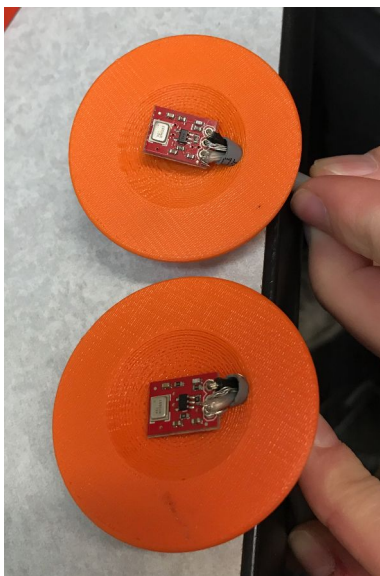
3D Printed Casing



The team decided to use a two conductor shielded cable with drain wire (Digi-Key C2534-50-ND). This will allow one conductor for the audio signal, one conductor for the voltage supply, and the drain wire to be connected to ground. The team began to assemble and test the prototype today and will continue working on it later tonight.



This week the team finished building the prototype. We fed the cable through the hole in the casing. Once through we soldered the cable to the microphone. The black cable was attached to audio input, the white cable to the VCC power supply, and the drain wire was attached to the ground.



The team decided to integrate the microphones into a band that can be adjusted. This allows the device to fit a wide range of patients while eliminating the need for multiple shirts of different sizes. We intended to make the band using a cloth bandage wrap. This should be rather comfortable for the patient since the wrap was intended to be used on the body. We will add a metal ring and velcro so that the band can be secure while also being easily adjustable. We plan on assembling the band this weekend.

### Activities

Date	Member	Task	Time (hrs)	Week Total	Sem Total
4/6	All	Developed prototype and progress report	3		
4/3	Tim and Kelsey	Client Meeting	.5		
	Tim			3.5	27
	Kelsey		3.5	3.5	28
	Luke			3	24.5

### Statement of Team Goals

- Download labVIEW on a team members computer and begin preliminary testing.
- Download labVIEW on IRB laptop and confirm that the software runs correctly.
- Create chest strap and attach microphone casings.

### Individual Goals

- Luke: Install LabVIEW program and extension onto my computer.
- Tim: Assemble the strap. Continue testing.
- Kelsey: Order chest strap. Continue testing. Email Dr. Mathur material order receipts.

### Difficulties

One major difficulty that we continue to encounter is getting the correct version of LabVIEW on a computer to run our program. The new design lab computers are all CAE, so we can not get the correct function and the lone non-CAE computer either. To solve this problem, we hope to download the correct version on one of our personal computers so we can develop the program before transferring it to the IRB computer for testing.

### Project Schedule/Timeline

Task	Jan		February				March					April			
	20	27	3	10	17	24	3	10	17	24	31	7	14	21	28
<b>Deliverables</b>															
Progress Report	X	X	X	X		X	X	X		X	X				
PDS			X												
Preliminary Presentation					X	X									
Preliminary Report/Notebooks					X										
Final Presentation															
Final Report/Notebook/Evals															
<b>Team Goals</b>															
Select 3 final design ideas				X											
Design Matrix				X											
Presentation Powerpoint					X										
Decide on final design						X									
Presentation poster															
<b>Meetings</b>															
Team	X		X	X	X	X				X	X				
Advisor	X	X	X	X	X	X	X				X				
Client	X					X					X				
<b>Website</b>															
Update info	X	X	X	X	X	X	X	X		X	X				

### Expenses

Date	Item	Cost
3/8/17	Digi-Key 2 conductor Shielded Cables with drain wire (C2534-50-ND)	\$41.64
3/16/17	Microphone casings	\$9.51