EE/CprE/SE 491 WEEKLY REPORT 05
11/1/2019 – 11/14/2019

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**

We have completely changed version of simulators which has introduced some more issues. We are moving from version v.5.2 to v.1.1.1, which means upgrading operating systems and redoing the initial set up steps. This involves removing and power saving features, disabled C-states and hyperthreading from the BIOS and operating system. The new version of OAI also requires more dependencies, so all of those need to be installed and gathered to begin running the simulations.

o **Summary of Weekly Advisor Meeting**

There are major issues with working with v.5.2 of OAI, so our advisor suggested we move to version v1.1.1. This version is 2-3 years newer, so it requires a different version of Ubuntu and has different installation steps. Support for SUMO has been removed, although the files still exist. We also will need a physical layer interference generating simulator from the older branch, so it might need to be ported over if similar functionality can't be created in the new version of OAI. This is the work of another senior design team so there might be dependence of our project on theirs if we want near real world simulations.

- o **Past week accomplishments**
  - **Ibro:** Installed Ubuntu 16.04 for OAI v1.1.1. Configured low latency kernel and OAI dependencies. Began physical layer simulator analysis and potential porting. Look more at how SUMO might interface with the version of OAI.
  - **Will:** Read through new resources, began creating documentation of OAISIM interfaces and how/where they connect to OAI to prepare for the porting.
  - **Nathan:** Read through part of a book on network systems recommended by our teacher. Continued to get SUMO working.
  - **Sam:** Ran SUMO simulations created by the web tool and found out how to edit configuration files to add sockets and create dump files for positional data
  - **Drew:** Installed SUMO and worked on Setting up VM
  - **Nick:** Tested my simple equation for finding the power of the wireless systems for the cy-network
- o **Pending issues**
  - Potential OAI physical layer (oaisim) porting from v.5.2 to v1.1.1. This is another teams work. Running OAI successfully still hasn't been done yet.
- o **Individual contributions**

Name	Individual Contributions	Hours this period	Hours cumulative
Andrew Eschweiler	Setting up VM forOAI	4	47
William Byers	Began OAISIM documentation	5	56
Nathan Whitcome	Got SUMO working individually	5	52
Samuel Stanek	Ran SUMO and found out how to create dump files with positional data through configuration files	8	52
Ibrica Tutic	OAI v1.1.1 installed on Ubuntu 16.04 with low latency kernel. OAI dependencies installed and physical layer simulator interface investigated for potential porting from v.5.2	15	79
Nicholas Lorenz		3	50

- o **Comments and Extended Discussion**
    - The scope of our project changed slightly again, and we have pivoted to a new version of Open Air Interface under the guidance of our client. This new version includes new features and requires a new operating system and dependencies, meaning some work that was previously done to get all of this set up will need to be repeated.
    - Our project might rely on the results of another senior design team that is porting over a physical layer simulator from an earlier version of OAI (called oaisim). This simulator is needed to have near real-world simulations by introducing real-world interference to the wireless network.
    - Newer versions of OAI have been developed without updating SUMO. This means that the old version which potentially had a working version of the interface between SUMO and OAI will not work anymore. Initial conversations with a top contributor to the repository indicate that this may be difficult.

- o **Plans for the Upcoming Period**
    - **All:** Continue work on porting physical layer simulation layer over to v1.1.1. Work on SUMO server/client interface.
    - **Ibro:** Continue working on getting OAI fully running. Dependencies should be completely installed. There are some known issues with running OAI on a virtual machine so hopefully don't run into those problems. Going to install Ubuntu 16.04 with correct cpu settings and kernel on lab machine just in case virtual machines are infeasible.
    - **Will:** Finish documenting all interfaces of OAISIM into OAI, then analyze where those interfaces appear in v1.1.1. Determine if it is better to wait for other team's port, or if we can develop a temporary solution until then.
    - **Sam:** Create a small c client to open a connection to SUMO that will print out traffic info every second/millisecond. This data will include node id, x and y positions, and time stamps if they exist.
    - **Nathan:** Figure out how to pipe SUMO data live.
    - **Drew:** Finish installing OAI on the VM and verify it works
    - **Nick:** Install simple equation on the actual systems and get it working.