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14. ABSTRACT

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RPPR Final Report
as of 13-Dec-2022

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Proposal Number: 73807NSRIP

Agreement Number: W911NF-19-1-0156

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Final Report for Period Beginning 15-Mar-2019 and Ending 14-Oct-2021

Title: A Wireless Networking Testbed for Low Latency Mission Critical Communications

Begin Performance Period: 15-Mar-2019

End Performance Period: 14-Oct-2021

Report Term: 0-Other

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STEM Degrees:

STEM Participants:

Major Goals: This project was for acquisition of equipment to establish the Wireless Networking Testbed in support of ARO's project W911NF-17-1-0508 entitled "Low Latency Wireless Networks for Mission Critical Communications". The following equipment was acquired for the testbed: ten wireless radios USRP-2974, one LabVIEW Communications 802.11 application framework software with associated licenses, and computer servers. The Wireless Networking Testbed will allow us to demonstrate the performance of novel network control algorithms for real-time communications in a realistic operating environment. Real-time communications arise in many settings that are of importance to the Army's mission, including dissemination of targeting information, command and control, and surveillance.

The broader impacts of this project include mentoring graduate and undergraduate students, as well as incorporating some of the insights acquired with the testbed into networking classes. Several students will be involved in this project and will learn to implement and deploy algorithms into the Software Defined Radios, to design and execute meaningful experiments using the testbed and, as a consequence, gain insight into the challenges of experimentation. Moreover, the equipment requested in this proposal will be incorporated into laboratory sessions of the course "Communication Systems & Networks".

Accomplishments: The testbed was completed with the acquisition of the eight standalone USRP 2974s, 3 USRP 2953R, and 6 USRP 310s, along with the necessary software (labview communications) and related equipment (CDA-2990 8 CHANNEL CLOCK DISTRIBUTION ACCESSORY). In addition, the testbed includes three lambda desktop servers, and a number of Raspberry Pis.

Training Opportunities: Igor Kadota a graduate student in my lab has been trained in the use of the equipment.

Results Dissemination: Nothing to Report

Honors and Awards: Nothing to Report

Protocol Activity Status:

Technology Transfer: Nothing to Report

RPPR Final Report
as of 13-Dec-2022

Partners

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I certify that the information in the report is complete and accurate:

Signature: Eytan Modiano

Signature Date: 6/17/22 9:42AM

CNRG Programmable Radio Lab

Software Defined Radio Testbed

LabVIEW Communications with
802.11 Application Framework

Eight standalone NI USRP-2974

- Freq. range: 10 MHz to 6 GHz
- Processor: Intel Core i7
- FPGA: Kintex-7

Three NI USRP-2953R

- Freq. range: 1.2 GHz to 6 GHz



Raspberry Pi Testbed

Twenty five Raspberry Pi's:

- Operating System: Linux
- Communication: WiFi and Ethernet
- Add-ons: Camera, GPS antenna, Inertial Measurement Unit.



Workstations

One Lambda Quad desktop:

- Operating System: Windows 10
- Software: TensorFlow, Keras, Cuda, MATLAB and LabVIEW.
- Processor: Intel i9 with 12 cores
- GPUs: 4x RTX 2080 Ti
- Memory: 128 GB

Two Lambda Dual desktops:

- GPUs: 1x RTX 2080 Ti

