

We have finished the sensor research and testing phase. For the testing, which was shown in Demo 1, we investigated the sensors' "viewing" distances and widths. We have also powered up the Whirlpool UIs and made sure they are functioning correctly. Our sponsor, Mr. Jeffery, came to visit on November 4 and showed us how to use the WIDE bus to communicate with the UIs. The current concentration is to better understand how to communicate and control the appliance UIs. There is still a lot of work to be done.

Due to the amount of extraneous assignments, our group has had trouble concentrating on the actual project. This is disappointing since it is the fun part. Now that it is later in the semesters there is more time to work on the project and we expect to make a lot of progress in the next week or two.

The Whirlpool WIDE bus has been the most challenging part of the project thus far. Currently we are working with a Whirlpool development board and custom software that Mr. Jeffery gave to us. The Whirlpool development board is a tool Whirlpool uses to develop many different appliances. The board is the main bridge between a computer and the appliance. It has a lot of capabilities, but we will only have to use a limited subset of these. Use of the development board will include sending "button pushing" commands to the appliance UIs to control the power on/off and using the onboard A/D converters to hook up our sensors into the system.

The custom software provided is very complicated and this has presented a road block for us. The actual programming will likely not be very complex; it is the challenge of getting the software to work properly. This requires help directly from Mr. Jeffery because some of the software and all of the hardware is proprietary—we cannot find any information online to help us bridge gaps. Even with his visit and explanation we are still having problems. We will have further communication with Mr. Jeffery to work out the problems we have been having.

Our progress will accelerate after we figure out our problems in communicating and controlling the appliance UIs. We have been trying to figure out how to use the software provided to control the appliances through the Whirlpool development board.

Unfortunately, for some time we believed we were not using the software or hardware properly then we discovered one of the connectors had a wire loose. This set us back, but now we believe we have been able to get communication with the appliance UIs.

We still have not been able to demonstrate control of the UIs through the software. This is our main focus currently.

Our other focus is to show the use of an ultrasonic sensor to change information density for an LCD. According to Mr. Jeffery the programming of a LCD display is extremely complicated even for an expert, so he suggested we show how the ultrasonic sensors can change information density of a simulated LCD on a computer. For this task, we will be interfacing the ultrasonic sensor to a microcontroller. This microcontroller will communicate with a PC. We will create a Visual Basic environment to simulate a LCD UI from an appliance.

We currently have the hardware configuration working for this goal. We have been able to use the ultrasonic sensor and see the voltage output on an oscilloscope, so we know that the sensor is working properly. We are currently trying to figure out how to receive a five bit sequence instead of a single bit into Visual Basic. This is because the ultrasonic sensor output has a five bit output.

The next step in our project is to begin construction of an enclosure for the development board. Although, we may decide this to not be necessary since the development board is large and would never be a part of a manufactured, large volume product. We will definitely have to aesthetically integrate our sensors into the UIs. While it does not involve any electrical or computer engineering, this is one of the important parts of the project because Whirlpool and their customers are very concerned with the appearance of their appliances.

Schedule Update:

Task Name	Duration	Start	Finish
☐ Project Definition	10 days	Wed 9/2/09	Mon 9/14/09
Project Assignment	3 days	Wed 9/2/09	Fri 9/4/09
1st group meeting	1 day	Wed 9/9/09	Wed 9/9/09
1st contact with facilitator	1 day	Wed 9/9/09	Wed 9/9/09
Meeting with Sponsor	1 day	Mon 9/14/09	Mon 9/14/09
☐ Initial Research	27 days	Tue 9/15/09	Wed 10/21/09
Sensor Research	7 days	Tue 9/15/09	Wed 9/23/09
Wireless Research	1 day	Thu 9/24/09	Thu 9/24/09
Industry contact	1 day	Thu 10/8/09	Thu 10/8/09
WMDE training	1 day	Wed 10/21/09	Wed 10/21/09
☐ Conceptual Design	35 days?	Fri 9/4/09	Wed 10/21/09
Develop individual Ideas	7 days?	Fri 9/4/09	Sun 9/13/09
Team brainstorm	3 days	Mon 9/14/09	Wed 9/16/09
Narrow down choices	8 days	Thu 9/17/09	Mon 9/28/09
Finalize Design	0 days	Wed 10/21/09	Wed 10/21/09
☐ Component Acquisition	37 days	Tue 9/15/09	Wed 11/4/09
Acquire Sensors	5 days	Fri 10/9/09	Thu 10/15/09
Acquire User Interfaces	13 days	Tue 9/15/09	Thu 10/1/09
Acquire RF Devices	7 days	Thu 10/22/09	Fri 10/30/09
Acquire Initial Design Components	7 days	Tue 9/29/09	Wed 10/7/09
Acquire Intermediate Design Components	7 days	Tue 10/27/09	Wed 11/4/09
Acquire Final Design Components	7 days	Thu 10/22/09	Fri 10/30/09
☐ Testing and Analysis	26 days	Thu 10/8/09	Thu 11/12/09
Initial sensor testing	7 days	Fri 10/16/09	Mon 10/26/09
Evaluate sensor performance	2 days	Tue 10/27/09	Wed 10/28/09
WMDE integration	14 days	Thu 10/22/09	Tue 11/10/09
Initial Design Testing	8 days	Thu 10/8/09	Mon 10/19/09
Intermediate Design Testing	6 days	Thu 11/5/09	Thu 11/12/09
☐ Finalized Product production	24 days	Tue 11/10/09	Fri 12/11/09
Finalized Product Design	9 days	Fri 11/13/09	Wed 11/25/09
PCB Layout	8 days	Thu 11/26/09	Mon 12/7/09
Assembly of final components	4 days	Tue 11/10/09	Fri 11/13/09
Final testing	12 days	Wed 11/25/09	Thu 12/10/09
Final Product completion	1 day	Fri 12/11/09	Fri 12/11/09

Above is the updated Gantt chart for our schedule. We are currently running behind schedule, but we have made a lot of progress recently. We will be very busy up until Design Day but should be okay with respect to time.