PAWR Project Office

July 2023

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

POWDER-RENEW

Congratulations to POWDER! The platform is one of three PAWR testbeds to gain status in July as an official Open Testing and Integration Center (OTIC) as designated by the O-RAN Alliance. Read the full press release from the PAWR Project Office on the PAWR website.

POWDER supports end-to-end Open RAN testing in lab and field scenarios and has developed a Testing Orchestration and Testing Automation (TOTA) framework to provide streamlined, on-demand testing capabilities. O-RAN Alliance defined OTIC services provided by POWDER will include interoperability and end-to-end testing, badging, and certification. POWDER will offer additional Open RAN related services including use case and proof-of-concept development and evaluation, functional testing in lab and field

environments, and Open RAN intelligent ecosystem research, testing, and development.

COSMOS

The 6th NSF COSMOS-NewLAW-CS3 Research Experience and Mentoring for Teachers (REM/RET) program started on July 10. This summer, the program includes 20 teachers hosted at Columbia and NYU for 3 weeks. The program, supported by the National Science Foundation, offers resources to cultivate innovative and immersive learning experiences for middle and high school students in New York City and develops an ecosystem of like-minded educators across the city to bring this vision to fruition.

An article profiling a previous participant in the program can be found on the

Columbia University website. It highlights the benefits of the program and how teachers have used it to extend lessons learned to their own K-12 classrooms.

AERPAW

Several feature upgrades are in process at AERPAW, starting with the installation of real-time kinematic positioning (RTK – essentially more precise GPS) at Lake Wheeler nodes. RTK base stations are now deployed at Lake Wheeler 1 and 2, as well as on portable nodes. Additional deployments will follow at all Lake Wheeler towers.

RTK is valuable for two primary reasons. First, it helps with positioning of mobile nodes on drones and rovers. Second, it enables extremely accurate time synchronization, allowing computers and SDRs in the testbed to be synchronized down to a few nanoseconds. To enable better frequency control

as well as time synchronization for the portable nodes, AERPAW has also developed a custom GPS-Disciplined Oscillator board to provide a highly accurate pulse-per-second signal, as well as a stable 10MHz that is internally used by AERPAW SDRs to provide both accurate and stable frequencies.

In the AERPAW emulation environment (remotely accessible to researchers anywhere), the team has now successfully integrated srsRAN code for both a 5G base station and two 5G UEs, enabling emulated 5G scenarios.

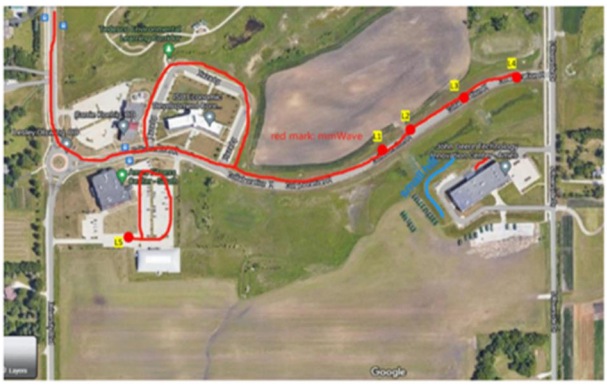
Finally, construction for AERPAW has begun on a new Drone Operations Center at Lake Wheeler. The mobile center is due to be in place by the end of the year.

ARA

Congratulations to ARA! The platform is also one of three PAWR testbeds to gain status in July as an official Open Testing and Integration Center (OTIC) as designated by the O-RAN Alliance.

On the platform itself, preliminary studies of the Ericsson 5G network have produced some promising results, including measured throughput between 400Mbps and 3Gbps+ around the Ames Municipal Airport and John Deere Technology Innovation Center.

Coverage around John Deere Tech Innovation Center



- mmWave/28GHz-band
- Throughput
  - L1: 2.4 Gbps
  - L2: 1.8 Gbps
  - L3: 1.2 Gbps
  - L4: no connection, receive signal strength at -118dBm
  - L5: 1.4 Gbps

- Inside blue dot line:600Mbps+
- Blue line on road: 400 - 600Mbps

Meanwhile, the ARA Public Launch event is planned for Sept. 6-8, 2023. The event is being planned to highlight ARA achievements, offer training on the platform, and provide an opportunity for thought leaders from the government (federal, state, and local), industry, academia, and communities to plan ARA-enabled programs/initiatives for shaping the future of advanced wireless, rural broadband, as well as applications in critical domains such as precision agriculture.

Colosseum

Congratulations to the Northeastern team! Assets from Northeastern's Institute for the Wireless Internet of Things (WIoT) – including Colosseum – are now part of another new Open Testing and Integration Center (OTIC) as designated by the O-RAN Alliance in July.

The Northeastern team is using the Colosseum infrastructure, which is affiliated with the PAWR program, and other assets of the Institute's Open 6G Hub to provide testing capabilities for end-to-end AI and ML solutions that will enable new Open RAN use cases. Through its OTIC, Northeastern will provide testing, certification, and badging capabilities.

Platforms for Advanced Wireless Research NSF POWDER RENEW COSMOS AERPAW Aerial Experimentation and Research Platform for Advanced Wireless ARA COLOSSEUM