

## CyWi: Open-Source Wireless Innovation Lab for Smart Ag, AR/VR, and Beyond

**Team Number:** sddec19-02

**Client:** Dr. Hongwei Zhang

**Faculty Advisor:** Dr. Hongwei Zhang

### Team Members

Chenye Lim                      Ryan Cullinan

Jian Chew                        Shay Willems

Pawel Darowski                Tyler Beder

### Dates

March 2 to March 8, 2019

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### Weekly Summary

This week, the team looked at finalizing hardware decisions. We put together a list of considerations for comparison including CPU, memory, storage, wireless performance, OS, programming environment/tools (including a necessity to being open-source), expected lifetime of the solution, and community support. We compared three vendor options and found that the Texas Instruments CC26X2R1 Launchpad evaluation kit performs best on all specifications. This will be the hardware that we'll present to the client for our CPS/IoT component. We also compared node controller options such as MintBox versus NUC mini computers. MinBoxes are less expensive but their performance pales in comparison to Intel NUC7s and NUC8s.

The team continues to define our wireless research testbed and the features it could support. Some of the features include possible concurrent experiments being run and support for real-time GUI experiments. We are putting together a list of features and big ideas so we have a lot to choose from, but realistically we'll have to weed some features out in order to finish the project by the deadline. Researching the Powder and ORBIT testbeds is providing us with examples and will help us determine which features are appropriate for our testbed.

### Accomplishments

- Pawel - Compared hardware specifications of a Texas Instruments, Qualcomm, and NXP solution as well begun in depth research of SimpleLink and TI-RTOS
  - Qualcomm's documentation and community support seems to be lacking.
  - NXP has less powerful MCU and documentation/community is rather small.

- Texas Instruments seems to be the ideal hardware choice for our CPS/IoT hardware. It has a powerful ARM Cortex-M4F MCU, plenty of RAM and flash, comes with an open-source TI-RTOS, and has plenty of documentation and community support. I spent time reading through the SimpleLink and TI-RTOS user guides and other documentation.
- Pawel - Continued to research the ORBIT testbed implementation
  - ORBIT has great documentation and tutorials for how to use their testbed. It defines how to write and use scripts to run their experiments.
  - Signed up for an ORBIT account early in the week but haven't yet been confirmed.
- Ryan - researched about how POWDER works and researched what NUCs to use
  - Successfully reserved resources for POWDER
  - Attempted to run a experiment
  - Ran cost benefit for NUCs

### Pending Issues

- Pawel - Pending ORBIT account verification to run some test experiments.

### Individual Contributions

Team Member	Contribution	Weekly Hours	Total Hours
Chenye Lim	Contacted TI support to finalize orders for CC26X2R1. Helped research technology that will be used for CyWi testbed.	7	21
Jian Chew	Spent time on reading OAI profile documentation.	3	19
Pawel Darowski	Compared three vendors' dev kits, read Texas Instruments guides/tutorials, opened TI support case to verify open-source RTOS support, and researched ORBIT experiment scripts	6	34
Ryan Cullinan	Cost benefit for NUC's and POWDER research	6	20
Shay Willems	Helped research software platforms, NUC7/8	6	23
Tyler Beder	Compared hardware specs	2	15

**Plan for Coming Week**

- Jian - Give a simple tutorial about OAI experiment on Powder.
  - Reserve node to run an experiment for the tutorial.
- Begin ordering Texas Instruments CC26X2R1 Launchpads
- Continue fleshing out our testbed features
- Order NUCs