



---

# Progress Report

---

---

<b>Project team</b>	JabarJung Sandhu (CEO) Wei Lu (CFO) Di Luo (COO) Henson Truong (CTO)
---------------------	---

<b>Contact</b>	JabarJung Sandhu
----------------	------------------

<b>Submitted to</b>	Dr. Andrew Rawicz - ENSC 440W Dr. Steve Whitmore - ENSC 305W School of Engineering Science Simon Fraser University
---------------------	---

<b>Issue date</b>	November 17, 2014
-------------------	-------------------

<b>Revision</b>	1.0
-----------------	-----

---

## Introduction

Svasth Healthcare is designing Comfort Mat System (CMS), which will be able to collect all of the monitoring data from sensors (pressure, temperature, and humidity sensors), process it with a smartphone application and display the results in a graphical user interface in real time. Another feature that CMS exhibits is once the collected data meets a preset threshold value, the system can automatically turn on different vibration motors to increase blood circulation in the affected area and sending an alarm to the user to reposition their body or to the person who is caretaker for that person. Comfort Mat System will be integrated with Android and iOS apps, which will allow people to monitor their current skin pressure, temperature and humidity condition and control the system by using their own smartphone device.

## Schedule

The initially proposed project schedule is depicted in Figure.1. We are now at November 17th, which is shown with a red line in the chart. We are still working on getting our units integrated with our smartphone App, testing, debugging and troubleshooting issues that arise. As it stands now, we are essentially on schedule to complete our project, and confidently be able to demo on December 1st.

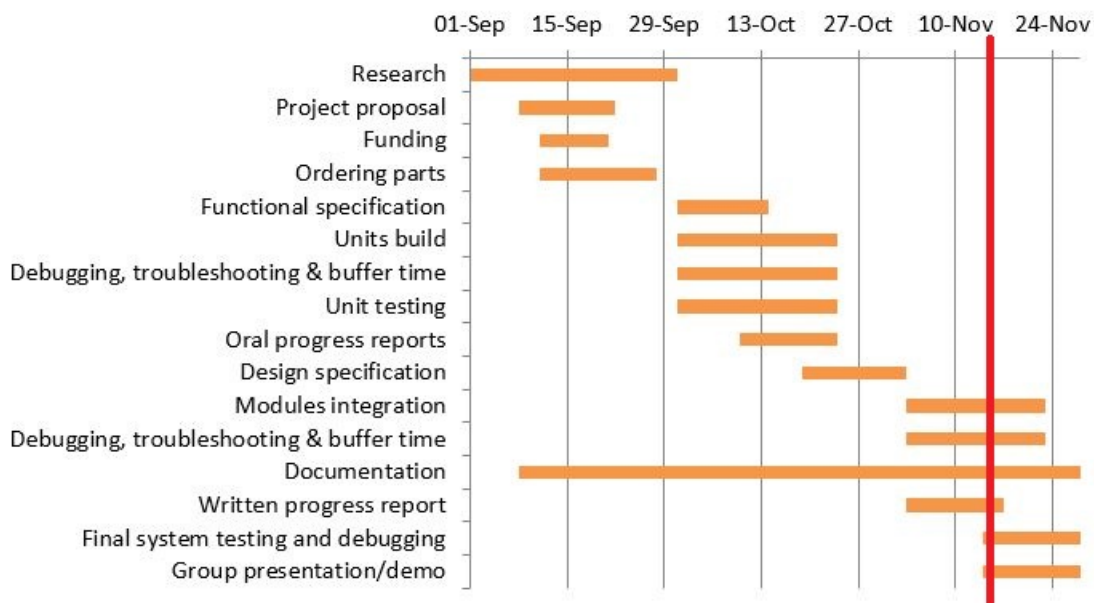


Fig.1 Schedule of project: Comfort Mat System

## Financial

Table.1 shows our original projected cost and actual cost to build the Comfort Mat System (CMS). We have spent approximately \$653 of our estimated budget \$750 for this project. We have got \$650 in funding from the Engineering Science Student Endowment Fund (ESSEF), which is almost even to cover all cost of this project. We also managed to

borrow some parts to get further reduce the cost of our project. The current breakdown of parts used is shown below

Component name	Estimated Cost(CAD)	Actual Cost(CAD)
Arduino Mega 2560	80	75
Temp & Humidity Sensor	15	15
Copper Foil Tape	12	12
Motor-Vibrating Pager	30	22
Multiplexer 4051N	1.5	1.5
Shift Register 74HCT595N	1.5	1.5
Bluetooth 4.0 Low Energy - BLE Shield	30	30
DMI Med Convoluted Foam Chair Pad	20	41
FSR 402 0.5"	384	352
Jump Wire (Male and Female)	40	40
Conductive Wire	30	30
Resistor	Free	Free
Battery Connector	5	5
Plexiglass Sheet	20	10
Touch Screen LCD	75	N/A
Motor Driver IC L293D	20	18
<b>Total Cost</b>	<b>764</b>	<b>653</b>

\*Touch Screen LCD is for testing use only, but we use Matlab to test our FSRs instead.

Table.1 Current Cost breakdown of CMS

## Progress

### Hardware Progress

Svsth Healthcare hardware team has already purchased all of the components needed for the assembling and testing of the first prototype. All the components have been tested individually and integration is almost complete with the system. The major modules are: the 8X8 FSR matrix array, the temperature and humidity sensor, the vibration motors, the Arduino Mega 2560 controller board and bluetooth adapter IC. There are also separated minor circuit was made on the PCB board to integrate all components with their peripheral parts. Backup power is also considered in our hardware design. The extra battery pack will support high current draw from our vibration motors to keep them running smoothly, which also able to reduce noises to the Arduino controller board.

### Firmware and Software Progress

The firmware team has been working on programming the Arduino controller board, which is able to implement our well-designed integrating system work as a whole unit.

We were also successfully simulated a real-time pressure mapping system by using Matlab, which input from our 8X8 FSR matrix array, and map out a real time graph of the pressure applied to each FSR sensor. We are able to capture the sensors' data and send it through bluetooth connection to a smartphone.

For the smartphone application development, we have not yet completed the implementation of the smartphone application as of yet. But we got bluetooth connection setup between controller and our customized App, decoded and displayed data in our App and designed App UI. As scheduled, our first App will complete by Nov 20th, and then we will start testing our prototype as a whole once the smartphone application is complete.

## Remediation

### Hardware Remediation

Compared to our initial hardware schedule, we are in the testing and debugging phase. We are thinking of adding more motors to increase blood circulation to the affected area and to have more coverage over the entire mat. This modification depends on our final prototype testing.

### Software Remediation

For the software side of our project, we are currently getting our smartphone app developed and integrated together with our hardware. We are in the process of trying to figure out how to control digital pins on the Arduino Mega over bluetooth with a smartphone app to turn on our vibration motors. If this does not work out, we will turn on the vibration motors via hardware (using the Arduino Mega firmware) without the smartphone app whenever long lasting pressure is detected.

## Conclusion

In conclusion, we are sitting on our schedule and expecting to be able to meet our final deadline for the development of the Comfort Mat System. The engineers in our team are confident in providing a working prototype by the December 1st since there are no issues with the budgeting and the smartphone app is almost complete.