Microflow
Systems Inc.

Progress Report for Microflow's Networked Water Faucet System

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Introduction

Included in this document is a discussion of project work completed, the project work that has yet to be done, project financing, project problems encountered and any identified future issues.

Schedule

Overall we have completed our milestones on time. The following, however, still needs attention: software development, hardware integration, demo presentation and writing of the postmortem document.

The software development for the LCD screen and the flow sensor have been completed independently and integrated into a single working project. The wireless transceiver software development is currently under way. Using the demonstration code provided to us by Microchip, we were able to modify the code for our application such that it can broadcast messages. Further investigation and software development is required to allow the wireless transceiver to receive and process data. Once the software development for the wireless transceiver is complete, the code used to control the wireless transceiver will be integrated into the already integrated project.

Hardware integration wise, all the necessary components and parts have arrived. Fabrication and modification of water faucets to integrate the LCD screen and the flow sensors are under way. The waterproof plexiglass bracket to encase the LCD screen and route wires from the microcontroller to the screen has been made, and test-fitted. The faucet has been modified such that the LCD screen bracket will fit between the handles, and additional modification to enable the flow sensor to measure water usage out of the faucet is currently under way. Fabrication of an enclosure to contain all the electronics in waterproof enclosure is also under way. We are expecting the hardware development to be completed before the software development to give us more time with software debugging and optimization.

The demo presentation is scheduled to take place on April 16th 2:30 to 3:30 PM. After the demo presentation our group is scheduled to write the post mortem.

Financing

During the project, we have actively searched for funding opportunities. Early on in the project, we presented our project idea to the Engineering Science Student Society for extra funding and we have received $400.00 which has been used to partially reimburse those of our team who have made purchases.

We are looking for additional sources of funding such as the Wighton Engineering Development Fund, and IEEE Student Enterprise Award Fund. The Wighton Engineering Development Fund is expected to be our second source of funding.

Budget

Table 1 details an updated project cost breakdown which has changed from the original project proposal which was submitted January, 2010. The cost breakdown reflects our decision to reduce our faucet nodes from 3 to 2 units.

Table 1: Project Cost Breakdown (updated March 20ᵗʰ, 2010)

Part Name	Units	Cost per Unit	Total Cost
Mechanical Parts			
Flow Sensor FTB2004	3	95.00	285.00
RONA Faucets	3	50.00	150.00
Various Fittings	1	40.00	40.00
Electronic Parts			
Microchip PIC24 Series	3	3.00	9.00
Microchip RF Module	3	10.00	30.00
New Haven LCD Display	3	10.00	30.00
Microchip PIC Programmer	1	200.00	200.00
Various Connectors and Elements	1	30.00	30.00
TOTAL			**$774.00**

There are some items that went over budget due to unforeseen costs related to necessary mid-cycle design changes, and underestimating the cost of shipping and currency exchange. We were able to procure some parts at no cost by re-using parts from previous projects and by engaging in the demonstration part testing program from Microchip**.** Due to some parts being cheaper than previously expected, such as the PIC programmer by $160, it was possible for us to afford a ZENA Wireless Network Analyzer to speed up the wireless development process.

Currently, the total project cost incurred is close to what we proposed in the project proposal. We are not expecting any further project costs to arise; it is safe to say we will be within budget.

Problems and Issues

There have been a couple of problems that have been resolved and some suspected future issues that will now be addressed. There was a problem procuring plumbing fittings/adaptors required for flow sensor installation. Eventually, we were able to source this part from McMaster Carr. We had not originally anticipated using this supplier as they no longer officially supply to Canadian customers. This was the only company that we could find that had these specialized fittings in stock. Unfortunately, these fittings are brass, and are thus much more expensive than we would like for their fairly unimportant role in our product. At about $3.00 each after shipping, considering that we require two for installation into each device, this is an appalling cost that we need to find a solution to upon commercialization.

The biggest problem we face currently is figuring out a good universal mounting solution for the LCD so that it does not interfere with the mirror typically placed behind faucets in the standard household. We originally on a design that would angle the LCD back, but we have found that this may not be feasible.

Our last challenges will be to fabricate the PCB, and to achieve successful installation into Sonca's home to test our product for real-world viability.