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## **EE/CprE/SE 491 WEEKLY REPORT 03**

**10/12/2019 – 10/18/2019**

**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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### ○ **Weekly Summary**

The team spent most of its time on looking more at the algorithm and how to integrate it into OAI. The OAI network stack is extremely large and code is rarely commented, so it has been difficult to try and find how it all works together. We also set up the server to run OAI and disabled any features that might alter the state of the CPU (change its frequency) to avoid any issues with OAI simulation. We also installed a low latency kernel and followed OAI instructions to make sure we have a server that is ready to simulate networks.

### ○ **Summary of Weekly Advisor Meeting**

Spoke with our advisor more on the design of the project and how to use OAI and SUMO. He got us in contact with a student of his that has experience setting up OAI and he sent us instructions on how to get started. We also talked more about various roles in our team, especially for features around EE related topics.

Talked more about using NS3 instead of OAI, but since we will need to use OAI during hardware simulation, we are going to need to bite the bullet and try to get SUMO to integrate with OAI by hand. It seems that there are some legacy files left over from previous SUMO support so we will need to see if these files are actually hooked up to anything or if they are just left over from when somebody ripped out the SUMO functionality in a version prior to v0.5.2.

- **Past week accomplishments**

- **Ibro:** Audited NS3, it seems that it could work for simulations but not for hardware work. Set up the server needed to run OAI (low latency kernel, CPU frequency modulation features disabled, SSH access for our team, etc). Started analyzing OAI/SUMO integration, because it looks like there are some files left over from prior SUMO support.
- **Will:** Familiarized much more with the OAI code base and took more detailed notes on how various parts are connected.
- **Nathan:** Worked with Ibro to set up a headless server running Ubuntu 14.04, allowing ssh, and installing a low-latency Linux kernel. Couldn't do much else due to having my grandfather pass away and spending time with my family.
- **Sam:** Continued testing with SUMO on personal computer and watched multiple tutorials and guides on how to better understand it.
- **Drew:** Installed and used SUMO
- **Nick:** This week I learned about using SUMO and OAI together and how its done.

- **Pending issues**

- OAI Codebase is poorly documented, makes it hard to navigate and familiarize with. That being said, there isn't much we can do outside personal documentation.

- **Individual contributions**

<b><u>Name</u></b>	<b><u>Individual Contributions</u></b>	<b><u>Hours this period</u></b>	<b><u>Hours cumulative</u></b>
Andrew Eschweiler	Installed SUMO and researched algo.	4	37
William Byers	OAI Codebase Investigation	4	41
Nathan Whitcome	Worked with Ibrica to set up the server.	3	39
Samuel Stanek		4	41
Ibrica Tutic	Set up server, installed ubuntu 14.04 with low latency kernel, ns3 audit and OAI/SUMO integration	8	47
Nicholas Lorenz	Looked up GPS	6	42

- **Comments and Extended Discussion**

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- **Plans for the Upcoming Period**

- **All:** Plans
- **Ibro:** Continue investigating the legacy files left in OAI v0.52. The SUMO files seem to be built to support SUMO out of the box, but whether they are hooked into anything or not is still left to be seen. OAI seems to support SUMO, but they lost support somewhere in their lifetime so need to figure out if those files are actually working or if they were just left there

from some legacy code. Either way we should be able to use the file if needed to get our own stuff set up.

- **Will:** Begin writing up a diagram to map out the structure of the OAI code for everyone. This will allow those less familiar with the design to more easily find specific parts or implement interfaces in the future. Create a local Git repository for the the tagged v0.5.2 of OAI and begin preliminary design such as repo setup, pseudocoding, etc.
- **Sam:** Start looking into how we can connect SUMO and OAI. Look into last version of OAI to see how they integrated SUMO to see if we could learn anything from it. Get OAI running on the virtual machine so we can start running tests remotely.
- **Nathan:** Run more SUMO tests and try to figure out how SUMO sends data so that I can work to write an API that allows SUMO to communicate with OAI. Investigate old code in OAI that had to do with SUMO integration and see how much that can help with what we are trying to accomplish.
- **Drew:** Continue work with SUMO and learning more about algo.
- **Nick:** See if I can find out a way to determine the power usage of the cyнет network from the output signals. Work with Sam and Nathan on SUMO.