



## Progress Report

### • Personal Electronic Stethoscope

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## **Introduction**

Heart disease is the number one killer in the world. If people diagnose it by themselves, they can prevent tragedies from happening. Base on this reason, Better Life Technology has been working on the project – Personal Electronics Stethoscope (PES) over the past three months. With this product, users can monitor their heart conditions anytime they want.

In this report, we will outline the progress we have made so far during the past three months, including the schedule, finance, progress, and remediation for both hardware and software of this product.

## **Schedule**

Originally, we planned to finish the hardware design before mid-March. However, due to technical problems of the PCB layout program, we are two weeks behind schedule. Nevertheless, we are confident that we can catch up and finish the project before April 15<sup>th</sup>, 2013.

## **Financial**

Up until now, everything is currently on budget. We have received \$450 from Engineering Student Society Endowment Fund (ESSEF), and \$300 has been spent on the product: \$200 for hardware components and PCB order designed including prototype and \$100 for the software development fee. We will use the extra \$50 for the hardware packaging. For hardware packaging, we need to buy plastic materials, a rubber sleeve, and microphone head. That gives us a total with \$350. However, if we spend over the limits, our team at Better Life Technology has compromise that we will split the extra cost.

## **Progress**

### **Hardware**

Better Life Technology has worked on the research of an electronic stethoscope and tried to design it portably. To conduct this, we found the SMD components to replace through-hole components, but we could not find exactly the same components for some capacitors. Therefore, we conducted a lot of research and concluded that we can switch the capacitors we were using with other types of capacitors. We will find out whether it is working or not with samples next



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week. We have finished the design for the hardware circuit by using the Eagle program and have claimed an order from the PCB manufacturing company. We tried using the OrCAD program for PCB design during our first run; however, we cannot find some footprints for the specific components, so we changed it to the PCB program. PCB manufacturing company promises we will be able to get the product before April 5<sup>th</sup>, 2013.

### **Software**

For the software team, we have finished the user interface and signal processing analysis. The app is working followed by original purposed and sound signal will be analyzed and transferred to data files. All the options and functions are not tested yet because we need the hardware device to test these functions. We are now waiting for the hardware device (PCB) for testing purposes. We expect there will be some error but it shall be fixed before the presentation.

### **Hardware Packaging**

Hardware packaging will be performed with an acrylic signboard, a rubber sleeve, and a metal or plastic head for microphone. We figured out what kind of materials should be used and how much the cost will be. We also finished the shape of the PES hardware case and the stethoscope head. We need to make it in two weeks and we can finish it before demo date.

Roughly, all the members from Better Life Technology meet up once every week. Once we receive the product, testing can be started and everything should be ready by April 12<sup>th</sup>.

### **Remediation**

#### **Hardware**

At the beginning, we were planning to create a wireless device using Bluetooth chip. We noticed that we will not be able to make it by using regular Bluetooth chip because there is a special license fee to use the Bluetooth technology to transfer data. As a result, instead of creating a wireless device, we modify the device connect by audio cable directly. We tried to use the OrCAD PCB layout program, but we switched to Eagle because we had issues in the footprints for the specific components. We could not figure this out, thus we used another program. Once we designed PCB board, we had issues with the SMD components and voltage regulator to reduce the size of the circuit board. This process took a lot out of our time, so our schedule is delayed by two weeks. However, this is not a problem because we can still finish everything by April 12<sup>th</sup> which is before demo date.



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### **Software**

For the software, we first hoped that this device can be suitable for the entire smartphone market. Unfortunately, due to the time constraints and the different types of interfaces and language types, we are now only concentrating on one smartphone type.

### **Hardware Packaging**

We are supposed to use AutoCAD or SolidWorks for the case design. Because of a budget problem, we cannot design a fancy case now. If we design the case using the program, then it will cost a couple of hundred dollars more. To reduce the manufacturing costs, we will manually make a case and cover for PCB and the head. This should take just a few days.

### **Conclusion**

The members from Better Life Technology have made great efforts and progress on this project. Because of some issues such as components mismatch, PCB program errors etc., we are currently behind schedule. However, we have finally finished the hardware and software designs and the only thing left to do is testing. Although we are two weeks behind schedule, the team is on the same page. We all believe that we can catch up and create the products in time.