

IST-062
Propagation Measurements for Rural Multitier Wireless Networks

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Abstract

To meet diverse communication requirements of users, wireless systems must simultaneously support wide-area access (ubiquity) and local area performance (capacity). Multitiered wireless networks represent a natural design option that fulfills these joint goals. These networks contain radios designed with coverage areas that vary in their order of magnitude. As a demonstration of the benefits offered by such systems, topographic and demographic data for Susquehanna County, a rural and technology-poor county in Northern Pennsylvania, will be used to implement derived results and to devise a multitier network for that region. This multi-year design project will take into consideration the extremely hilly propagation characteristics of the area; location of population centers; and communication requirements at these locations in order to better serve the needs of the county (e.g., provide satisfactory cellular coverage, deliver broadband access, promote distance learning initiatives, etc.).

This PITA proposal seeks funds to support efforts in developing a radio propagation map for Susquehanna County. The funds will support graduate students who will develop a radio/location measurement device and record existing radio signals in Susquehanna County. These measurements will be critical in validating and enhancing a software-based radio map currently being developed by the PI's research group. Without this validation, future phases of the project cannot be conducted. The techniques developed in this project can be used to perform similar studies and design projects for other rural areas of the state. The overall effort will require collaboration between Lehigh University, local PA communities, and The Affinity Group, a PA-based company helping communities develop information technology strategies. In the process, we will train graduate students in highly-technical skills that will especially benefit the communication infrastructure in PA's vast rural areas.