EE/CprE/SE 491 WEEKLY REPORT 06

01/16/2019 – 01/30/2019

Groupnumber: ***sdmay2036***

Project title: ***Open-Source Prototyping of 5G Wireless Systems for Unmanned Ground and Aerial Vehicles***

Client &/Advisor: ***Hongwei Zhang***

Team Members/Role:

Andrew Eschweiler – *Algorithm Dev.*

William Byers – *Algorithm Dev.*

Nathan Whitcome – *OAI Integration Dev.*

Samuel Stanek – *OAI Integration Dev.*

Ibrica Tutic – *Project Manager*

Nicholas Lorenz – *Quality/Performance Analyst*

- **Weekly Summary**

  We are still working on updating to the new simulator and figuring out the architecture of the new version of OAI. OAI went a large architectural split from the version that we were familiar with vs the new version that we are using, so we are still in the process of figuring out where we would put our physical layer abstraction/SUMO layer in OAI. Furthermore, we have started working on using SUMO to move positions of nodes represented as structs with X and Y positions in C code. This will hopefully help us when we get to the final integration portion of the project.

- **Summary of Weekly Advisor Meeting**

In the meeting with the advisor, we went more over the different roles that the team members should have and everyones roles in the projects. In general, there is a team working on physical layer abstraction, a team working with the simulator and trying out different simulations and configurations and a team that is working on getting data from SUMO so we can use a client-server type architecture to transfer SUMO data to OAI.

- **Past week accomplishments**
  - **Ibro:** Worked on the porting of the physical layer abstraction from version .5.2 to v1.2.0. Began understanding the relevance of various tables needed for BLER and SNIR estimations that use node positional data to estimate channel conditions. Began moving this code over and updating the code used to parse the table and return the values that are appropriate for current channel conditions.
  - **Will:** Worked on familiarization with OAI v1.2.0 code and determining areas from earlier investigations that have changed in the identified MAC layer files. Began trying to identify possible ways of implementing the algorithm in the current codebase.
  - **Nathan:** Worked on setting up OAI 1.2.0 and setting a plan for myself in the future. The first few weeks of the semester are really busy for me so I haven't had much time to work on the project.
  - **Sam:**
  - **Drew:** Worked on setting up OAI 1.2.0 and getting it to run.
  - **Nick:** Worked on the power equation and how I would install it.
- **Pending issues**
  - Understanding the differences between OAI .5.2 and 1.2.0
  - Getting OAI v1.2.0 running
  - Creating the physical layer abstraction needed for multi-node/multi-enB single machine setups
- **Individual contributions**

Name	Individual Contributions	Hours this period	Hours cumulative
Andrew Eschweiler	VM setup for OAI, need to install OAI	3	3
William Byers	OAI code familiarization, algorithm design preliminary work	10	10
Nathan Whitcome		3	3

Samuel Stanek	Working on SUMO integration for newer version of OAI. Testing C libraries made for TraCI in previous verison with my c client.	10	10
Ibrica Tutic	OAI v1.2.0 install, working more on understanding the differences in the physical layer interface for .5.2 vs 1.2	18	18
Nicholas Lorenz		3	3

- **Comments and Extended Discussion**
  - Work is still being done on moving the physical abstraction layer code over to v1.2.0. This is needed for full scale simulation and validation in OAI. There is a lot of work to be done in just understanding the architectural differences between the old version of OAI and the new ones, so we will need to be sure we understand all of the objects in use (essentially how to configure the UE's and eNB's in the code) and any major differences in code between the two versions. In general, there is almost no similarity between the two code bases, aside from some legacy code that hasn't been removed that may be of interest to us.

- **Plans for the Upcoming Period**
  - **All:** Continue work on porting physical layer simulation layer over to v1.2.0. Work on SUMO server/client interface. Work on managing UE node locations using x,y coordinates of structs in the code.
  - **Ibro:** Work on moving over the files and tables needed for physical layer abstraction from v.5.2 to v1.2.0. There are large differences between the interfaces that control the flow of information from the actual PHYS layer and the layer above it in v.5.2 and v.1.2.0. I am collaborating with Fancheng (a master's student at ISU) for part of this work since he is blocked until it is done.
  - **Will:** Identify a way that the team can interface data from the PHY abstraction into the MAC layer of OAI. Finding a way to implement the scheduling algorithm that plays nicely

with OAI's current code base is going to be extremely difficult, so this will probably come after trying to get SUMO and the PHY abstraction finished. Clarify with advisor if the new algorithm replaces Round Robin or works above it. Focus on helping others with SUMO and PHY layer abstraction work.

- **Sam:** Continue going through left over SUMO code in OAI to figure out where to integrate the C client. Use the TraCI libraries that OAI has for C in the small C client, which will eliminate the need for a python script to start SUMO. Try to run different versions of OAI that don't use physical layer abstraction and try to run SUMO with it.
- **Nathan:** Continue to work on installing OAI 1.2.0 and talk to my other teammates to understand what our plan is for the semester.
- **Drew:** Install OAI 1.2.0 and test to see if I can get it to run properly.
- **Nick:** Go over equation again.