CRI: Wireless Open-Access Research Platform (WARP) - A Scalable and Extensible Testbed for High Performance Wireless Systems

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PROJECT SUMMARY

We envision an environment which promotes a holistic, yet rapid approach to the design of wireless networks. At the center of our vision is the design of a common platform, the Wireless Open-Access Research Platform (WARP), used by a community of researchers to perform collaborative research. The platform is carefully designed to meet the needs of next generation concepts and address all layers and components in a wireless network design. The major thrusts of the WARP project are:

1. **Scalable and Extensible Platform**: WARP is a complete system solution with three component layers: (a) custom hardware with scalable processing resources and extensible I/O support, (b) platform support packages for seamless integration between different hardware components, and (c) an application design environment matched to the needs of multiple wireless research communities. Our key innovation is a prototyping environment which allows researchers working on different wireless network components to seamlessly integrate their research, while using well-established tools.

2. **Open-Access Repository**: All components of the WARP project will be open-source and available to anyone via the web; this will allow WARP users to construct wireless networks in a "plug-and-play" fashion. In addition, researchers can share their experiments via the Internet and implement them on their local WARP hardware kits. This will allow fair comparisons between new ideas on a common platform, a fundamental requirement of rigorous experimental methodology.

MILESTONES TO-DATE & RELEVANCE TO GENI

Now approximately six months into the first year of the project, WARP project is on track of its suggested timeline. Major milestones to-date are as follows

1. **Operational WARP Hardware**: The first version of the WARP hardware, both the base FPGA board and the radio daughter-card, are fully functional. Several kits are being used simultaneously at Rice university CMC Labs to develop a range of advanced, high performance physical layers, medium access protocols and cross-layer mechanisms.

2. **Functional Wireless Network Stack**: A baseline complete system with an OFDM physical layer and aloha-like access protocol has been tested with real video traffic. Furthermore, the same two-way link has been successfully tested to stream live video chats and web browsing over the air.

3. **Live Open-access Repository**: All major parts of the system are already available at http://warp.rice.edu under Rice open-source license. As Rice and its close partners continue to develop new physical and MAC layer protocols on WARP, they will be posted on the WARP repository under the same license terms.

Programmable and open-access wireless devices are a crucial component in developing new protocols for mobile internet, which is a dominant user segment. As the hardware kits are distributed to different universities in 2007, we expect the contributions to WARP repository to grow and be populated with innovative new protocols and measurement data. This, in turn, will lay the groundwork for high-performance protocol research as part of GENI initiative.