EE/CprE/SE 491 WEEKLY REPORT 08
01/31/2020 – 02/15/2020

Group number: **sdmay20-36**

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*

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o **Weekly Summary**
Continued working on porting over the physical abstraction layer from the old version of OAI to the most recent version. This work primarily involved determining what files are relevant for PHYS abstraction and putting them in the proper directories in the new version. This also involves rebuilding the make files to ensure that the PHYS abstraction layer is compiled properly and has all of the required dependencies (both within the source code and external dependencies). The build script was also modified to include flags to build with PHYS abstraction.

o **Summary of Weekly Advisor Meeting**
Discussed more way we can break the project up so we can move in parallel to make as much progress as we can. Also talked more about potentially splitting up the PHYS abstraction work to allow for other people to take smaller chunks of works without needing to know how the whole simulator works. We also organized more tasks on Trello to help keep track of progress on the individual part needed for the final project.

o **Past week accomplishments**

- **Ibro:** Moved over files relevant to physical layer abstraction from OAI v.5.2 to v1.2.1. Began rebuilding the make files to compile files relevant to oaisim. Started on dependency analysis and figuring out what files need to be modified to make the two difference architectures work with each other
- **Will:** Per our advisor's guidance, read through PRKS algorithm paper again. Documented processes and procedures in as much detail as possible. Began reading through CPS and documenting processes and procedures. Started to compare the differences to determine the differences between the two algorithms.
- **Nathan:** Looked at the newest version of OAI that recently came out. Switched to working on a C program that takes input from the program Sam is working on and graphs it so we have a visual of what is going on.
- **Sam:** Worked on implementing the older OAI versions TraCI library for C so that we can eliminate the need for a python script. Worked more on analyzing older SUMO files from OAI to determine which ones are necessary for the information we need to relay, will be able to cut out a lot of it since we don't need most of the SUMO functions in OAI.
- **Drew:** Setting up OAI 1.2.0 and getting it to run.
- **Nick:** Figured out that I need to use the info that I get directly from the system to do proper power calculations

- o **Pending issues**
- o **Individual contributions**

Name	Individual Contributions	Hours this period	Hours cumulative
Andrew Eschweiler	Looked at PKRS algorithm and setting up OAI on VM	10	60
William Byers	Analyzed PRKS processes/procedures	12	88
Nathan Whitcome	Looked at new version of OAI, worked on C graph program	10	73
Samuel Stanek	Finishing up implementing TraCI C libraries to eliminate use of python script to improve latency and compatibility with new version of OAI.	10	84
Ibrica Tutic	Moved files needed for PHYS abstraction, began compiling, added additional flags to build script to compile PHYS abstraction layer	14	116
Nicholas Lorenz	Figured out that I need to use the info that I get directly from the system to do proper power calculations	9	55

- o **Comments and Extended Discussion**
  - PHYS layer abstraction dependency analysis might take a while depending on how much stuff has changed between the two versions. An initial glance suggests that a

lot of the files references from PHYS abstraction in v.5.2 are present in v1.2.1, which is good, but the method signatures need to be verified/validated to make sure that the old PHYS abstraction layer functions as expected. There are some files that have been moved and replaced so work will need to be done to figure out what other files need to be modified to work with PHYS abstraction from v.5.2 and to maintain functionality when switching to the actual PHYS layer.

- ○ **Plans for the Upcoming Period**
  - **All:** Make progress on areas determined with advisor's input.
  - **Ibro:** Continue dependency analysis on files relevant to compiling PHY abstraction from OAI v.5.2. This will include determining what files are missing and what files had their method signatures changed (I.e. no longer compatible with what the functions from OAI v.5.2 are expecting). Will also work on splitting out the PHYS abstraction work into well-defined smaller tasks to allow other people outside of our team to assist.
  - **Will:** Finish analyzing the CPS algorithm and documentation. Create a comparison between PRKS and CPS. Analyze UCS and document its procedures and processes. Create a comparison between PRKS and UCS.
  - **Sam:** Finish up implementing TraCI libraries for C client and get rid of the python script. Newer version of OAI has eliminated a good portion of the SUMO files I have been looking at in the previous version, so I will be finding out the files we need to port over to the new version to get the minimum SUMO functionality.
  - **Nathan:** Work more on the C graphing program. Start by getting it to show basic data and make it work with the kinds of data that we will be getting in. Eventually figure out how to connect it to the system.
  - **Drew:** Continue to research the OAI algorithm and finish testing with OAI 1.2.0
  - **Nick:** Figure out if I can use system data from the transmitter as well as have a running average of the assumed power usage.