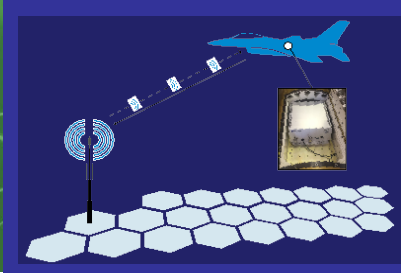
DoD test ranges can free up spectrum by leveraging commercial LTE



The Problem

Radio Frequency (RF) spectrum is a vital resource to DoD Testing, supporting testing activities for every type of military weapons system. As weapons systems become more complex, the spectrum demands continually increase. The DoD needs affordable solutions for efficient use of the spectrum in order to provide the additional 400 Megahertz of spectrum that will be needed by 2025.

The Objective

The objective of the Cellular Range Telemetry Network (CeRTN) project is to develop an efficient and robust cellular approach for Aeronautical Mobile Telemetry (AMT) applications at government test ranges, using commercial-off-the-shelf (COTS) cellular technology leveraging the vast investment of the industry-standard architecture and waveform.

The Key Innovation

This project delivered a vendor-agnostic Doppler compensation hardware appliqué to address up to supersonic vehicle speeds encountered on a DoD test range. This solution was paired with a novel ground base station real-time handover controller (Integrated Cellular Network Controller, ICNC), to direct the radio link to preferred cells.

The Solution

A team of NSC members, led by Perspecta Labs delivered three key complementary modules that comprise the overall solution:

1. Integrated Doppler Compensation Appliqué and LTE modem for the aircraft side
2. Real-time network supervision and directed Handover execution at base station within ICNC
3. A complete operational LTE network in the DoD C-Band spectrum

The Results

Using native LTE and the key innovations developed and successfully demonstrated with flight testing during this project, Government test facilities are able to accommodate a greater number of test activities using less spectrum resources and at lower cost:

1. Multiple aircraft sharing same spectrum
2. No frequency scheduling required
3. Re-use of spectrum in different geographic areas of test range

Project Highlights

Flight Tested at Edwards AFB:

- Full-Duplex air-to ground communications in lower C-Band
- 28Mbps air-to-ground peak data rate
- 60 km range to a single cell
- Built 2nd Generation airborne transceiver for mounting in fast-mover aircraft
- 5G-ready airborne transceiver (5G modem swappable)
- **CeRTN technology available for insertion on other DoD test ranges**

If you are interested in learning more about this technology please contact Spectrum.Consortium@ati.org.

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