Weekly Progress Report

Project Name: Energy Management System (EMS)
Date: September 13, 2015
Collaborators:

Andrew Cope, Computer Engineering major, ajc4630@rit.edu
Jacob Lauzon, Computer Engineering major, jfl4577@rit.edu
Donald MacIntyre, Computer Engineering major, djm4912@rit.edu
Ryan McLaughlin, Computer Engineering major, rpm6651@rit.edu

Project URL: TBD

Updated Milestone Chart:

Updates from previous revisions are italicized for clarity.

Task Description	Original Scheduled Completion Date	Responsible Team Member	Modified Completion Date	Comments
Critical Component Breakout Boards	8/24/2015	RM, DM	9/28/2015	Critical component breakout boards have been completed for all functions except PLC.
User Interface Implementation	8/24/2015	JL, AC	9/28/2015	Rest of system does not heavily depend on webapp so completion delay is not a large factor.
Web App Database Communication	8/24/2015	AC, JL	9/13/2015	*The web application is able to communicate with the database using Hibernate (An Object-Relational Mapping library for Java)*
Order Parts	8/24/2015	All	9/28/2015	*Two PLC evaluation boards have been acquired. Unfortunately one of the evaluation boards does not work.*

Task Description	Original Scheduled Completion Date	Responsible Team Member	Modified Completion Date	Comments
				Team is working with Becker-Gomez in order to determine next best course of action.
Initial PCB Design	8/31/2015	DM	9/6/2015	Focusing efforts on vero-boarding initial hardware design instead of PCB design. Breadboard has been constructed. PCB may still be constructed if time permits, but based on summer slippage time for spinning PCB my not be available. Completion of breadboard has met the intent of this task.
Obtain and Verify Parts	9/7/2015	All	9/20/2015	All parts except PLC have been received and verified. *Completion date has been pushed back as received evaluation PLC boards are not functioning properly.*
Verification of Power Supply Circuitry	9/14/2015	DM		On schedule
Verification of Breadboard Load Switch	9/14/2015	DM		On schedule
Verification of Breadboard Current Sense	9/21/2015	DM		On schedule
Verification of Breadboard Voltage Sense	9/21/2015	DM		On schedule
Outlet Communication with PLC	9/28/2015	RM		*Evaluation boards have been acquired. One of acquired PLC evaluation boards is not functioning correctly.*

Task Description	Original Scheduled Completion Date	Responsible Team Member	Modified Completion Date	Comments
Interface PLC with Pi	9/28/2015	RM, JL		*Team has decided to acquire PLC evaluation boards.*
Verification of Breadboard Processor	10/5/2015	All		On schedule
Final PCB Design	10/19/2015	All		
Finalized Database Structure	10/19/2015	AC, JL	9/28/2015	This will be a result of the webapp completion.
PI PLC API	10/26/2015	RM, AC, JL		Deciding best approach still a subject of team meetings.
System recognizes new outlets automatically	11/2/2015	All		
Send Hardware Measurement over PLC	11/9/2015	RM, JL, DM		
Receive and store measured data	11/9/2015	AC, JL, RM		
View measured data	11/9/2015	JL, AC		
Toggle state of single outlet from web interface	11/16/2015	All		
Toggle state of a group of outlets	11/16/2015	All		

Task Description	Original Scheduled Completion Date	Responsible Team Member	Modified Completion Date	Comments
Outlets and groups follow schedule	11/16/2015	All		
Data Compression Verification	11/16/2015	AC		
Full system test passed	11/25/2015	All		

Current Milestones:

Task Description	Original Scheduled Completion Date	Responsible Team Member	Modified Completion Date	Comments
Critical Component Breakout Boards	8/24/2015	RM, DM	9/28/2015	Critical component breakout boards have been completed for all functions except PLC.
User Interface Implementation	8/24/2015	JL, AC	9/28/2015	Rest of system does not heavily depend on webapp so completion delay is not a large factor.
Web App Database Communication	8/24/2015	AC, JL	9/13/2015	*The web application is able to communicate with the database using Hibernate (An Object-Relational Mapping library for Java)*

Task Description	Original Scheduled Completion Date	Responsible Team Member	Modified Completion Date	Comments
Order Parts	8/24/2015	All	9/28/2015	*Two PLC evaluation boards have been acquired. Unfortunately one of the evaluation boards does not work. Team is working with Becker-Gomez in order to determine next best course of action.*
Initial PCB Design	8/31/2015	DM	9/6/2015	Focusing efforts on vero-boarding initial hardware design instead of PCB design. Breadboard has been constructed. PCB may still be constructed if time permits, but based on summer slippage time for spinning PCB my not be available. Completion of breadboard has met the intent of this task.
Obtain and Verify Parts	9/7/2015	All	9/20/2015	All parts except PLC have been received and verified. *Completion date has been pushed back as received evaluation PLC boards are not functioning properly.*

Next Milestones:

Task Description	Original Scheduled Completion Date	Responsible Team Member	Modified Completion Date	Comments
Critical Component	8/24/2015	RM, DM	9/28/2015	Critical component breakout boards have been completed

Task Description	Original Scheduled Completion Date	Responsible Team Member	Modified Completion Date	Comments
Breakout Boards				for all functions except PLC.
User Interface Implementation	8/24/2015	JL, AC	9/28/2015	Rest of system does not heavily depend on webapp so completion delay is not a large factor.
Order Parts	8/24/2015	All	9/28/2015	*Two PLC evaluation boards have been acquired. Unfortunately one of the evaluation boards does not work. Team is working with Becker-Gomez in order to determine next best course of action.*
Obtain and Verify Parts	9/7/2015	All	9/20/2015	All parts except PLC have been received and verified. *Completion date has been pushed back as received evaluation PLC boards are not functioning properly.*
Verification of Power Supply Circuitry	9/14/2015	DM		On schedule
Verification of Breadboard Load Switch	9/14/2015	DM		On schedule

Status

Difficulties:

Have obtained a PLC evaluation board but one of the two obtained PLC boards will not power on. Basic debugging has occurred as follows:

1. Perform a continuity test (with no power applied) to verify that the AC line in power is making it onto the board. Continuity test results indicate that there are no loose connections despite loose connector.
2. Perform a continuity test (with no power applied) to verify that the fuse, (F1) located on the evaluation board is not blown. Continuity test results indicate that the fuse is functioning properly.

Team has reached out to Dr. Becker-Gomez regarding best course of action going forward regarding possibly receiving a replacement board or getting current board repaired.

Surprises

PLC board request was accepted and processed very quickly. A larger surprise however, was one of the acquired PLC evaluation boards did not work.

Successes:

Parts have been obtained and vero-boarding construction of remote outlet prototype circuits is almost complete (except for PLC).

Serious progress has been made on the web app. The Hibernate and Spring configuration is complete and working, meaning that the web app can talk with the database. The User Interface implementation has begun.

Questions/problems for consideration:

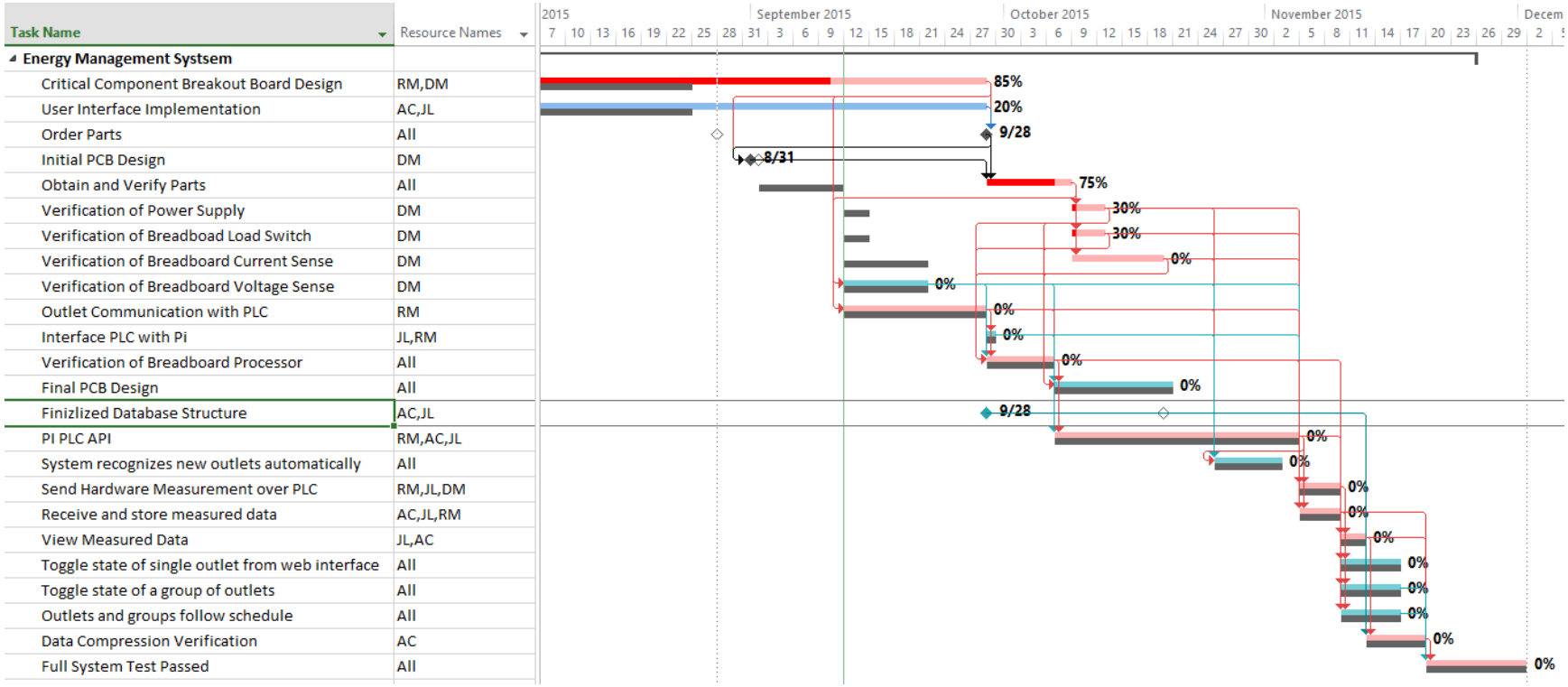
We have decided not to make an overall PCB but to develop a working hardware prototype on vero-board which can be used to demonstrate the functionality of the system, and if time/budget permits then complete a PCB design.

Based on group meetings and discussions it has been determined that attempting to obtain a PLC evaluation kit is the best approach.

We are making a design change within the web application. We are switching from using the Python based Django framework to the Java based Vaadin framework. This is being done because the team is more familiar with Java and the Vaadin

framework and also because Java is a more powerful platform for development. This means we will need a way for the Java app to talk to native Python scripts running on the Raspberry Pi (possibly Jython) and that the web application will use significantly more system memory. Some additional tests will be run in the near future to ensure the memory usage is not too high.

Gantt Chart:



Task Name	Resource Names
Energy Management Systsem	
Critical Component Breakout Board Design	RM,DM
User Interface Implementation	AC,JL
Order Parts	All
Initial PCB Design	DM
Obtain and Verify Parts	All
Verification of Power Supply	DM
Verification of Breadboad Load Switch	DM
Verification of Breadboard Current Sense	DM
Verification of Breadboard Voltage Sense	DM
Outlet Communication with PLC	RM
Interface PLC with Pi	JL,RM
Verification of Breadboard Processor	All
Final PCB Design	All
Finizlized Database Structure	AC,JL
PI PLC API	RM,AC,JL
System recognizes new outlets automatically	All
Send Hardware Measurement over PLC	RM,JL,DM
Receive and store measured data	AC,JL,RM
View Measured Data	JL,AC
Toggle state of single outlet from web interface	All
Toggle state of a group of outlets	All
Outlets and groups follow schedule	All
Data Compression Verification	AC
Full System Test Passed	All