
Telecommunications Engineering, Analysis, and Modeling

The Telecommunications Engineering, Analysis, and Modeling Division conducts studies in these three areas for wireless and wireless-wireline hybrid applications.

Engineering includes assessment of the components of telecommunications systems; evaluation of protocol and transport mechanism effects on network survivability and performance; and assessment of the impact of access, interoperability, timing, and synchronization on system effectiveness in national security/emergency preparedness (NS/EP), military, and commercial environments.

Analysis is often performed in association with Telecommunications Analysis (TA) Services, which offers analysis tools online via the Internet. In addition, ITS can provide custom tools and analyses for larger projects or specialized applications.

Modeling is one of ITS' core strengths. Propagation models are incorporated with various terrain databases and data from other sources, such as the U.S. Census. Adaptations of historic models, and those for more specialized situations have been developed, enhanced, and compared. ITS engineers contribute their propagation modeling expertise to the ITU as well.

Continuing to add to our wireless test facilities and research capabilities, ITS engineers have set up short and long range wireless test links to further research 2.5G and 3G technologies. The Wireless Networks Research Center (WNRC) in combination with these test links can accommodate studies of emerging technologies and PCS, analysis of wireless protocols, and studies of wireless network effects, e.g., congestion, and capabilities, e.g., priority access. (See page 79 for more information about the WNRC and page 71 for information about the wireless links at Green Mountain Mesa.)

Areas of Emphasis

ENGINEERING

Outdoor IEEE 802.11 Testbed Using multiple long range outdoor links, the Institute investigates the operating parameters of 802.11-based wireless data systems, which are becoming a significant telecommunications resource. This work is funded by multiple Department of Defense (DoD) agencies.

PCS Applications The Institute participated in the Telecommunications Industry Association (TIA) committee TR46.2 and now will participate in the T1 subcommittee T1P1.2. ITS is also developing a series of PCS interference models. The project is funded by NTIA.

Third Party Test Evaluation for Other Agencies The Institute assists the U.S. Coast Guard in modernizing and upgrading its communication capabilities by acting as a third-party technical consultant. The project is funded by the U.S. Coast Guard.

Wireless Network Analysis and Forecasting The Institute is actively investigating wireless networks and services expected to be used in the future, including the interfaces between various technologies. This work is funded by multiple DoD agencies.

ANALYSIS

Telecommunications Analysis Services The Institute provides network-based access to its research results, models, and databases supporting applications in wireless telecommunications system design and the evaluation of systems. These services are available to government and non-government customers and are funded by fee-for-use and fee-for-development charges through an on-line CRADA.

Geographic Information System Applications The Institute continues to develop a suite of Geographic Information System (GIS) based applications for propagation modeling and performance prediction studies. This work is funded by the DoD.

MODELING

Broadband Wireless Standards The Institute develops new radio propagation algorithms and methods that improve spectrum usage of wireless systems. Technical standards are prepared that support U.S. interests in third generation (3G) broadband wireless systems. The project is funded by NTIA.

Propagation Model Development & Comparisons The Institute compares and harmonizes existing propagation models, to improve their predictive accuracies and reduce the differences between their predictions. This project is funded by NTIA.