
SUPPORT TO PRIVATE SECTOR TELECOMMUNICATIONS ACTIVITIES:

Cooperative Research with Industry

Outputs

- PC software that measures the quality of audio and video signals that have been transmitted through a telecommunications system.
 - Tools for measuring the quality of digital video and speech transmission through next generation Internet and Internet 2 technologies.
 - Measurements to validate the theoretical capacity of the Bell Labs Layered Space-Time (BLAST) antenna system.
- East Carolina University's Brody School of Medicine.
 - General Electric Company
 - GTE Laboratories Inc.
 - Hewlett-Packard Company (HP)
 - Netrix Corporation
 - Telesis Technology Laboratories
 - 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. Recent CRADAs are described below.

The Federal Technology Transfer Act of 1986 (FTTA), 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. For a number of years ITS has participated 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.
- Bell Atlantic Mobile Systems
- Bell South Enterprises
- Industrial Technology, Inc.
- Integrator Corporation
- Intel Corporation
- Lehman Chambers
- Lucent Digital Radio
- Lucent Technologies
- Motorola Inc.
- Intel Corporation and ITS have completed cooperative research and development in the area of telecommunications and multimedia. The areas of interest include subjective and objective video quality, subjective and objective audio quality, and wireless communications. PC software that measures the quality of received audio and video signals is available on ITS' web site.
- ITS conducted cooperative research with the University of Pennsylvania to investigate the relationships between application-level performance (e.g., the video quality that is perceived by end-users of a video system) and the next generation Internet (NGI) and Internet 2 (I2) network performance parameters. By determining these Quality of Service (QoS) relationships and disseminating the results to industry, network providers will be able to design better NGI/I2 networks and services. In addition, end-users of NGI/I2 networks and services will benefit since they will have an objective means of measuring QoS from competing network providers. Updated software was completed and delivered this year.
- Lucent Technologies, Bell Laboratories, and ITS completed cooperative research to measure the transmission coefficient matrix associated with two 16-element arrays located above a ground plane. The purpose of this experiment was to validate the theoretical capacity of the



Testing the BLAST antenna system above a ground plane (photograph by P.B. Papazian).

Bell Labs Layered Space-Time (BLAST) antenna system. The BLAST system has the potential to greatly increase the capacity of wireless communications systems.

- East Carolina University's Brody School of Medicine and ITS began cooperative research and development in the area of quality assessment of digital video and audio for telemedicine applications. Traditional techniques for assessing analog video and audio quality are inadequate for accurately quantifying digital audio and video quality due to the adaptive processing of signals by codecs. Therefore, newer digital techniques developed by ITS must be employed for this assessment. A set of video test scenes were processed this year.

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 that would be 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 plans to vigorously pursue technology transfer to the private sector through CRADAs and thereby contribute to the rapid commercialization of these new technologies. In addition, ITS plans to commit substantial resources of its own to the development and standardization of these new technologies.

For more information, contact:
Kenneth C. Allen
(303) 497-5474
e-mail kallen@its.bldrdoc.gov