PROGRESS REPORT

SOLAR REAL TIME TRANSIT DISPLAY SYSTEM

SUNLINK INC.

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1 INTRODUCTION

Solarity by Sunlink is a transit display system that will show real time transit updates while being powered by solar energy. Sunlink intends to demonstrate a concept prototype on December 14th, 2015 for the joint benefit of the general public and stakeholders involved. The Solarity system is composed of both hardware and software working in real time. The hardware components are housed within a mechanical enclosure that protect them from the outside environment. Sensors on the system detect motion within a close range and signal to the system to retrieve data from the backend server. The backend server retrieves real time bus information from TransLink and creates an image which is sent to Solarity to be displayed. The objective of Solarity is to enhance a commuter's overall transit experience by automatically showing accurate next bus times at a given station. Additionally informing them if busses are delayed or system wide problems are occurring.

2 SCHEDULE

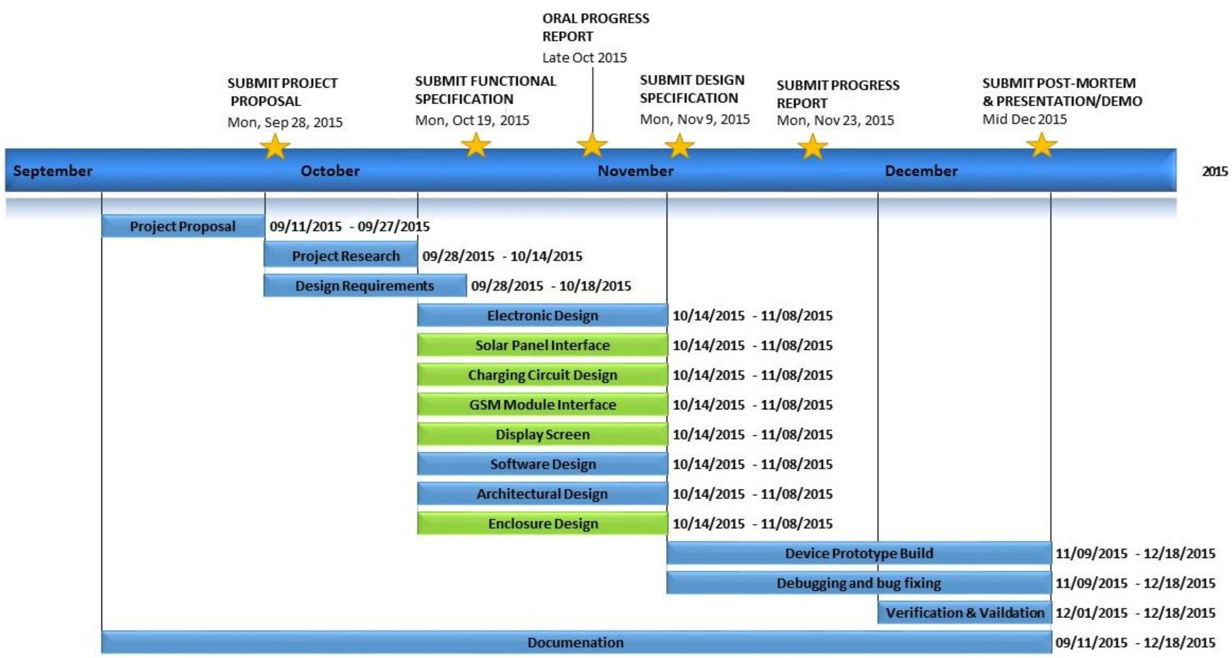

Figure 1: Development Schedule

Figure 1 depicts the planned development schedule for Solarity during the design stage. From the inception of the design process, the team understood that overlap between stages was inevitable and created a schedule plan accordingly. The design is on time in many areas but slower in others. Specific areas are the development of the battery/charging circuit and the sensors (proximity and light). Even though this task was somewhat delayed, it should not cause an area for concern. The initial development schedule was a rough estimation and developing a charging circuit must not be rushed to ensure that the circuit is as efficient as possible. Additionally,

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although the development of the battery/charging circuit and the sensors is not on schedule, it is projected to be complete by the week before the demonstration. All the other components are either completed or on schedule, and proceeding to final integration and testing.

3 FINANCIAL

Table 1 compares our original estimated budget, with our actual current budget. We did not seek any funding from an external source as all costs were covered by the internal team members. From the table it is clear that we are about $180 lower than our initial estimated budget. We have been consistent with the purchases and have found relatively cheap prices from different sources. Most of the parts for our project have been purchased – excluding the wiring and housing – therefore the amounts in the table below reflect the final budget. Additionally, we have been generously provided with several parts free of charge from family members.

Table 1: Budget Breakdown

Component	Estimated Cost	Actual Cost
Microprocessor (TI MSP430)	$ 20.00	$ 17.73
MPico Display	$ 175.00	$ 166.66
Solar Panel	$ 175.00	$ 0 (Already own one)
Battery and Charging Circuit	$ 50.00	$ 50.40
Sim 800c GSM Shield	$ 75.00	$ 80.44
Cables and Miscellaneous Electronics	$ 50.00	$ 106.34
Housing	$ 75.00	$ 132.00 (Estimation)
Subtotal	$ 620.00	$ 553.56
Contingency (25%)	$ 155.00	(Duty) $ 43.84
Total	**$ 775.00**	**$ 597.40**

4 PROGRESS

4.1 HARDWARE (~80% COMPLETE)

The development of the hardware for Solarity is currently on schedule for the microcontroller, display and GSM module but behind schedule for the proximity sensor, light sensor and charging battery circuit. We are able to run the software on the hardware to execute certain operations but have not integrated the remaining hardware components. These include the proximity sensors to detect nearby people, the light sensor to detect the lack of daylight, as well as build a circuit that will power and charge the entire system with the use of solar panels. The completed system will

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then be wired on a PCB and before placing it into an enclosed housing fixture. Workdays were initially allocated away from the hardware and focused on the software. Now that the software has been developed almost to completion, more attention has been shifted back to the hardware.

4.2 SOFTWARE (~80% COMPLETE)

The development of the software for Solarity is currently on schedule for the server, microcontroller, display and GSM module. We are able to run the software on independent hardware components to execute specific functions. Most components have passed their respective tests and function correctly. The remaining software tasks include integrating and testing the final code to run on an integrated hardware system.

4.3 MECHANICAL (~80% COMPLETE)

The development of the mechanical enclosure for Solarity is currently on schedule. The remaining work includes placing a clear polymeric material to protect the display screen from damage and placing all the hardware components inside the enclosure to be secure from movement. The remaining work for constructing the enclosure and placing the integrated system inside will require a few workdays.

5 REMEDIATION

Considering the software and enclosure are on schedule, more focus has been placed on the hardware. The decisions to use the SparkFun Ambient Light Sensor and the LV-MaxSonar-EZ0 Proximity Sensor have proven to be wise as they appear to have an easy integration. The charging system has already been designed through schematics, therefore building the circuit is projected to not take much time. With these facts in mind, the extra development period for the hardware has been reduced in terms of workdays.

6 CONCLUSION

As of now the development process of the Solarity prototype is a few workdays behind the original schedule. The GSM module, microcontroller and server are estimated to deliver according as planned. Even though the integration of the sensors and battery/charging-circuit have fallen behind a few days, allocating and focusing extra development hours in these areas will put the development back on track in time for integration testing. During the upcoming integration stage, additional effort and time will give us more flexibility in the days leading up to the completion date. Sunlink is confident to present a functional Solarity prototype on December 14th, 2015.