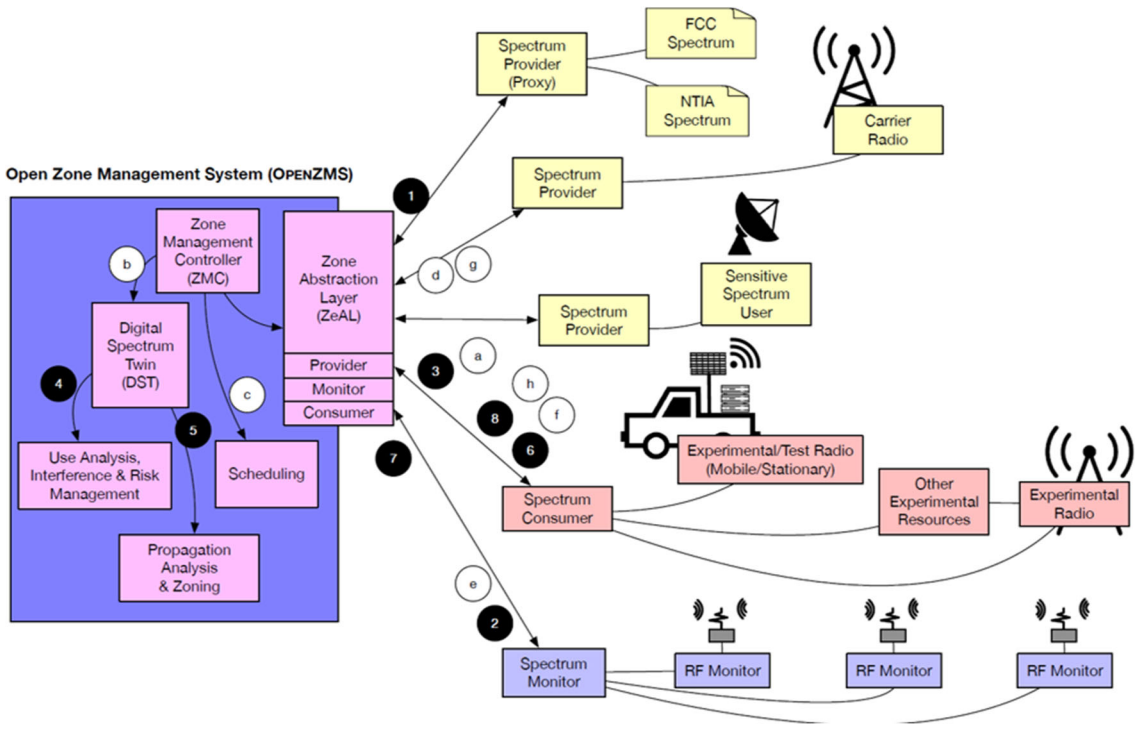
PAWR Project Office

December 2023

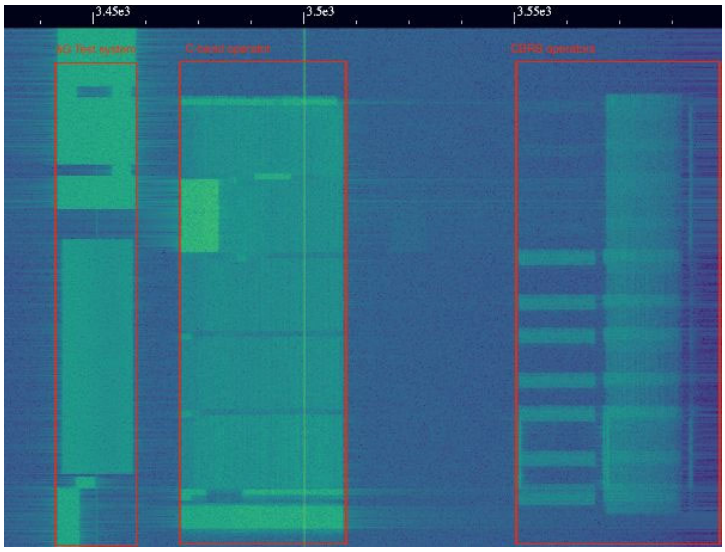
Welcome to the monthly PAWR update. Each month we deliver technical updates on: POWDER, COSMOS, AERPAW, ARA, and Colosseum.

POWDER



As part of their involvement in the NSF Spectrum Innovation Initiative (SII), the POWDER team has been collaborating with Washington University and Georgia Tech to create a Radio Dynamic Zone (RDZ) on the POWDER platform. One of the main goals of this POWDER-RDZ project (NSF awards 2232463, 2232464, 2232465) is to prototype an RDZ Zone Management System (ZMS) and to combine that with other POWDER building blocks to experiment with end-to-end RDZ workflows. This project reached a significant milestone this month in completing what is believed to be the first end-to-end RDZ workflow realization. The ZMS software the team developed, called "OpenZMS", has been designed with a modular cloud-native architecture, makes use of digital spectrum twin (DST) technology, and will be released as open source to serve as a foundational framework/building block for the RDZ community.

The figure below shows a spectrogram of the outcome of an end-to-end POWDER-RDZ workflow. The figure shows two sets of incumbents (C-band operator and CBRS operators) and an operational 5G Test system in POWDER using spectrum allocated to it by the OpenZMS (so as to avoid the incumbents).



COSMOS

COSMOS recently announced that it will serve as the testbed for Phase 2 of the NSF Convergence Accelerator (Track G) Intelligent 5G Networks Designed and Integrated for Globalized Operations (INDIGO) project that is led by industry consortium partner AT&T.

The $5M project, which is among 5 projects that advanced to phase 2, seeks to address the United States Department of Defense and Public Safety goal of providing secure/adaptive/resilient connectivity for Warfighters and First Responders. The goal is to securely operate through 5G NextG infrastructures in allied, hostile, and contested areas, and also to develop new infrastructures and partnerships for future secure wireless solutions in pace with emerging standards to fully realize the digital world that exists beyond the one in which we live today. INDIGO will set out to provide the timely transfer of information needed to connect every sensor and every actor despite the unique variations in network type, availability, traffic, and data across the lifecycle of a complex mission.

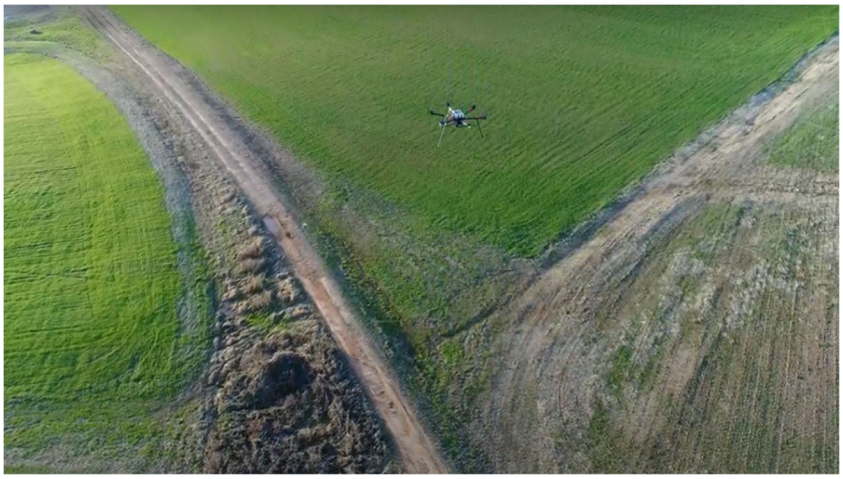
The 5G Convergence Accelerator is being supported by NSF in collaboration with the DoD, Office of the Under Secretary of Defense for Research and Engineering (OUSD), and the U.S. Army DEVCOM Army Research Laboratory.

AERPAW

AERPAW is proud to announce that three winners have been selected in the AERPAW Find a Rover (AFAR) challenge. The winners taking home top honors produced the most accurate localization results in an exercise to track the radio signal from an unmanned ground vehicle (UGV) by using an unmanned aerial vehicle (UAV) with a mounted radio and compute node.

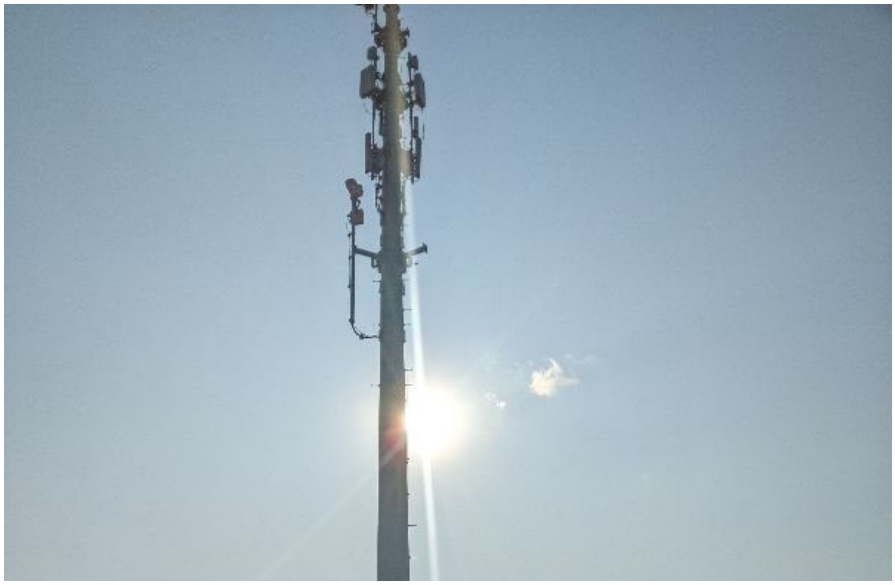
The University of North Texas Eagles Team had the closest estimations in live flight tests conducted at AERPAW's Lake Wheeler Field Laboratory, while the New York University Tandon School of Engineering team had the most accurate results in tests with their software using AERPAW's virtual development (digital twin) environment. University of Georgia's Team SunLab rounded out the top three with results that fell in between the other two teams in some tests occurring in both the development environment and at Lake Wheeler.

The AFAR challenge is the first in a series of new drone competitions AERPAW will host. For more details on the competition, please visit https://aerpaw.org/aerpaw-afar-challenge/.



ARA

The ARA team has now enabled three base stations and four UEs for RAN experiments using SDRs and the OAI 5G stack. Three base stations planned for phase two will also support open source 5G experiments.



Currently, ARA has 29 users from five universities/organizations. The experiments are focused on the following domains: URSP programming, analysis and design of chirp spread spectrum~(CSS)-based wireless solutions, generating datasets with different wireless parameters (such as channel state information) for AI/ML related research, benchmarking of wireless components, edge computing and networking, cellular networking and integration with IoT and sensor networks, and additional academic projects.

Colosseum

Since its relaunch at Northeastern University in October 2020, the Colosseum RF emulator has attracted 85 teams and well over 400 users. Software available through Colosseum includes open source software stacks for 4G and 5G, code for one of the original competition radios in DARPA's Spectrum Collaboration Challenge, and the new OpenRAN Gym, which is an open toolbox for data collection and experimentation with AI in O-RAN.

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