EE/CprE/SE 492 BIWEEKLY STATUS REPORT 4

February 24, 2020 – March 12, 2020

Group number: 37

Project title: **Open-Source Prototyping of Advanced Wireless Systems for Smart Agriculture and Connected Rural Communities**

Client &/Advisor: Hongwei Zhang, Matthias Sander-Frigau

Team Members/Role: Zequn Wang – Meeting Scribe
Dylan Sharp – Meeting Facilitator
Jiawei Deng – Chief Engineer
Zhenwei Su – Report Manager
Shaohang Hu – Test Engineer
Yulin Song – Test Engineer

- **Bi-Weekly Summary**

We heard back from our industry sponsor and they would not give us the source code to their driver implementations due to privacy reasons. Due to this our advisor told us that they would try to implement their code within the driver linking to a shared library and that we should do the same with our implementation. In addition to that the last two weeks have been busy for the team in regard to midterms and projects in other classes, so our velocity was a little slower than we would have liked.

- **Past week accomplishments**
  - Jiawei Deng
    - Improving Pseudo Code for PRK Scheduling.
      - Finished Pseudo Code for part “Link Reliability Estimation"
      - Developed parameters for the input of the code by referencing Shaohang’s work (https://git.ece.iastate.edu/sd/sdmay20-37/issues/14#note_36590) last biweek.
  - Yulin Song
    - Clarify misunderstanding parts of the PRK S algorithm
    - Read Prof. Zhang’s TinyOS implementation.
    - Understand how TDMA communicate with the PRKS
    - Check with Jiawei’s pseudo code to add missing parts for each box of the PRK S algorithm.
  - Shaohang Hu
    - Understanding the code of the cfg80211 and nl80211.
    - Identifying functions that required for PRKS algorithm.

        - Deep more into ONAMA scheduling algorithm.
    - Zhenwei Su
        - Study the tx.c and rc.c to look for the functions that we need, some confirmed, some not.
        - Study mlme.c and try to define own management frame
    - Zequn Wang
        - Study mac80211 source code and its use, and other knowledge relative to receive and sent packet.
        - Looking into the tx.c and rx.c files, and find the function that we need to use in our algorithms. Such as how to create mesh connection and check transfer status.
        - Summary knowledge about those files and their functions.
    - Dylan Sharp
        - Started writing ONAMA Pseudocode and reading over PRKS to help with the PRKS.
        - Continued reading up the MAC80211 driver implementation

- **Pending issues**
- Still have not defined which functions we will need to edit. For sure within functions along the Rx and Tx paths but those need to be defined
- Implement pseudo code into the kernel
- Build an architecture work which contains the shared library so that we can use to implement our code.
- Industry sponsors source code for implementation on top of the TVWS.

- **Individual contributions**

NAME	Individual Contributions	Hours this bi-week	HOURS cumulative
Zequn Wang	1. Learn mac80211 source code and how to use it, and other knowledge relative to receive and sent packet. 2. Post some useful link about how mac80211 work, how to receive and sent packets and what kind of function will be used.	10	37
Dylan Sharp	1. Started on ONAMA Algorithm 2. Reading more documentation	9	43
Shaohang Hu	1. Under standing of the cfg80211 and nl80211 code.	9	41

	2. Identifying the functions and parameters that need for the PRKS algorithm. 3. Understanding the data parsing from the Linux kernal space by reading the "Wireless tools" by hp Labs. 4. Understanding more about ONAMA.		
Zhenwei Su	1. Study rx.c and tx.c 2. Define mlme.c	10	38
Jiawei Deng	1. Improved Pseudo Code for PRK Scheduling. 2. Combine Shaohang's work to the input in the Pseudo Code.	12	47
Yulin Song	1. Read Prof. Zhang's TinyOS implementation. 2. Improve pseudo code	10	34

- **Comments and extended discussion**

- **Plans for the upcoming bi-week**
  - As a team the main goal for will be making sure everyone has a good understanding of PRKS algorithm and a beta version of our pseudo code done. Along with that will attempt to tie in where we will be getting specific parameters from data structs or functions within the kernel.
  - Shaohang Hu
    - nl80211 will be the next big focus.
    - Implementation of PRKS.
  - Zequn Wang
    - Working with Zhenwei, looking into the pseudo code and combine my knowledge with tx.c and rx.c file to implement the algorithm.
  - Jiawei Deng
    - Keep improving Pseudo Code, cooperate with Dylan to finish TDMA (ONAMA) Scheduling part.
    - Cooperate with Zequn and Zhenwei to figure out the input of broadcast functions, etc from their source code.
  - Dylan Sharp
    - Help with teams' main goal by focusing on learning and teaching the team about PRKS more. Along with that, help implement pseudo code.
    - Compile OpenWrt Toolchain for the version we are using
    - Atempt to compile whole OS again.
  - Yulin Song:
    - Read Prof. Zhang's TinyOS implementation.
    - Keep improving Pseudo Code, cooperate with Dylan and Jiawei about PRKS and linkage to TDMA implementations.
  - Zhenwei Su:
    - Study shell libraries
    - Give completed and all the possible functions that we need.