Application Case Study – University of Utah

Project: **POWDER**

Application: The University of Utah is building a wireless communication network for research and development at their campus and some surrounding areas in Salt Lake City, Utah. Their network allows users to run experiments on their wireless infrastructure utilizing NI's Software Defined Radios (SDRs). The project, called Powder (Platform for Open Wireless Data-driven Experimental Research -- www.powderwireless.net), is an NSF funded infrastructure project that is part of the PAWR (Platforms Advanced Wireless Research) program.

The Challenge: The university needed SDRs that could withstand Utah's wider temperature ranges and protect against dust, moisture, and other elements.

Details: The University of Utah placed several node points of their communication network in a dense deployment on campus which reduces in numbers as it spreads across campus and in targeted locations with partners off campus. They have ground-based installations that simulate a user who may, for example, be using a cell phone at regular human height. Other radio installations are placed on top of buildings and some are placed on campus buses to enable mobile communications scenarios.

Real Life Applications

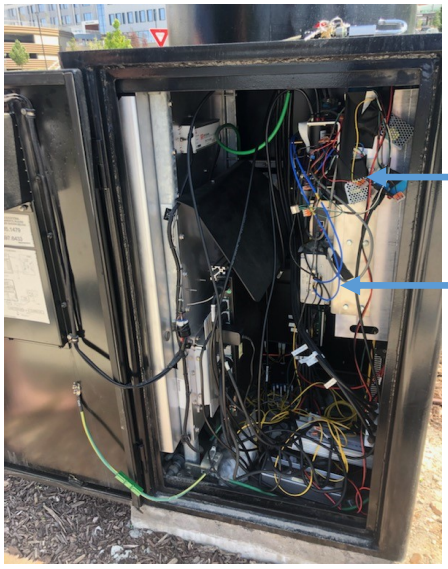
Tower on ground

Tower on roof

SDRs located inside buses

NI SDRs provide a flexible base for the POWDER, enabling a variety of wireless research and experimentation on the platform. The project supports software-programmable experimentation on 5G and beyond, massive MIMO, ORAN, spectrum sharing and CBRS, RF monitoring, and anything else that can be supported on software-defined radios. The $24 million project would be too complex and expensive for most researchers to implement in various regions across the US. The experimentation can be performed by various universities, labs, corporations that work in wireless systems & testing, etc. POWDER makes N310 radio devices available to platform users, allowing them to operate at various frequencies, but primarily the lower "CBAND" spectrum of 3358-3600 MHz. A secondary B210 radio is deployed with the N310 devices for monitoring RF transmissions and providing a "policing" mechanism that ensures the appropriate spectrum is used in the experiment and that the researcher is staying within approved parameters.

The Solution: The Pixus RB210 and RN310 provide the unites in a ruggedized IP67 weather-resistant enclosure. The rugged design keeps out dust, moisture, and other elements in a conduction-cooled chassis that allows usage in temperatures from -10C to +55C. Pixus also offers designs with external MIL-grade fans and internal features to meet -40C to +71C applications. The enclosures are also designed to withstand shock and vibration to MIL 810H levels.



Close up view of opened ground tower

RN310 inside tower

RB210 inside tower

Other Applications & Related Products

Other applications for Pixus' ruggedized SDRs include drone detection & deterrence, wideband spectrum monitoring, wireless testing, Signals Intelligence (SIG/INT), Electronic Warfare (EW), wireless communication, man-wearable RF communication and control, and much more.

Ruggedized NI USRP SDR models from Pixus include:

- RX310
- RX410
- RN310
- RB210
- Other – Need another NI SDR ruggedized? Contact Pixus to discuss your application.

RX310_MIL
Kintex-7 FPGA

RX410
Zynq Ultrascale+ RFSoC

1U RX310_Dual
(2X) RX310

RX310_Air
Air cooled version

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