Support to Private Sector Telecommunications Activities:

Cooperative Research with Industry

Outputs

- Interoperability measurements of Project 25 public safety radios.
- Measurements of ad hoc wireless network performance.
- Measurements of time-based transmitter and receiver performance.
- Measurements of X-band emissions from a newly developed radar.

The Federal Technology Transfer Act of 1986, as amended, allows Federal laboratories to enter into cooperative research agreements with private industry, universities, and other interested parties. The law was passed in order to provide laboratories with clear legal authority to enter into these arrangements and thus encourage technology transfer from Federal laboratories to the private sector. Under this Act, a cooperative research and development agreement (CRADA) can be implemented that protects proprietary information, grants patent rights, and provides for user licenses to corporations, while allowing Government expertise and facilities to be applied to interests in the private sector.

ITS participates in technology transfer and commercialization efforts by fostering cooperative telecommunications research with industry where benefits can directly facilitate U.S. competitiveness and market opportunities. ITS has participated for a number of years in CRADAs with private sector organizations to design, develop, test, and evaluate advanced telecommunication concepts. Research has been conducted under agreements with:

- American Automobile Manufacturers Association
- ARINC
- AudioLogic, Inc.
- Coherent Technologies
- Bell South Enterprises
- Bell Atlantic Mobile Systems
- East Carolina University's Brody School of Medicine
- FirstRF Corporation
- General Electric Company
- GTE Laboratories Inc.
- Hewlett-Packard Company (HP)
- Integrator Corporation
- Intel Corporation
- Lehman Chambers
- Lucent Digital Radio
- Lucent Technologies
- Motorola/Freescale Inc.
- Netrix Corporation
- RF Metrics
- Savi Technologies
- Spectrum Mapping LLC
- Telesis Technology Laboratories
- University of Colorado
- University of Pennsylvania
- US WEST Advanced Technologies
- US WEST New Vector Group

Not only does the private sector partner benefit, but the Institute is able to undertake research in commercially important areas that it would not otherwise be able to do. Active CRADAs in FY 2005 are described below.

The State of Wyoming and ITS cooperated in the testing of the interoperability of Project 25 radio equipment for a statewide public safety wireless network. In support of the State of Wyoming procurement of new public safety radio equipment, ITS worked with the various vendors to test the performance and interoperability of their various radios. This work supported Wyoming's determination of which equipment would best meet the state's public safety communication needs. It also provided results useful to ITS' support of various Federal departments and agencies involved with public safety.

The University of Colorado conducted measurements of the performance of ad hoc wireless networks with both ground-based and airborne terminals at ITS' Table Mountain Field Site. The Table Mountain Field Site is a National Radio Quiet Zone protected by Federal Regulation. Using IEEE 802.11 type equipment, routing protocols were tested and the performance of the ad hoc networks monitored. These measurements are contributing to the development of new wireless ad hoc network technologies.

ITS supported RF Metrics in RF link testing between a Time-Based Transmitter and a Time-Based Receiver at the Table Mountain Field Site. These systems are general purpose, software-controlled radios with a special distinction. The transmitter is capable of adjusting the output waveform in time to 1 nanosecond RMS of an input time

ITS and RF Metrics staff at the Table Mountain field site, preparing to measure the characteristics of the electromagnet emissions from a newly developed X-band radar (photograph by F.H. Sanders).

reference. The receiver is capable of time-stamping the received signal with the same resolution. The purpose of this test was to establish the RF link between the two systems in a real-world environment, and make measurements of the system performance during the communication session.

RF Metrics and ITS also made X-band radar emission measurements at the Table Mountain Field Site. These measurements helped RF Metrics characterize the emissions of a newly designed radar for the manufacturer. ITS benefited by learning how well industry could use the International Telecommunication Union – Radiocommunication Sector Recommendation M.1177 to perform radar emission measurements. ITS was the principal contributor to the Recommendation.

Cooperative research with private industry has helped ITS accomplish its mission to support industry's productivity and competitiveness by providing insight into industry needs. This has led to adjustments in the focus and direction of other Institute programs to improve their effectiveness and value.

ITS is interested in assisting private industry in all areas of telecommunications. The pages of this technical progress report reveal many technological capabilities that may be of value to various private sector organizations. Such organizations are encouraged to contact ITS if they believe that ITS may have technology useful to them. Because of the great commercial importance of many new and emerging telecommunication technologies, including third generation wireless (3G), wireless local area networks, digital broadcasting, and intelligent transportation systems, ITS will continue to vigorously pursue technology transfer to the private sector through CRADAs and thereby contribute to the rapid commercialization of these new technologies. ITS also plans to commit substantial labratory resources to the development and standardization of new telecommunication technologies.

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