



## PAWR Project Office

November 2023

Welcome to the monthly PAWR update. Each month we deliver technical updates on: [POWDER](#), [COSMOS](#), [AERPAW](#), [ARA](#), and [Colosseum](#).

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### POWDER

The POWDER team is continuing to run tests with newly acquired COTS radio units in combination with open source 5G software stacks. The latest configuration enabled includes a Quectel device as user endpoint, a Benetel COTS RU (indoor), srsRAN-powered DU and CU, and an Open 5GS core.

The team is also currently supporting the latest O-RAN Alliance plugfest.

For the latest research papers referencing POWDER, please see the [publication list](#) on the POWDER site.

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## COSMOS



The COSMOS team continues to expand its outdoor deployment with trenching currently underway (see above) for a medium node site on the edge of campus at City College of New York.

In research, an [NTT publication](#) based on a project using the COSMOS testbed was recently recognized as a best paper at the 49<sup>th</sup> European Conference on Optical Communications (ECOC). The paper was based on a field demonstration of optical wavelength path provisioning technology for on-demand high-capacity/low-latency connections among data centers. Results of the demonstration were also presented at the TIP Fyuz event in Spain.

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## AERPAW

AERPAW has now named the finalists for its AERPAW Find a Rover (AFAR) drone challenge. In the competition, students were asked to use an unmanned aerial vehicle (UAV) outfitted with a software-defined (SDR) radio to localize the signal from an unmanned ground vehicle (UGV). Competitors were given the antenna patterns for both the transmitter and receiver antennas, as well as a geographical map of the test environment. Participants then had the option to use fixed waypoints for a UAV test run to find the UGV, or to develop their own trajectory update algorithm for instructing which order of waypoints the UAV should fly based on the observed signal strength from the UGV signal source.

For information on the finalists and their varied approaches to the challenge, please see the [writeup on the PAWR website](#). The teams have worked in the AERPAW development environment to date. Field testing and demonstration of the proposed solutions will take place over the coming weeks.



The AERPAW team was out and about in November. Professor Rudra Dutta was honored to participate in the 2023 5G Summit in Taiwan to provide the AERPAW team's views on wireless testbeds and experimentation with Open RAN systems! Dr. Guvenc and Dr. Mushi attended the [joint OSC/OSFG-OAI Workshop: End-to-End Reference Designs for O-RAN](#) to learn more about O-RAN and its ongoing efforts.

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## ARA

For the first time in November, Xun Li (UCI) and Nadim Md (ISU) from the ARA team were able to push data through the AraOptical link, with stable pings and iPerf data rates at about 170 megabits per second. Further optimization and study will be performed to increase the throughput. This is an important milestone for research and experiments into high-capacity wireless terrestrial wireless x-haul systems, and it is the first such success in open, programmable free-space optical communications.



Elsewhere on the ARA testbed, team members Joshua Ofori-Boateng and Tianyi Zhang successfully established working open source 5G links. These links use OAI code on top of SDRs at both the base station and the UE sites in the network, meaning they are programmable down to the waveform. Currently there are two UE sites enabled at Curtis Farm, and testing is underway with additional UEs at Agronomy Farm at distances of 600 meters and 1,000 meters from the base station.

ARA is now offering office hours! ARA team members will be available for questions and support every Thursday from 4:15 to 5:00pm CST. To attend, visit the [WebEx link](#).

In other news, a recent [ARA article](#) on rural wireless channel measurement won the Best Paper Honorable Mention Award at the 2023 *IEEE Future Networks World Forum* on November 14. ARA also welcomed Dr. Ali Hussein this month, who joins the team as a software engineer and visiting scholar.

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## Colosseum



The Colosseum team at the Institute for the Wireless Internet of Things at Northeastern University has received the O-RAN ALLIANCE first seed funding project for the proposal "O-DT: O-RAN Digital Twin to Automate O-RAN End-to-End AI/ML Development and Testing on Colosseum". The funding will help further develop open and programmable network architectures and enable automated end-to-end AI/ML development, integration, and testing through realizing an O-RAN digital twinning platform on the Colosseum network emulator.

The Colosseum team is in the process of gradually upgrading the software and hardware of the SRNs with more powerful servers to drive the USRPs. For further information about the hardware upgrades progress please

visit: <https://colosseumneu.freshdesk.com/support/solutions/articles/61000253404-srn-specs-and-capabilities>

New RF scenarios have been added to the publicly available scenarios list. For more information please

visit: <https://colosseumneu.freshdesk.com/a/solutions/articles/61000306089>

