TIA|STAR

2005

STANDARDS AND TECHNOLOGY ANNUAL REPORT

TIA

ADVANCING GLOBAL COMMUNICATIONS

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05 **Table** of Contents

Engineering Committee TR-8 formulates and maintains standards for private radio communications systems and equipment for both voice and data applications. TR-8 addresses all technical matters for systems and services including definitions, interoperability, compatibility and compliance requirements. The systems addressed by these standards include business and industrial dispatch applications, as well as public safety (police, ambulance, fire fighting, etc.) applications.

Committee TR-8 is the standards formulation committee for Private Land Mobile Radio Systems. The standards developed by TR-8 are used to produce equipment for a number of services including business, industrial, transportation and public safety applications. Quite often, this equipment is deployed in mission-critical applications. Therefore, issues of radio coverage, reliability and security are of prime importance. In addition to standards for the equipment itself, the committee develops standards and bulletins that cover issues such as radio coverage, interference protection and radio frequency (RF) exposure limit verification and reporting. The standards formulated by the committee cover all aspects of the system from antenna and combining networks, subscriber equipment and fixed station equipment to network equipment. Most of the work of the committee involves developing standards for advanced digital voice and data systems. This activity includes work on dispatch voice systems, narrowband and wideband data systems and broadband data systems. However, the committee also continues to be involved in standards for the more traditional analog frequency-modulated (FM) voice systems.

An important requirement of public safety systems is that users from different jurisdictions be able to communicate with each other, in either routine operation or emergency situations. The standards Committee TR-8 and its subcommittees formulate are crucial to this interoperability. There has been much interest in the work of TR-8, not only from manufacturers, but also from users of the technology. The work of TR-8 is somewhat unusual, in that the user community is a big contributor to the standards process. In many cases, it is the users that establish the requirements for the technology being standardized.

2005 ACTIVITIES

The various subcommittees within TR-8 maintained a high level of activity. TR-8 and its subcommittees met four times during the year. The meetings were held in conjunction with meetings of APCO/NASTD/FED Projects 25 and 34, as well as working groups composed of manufacturers and users. (APCO/NASTD/FED is a collective group of the Association of Public Safety Communications Officials International, Inc. [APCO]; the NASTD - Technology Professionals Service State Government; and federal government agencies.) Much of the drafting of TR-8's documents was done outside the four meetings and was accomplished in face-to-face working sessions, teleconferences and other electronic working methods. Document-sharing at the meetings was accomplished through the use of a wireless local area network. This year, TR-8 received new computer and local area network equipment donated by

the Project 25 Interest Group (PTIG) intended to facilitate document transfer at the meetings.

Many subcommittees continue to work on the Project 25 standards for digital private radio. The suite of Project 25 standards consisted of 38 documents as of the end of 2005. TR-8 subcommittees have been engaged in the maintenance, upgrade and redrafting of some of these documents. During 2005, five documents were revised and 13 were in the process of being balloted, either as upgrades, revisions or new documents.

Subcommittee TR-8.3, Encryption published two new documents related to link layer authentication and key fill device protocol. Additional work in the area of Project 25 included the evaluation of advanced vocoders and work toward two-slot and four-slot TDMA technologies.

One of the prime focus areas last year was work on standards for interfaces for fixed network equipment in Project 25 systems. This includes standards for an inter sub-system interface (ISSI). This interface allows systems in different jurisdictions or sub-systems of larger agencies to be connected as interoperable communications networks. In addition, standards for interfaces to consoles and fixed stations are being developed within **Subcommittee TR-8.19, Wireline Systems Interface,** with initial drafting carried out by several working groups. This subcommittee and its associated working groups met in multiple sessions weekly. In 2005, the first ISSI document was approved for ballot, and the first fixed station interface document was approved for publication. Work continues on several more documents for each of the interfaces.

Subcommittee TR-8.11, Antenna Systems, continued its efforts toward the development of a standard for vehicular antennas. An upgrade to the *Terrestrial Land Mobile Radio – Antenna Systems – Standard Format for Digitized Antenna Patterns* was published as TIA-804-B. An additional document for standards for signal boosters was approved for publication and is due to be published in 2006.
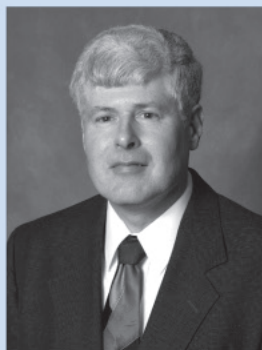
<< CHAIR, TR-8
JOHN OBLAK
E.F. Johnson Co.

VICE CHAIR, TR-8
ALAN WILSON
Motorola, Inc.

The establishment of the 700 MHz frequency band for public safety use necessitated the development of standards for wideband data systems within that band. Committee TR-8 was asked by the National Coordination Committee (NCC), established by the FCC to advise on public safety issues related to the 700 MHz band, to formulate these wideband data standards. The first releases of these documents were published in 2003. Recent activity by **Subcommittee TR-8.5, Signaling and Data Transmission,** has been aimed at revising and upgrading these standards. Recent work has also included the publication of TSB-902.BAAA, the *Wideband Air Interface Scalable Adaptive Modulation (SAM) Physical Layer Specification – Public Safety Wideband Data Standards Project – Digital Radio Technical Standards.* Work is also proceeding on standards for text messaging.

Subcommittee TR-8.17, Radio Frequency (RF) Exposure, continued its work on developing guideline documents for compliance with FCC-mandated RF exposure limits for mobile, portable and base station equipment. The subcommittee developed and published a document that provides a template for reporting of Specific Absorption Rate (SAR) data: TSB-150, *Private Land Mobile Radio Two-Way Portable Equipment RF Exposure (EME) Test Report Guidelines.* In addition, a document for reporting Maximum Permissible Exposure (MPE) was approved for publication.

Subcommittee TR-8.18, Wireless Systems Interference and Coverage, focused its efforts on issues related to

interference prediction and spectrum compatibility. An addendum to TSB-88-B, *Wireless Communications Systems – Performance in Noise and Interference – Limited Situations – Recommended Methods for Technology-Independent Modeling, Simulation, and Verifications,* was published. A major rewrite of TSB-88-B is also being undertaken. The subcommittee continues to provide input on interference and radio coverage issues that impact public safety users.

A great deal of interest is being shown in the area of broadband data systems for public safety use. In particular, the allocation of the 4.9 GHz spectrum for public safety usage has established a need for interoperability standards. User requirements for the technology are being developed by the Project 34 committees.

Subcommittee TR-8.8, Broadband Data Systems, published its first document, TSB-1065, *Broadband Data Standards Definition*. In addition, TR-8.8 established a liaison with Project MESA, the partnership for broadband data standards activity between TIA and ETSI, and was assigned as the subcommittee to convert documents produced by Project MESA into TIA documents.

TR-8 showed considerable growth in 2005, in terms of both participation and project activity. New companies and organizations attended each series of meetings. In addition, expanded interest was evidenced by many of the companies and organizations that have participated for many years. The public safety community's needs for reliable, interoperable communications systems, the allocation of new frequency spectrum and advances in technology have stimulated a great deal of interest and activity within the committee. TR-8 anticipates another year of growth and activity in 2006.

SUBCOMMITTEES:

TR-8.1 **Equipment Measurement Procedures**
Chair: John Oblak
E.F. Johnson Co.

TR-8.3 **Encryption**
Chair: Mike Bright
Motorola, Inc.

TR-8.4 **Vocoder**
Chair: Rich Frye
IPC Command Systems, Inc.

TR-8.5 **Signaling and Data Transmission**
Chair: Jeff Anderson
Motorola, Inc.

TR-8.6 **Equipment Performance Recommendations**
Chair: Terry Mansfield
Motorola, Inc.

TR-8.8 **Broadband Data Systems**
Chair: Larry Nyberg
Motorola, Inc.

TR-8.10 **Trunking and Conventional Control**
Chair: Stan Hansen
Motorola, Inc

TR-8.11 **Antenna Systems**
Chair: Louis Meyer
Andrew Corporation

TR-8.12 **Two-Slot TDMA Systems**
Acting Chair: Ernest Hofmeister
Tyco Electronics

TR-8.15 **Common Air Interface**
Chair: Alan Wilson
Motorola, Inc.

TR-8.17 **RF Exposure**
Chair: Robert Speidel
Tyco Electronics

TR-8.18 **Wireless Systems Interference and Coverage**
Chair: Bernie Olson
Motorola, Inc.

TR-8.19 **Wireline Systems Interface**
Chair: Jerry Drobka
Motorola, Inc.

Engineering Committee TR-14 is responsible for standards and recommended practices relating to terrestrial fixed point-to-point radio communications equipment and systems (microwave radio), primarily in the frequency bands above 960 MHz. Within the TR-14 Committee, only TR-14.7, Structural Standards for Steel Antenna Towers and Antenna Supporting Structures, was active in 2005.

It was a busy year for TR-14.7, the subcommittee that writes the popular standard ANSI/TIA 222, *Structural Standards for Steel Antenna Towers and Antenna Support Structures.* After hours of committee work over the course of seven years, the committee submitted ANSI/TIA/222-G for public vote in July. The standard was approved and published in August with an effective date of January 1, 2006.

TIA-222-G contains the most sweeping changes in the 222 standard since Version D was implemented over 20 years ago. Version G of TIA-222 contains new material and expanded content. Comprised of 15 chapters with 14 annexes, it was prepared by eight different task groups and covers technical issues such as wind and ice loading, seismic loading, design stresses, safety and climbing, and geotechnical requirements.

For sheer volume of information, the TIA-222-G standard surpasses its predecessors by three or four times, including more than 150 pages devoted to state-by-state map graphics illustrating wind, ice, frost and seismic factors. All new tower construction and major renovations of existing structures will be expected to follow TIA-222-G. Existing towers will not be required to conform to the updated standard unless physical alterations are made or antenna loading exceeds the original approved design. Which version of the standard applies to a structure is usually a decision of the engineer of record.

A major shift in thinking was necessary with the 222-G "makeover." All previous revisions utilized Allowable Stress Design (ASD), whereas the new revision uses Load and Resistance Factor Design (LRFD). This shift was necessary to stay current with local, national and international building codes and to bring further credibility to the most widely used engineering standard for communications towers in the world.

Beyond the LRFD approach, other sweeping changes include using three different structure classifications based on use and hazard to human life. The former default to TIA "normal" soils was replaced with a classification designated "presumptive soils" when a geotechnical soil report is not provided to the designer.

Exposure categories covering geographic location and topographic categories covering wind speed-up effects based on the presence of hills, ridges and escarpments are now mandatory considerations in tower design under TIA-222-G. The section covering climbing facilities was redrafted to take into account the latest information on safety and an entirely new annex with wind and ice maps and tables using the latest information from the American Society of Civil Engineers is provided. An expanded section on seismic loads was also included.

The committee was hard at work revising TIA-1019, *Structural Standards for Steel Gin Poles Used for Installation of Antenna Towers and Antenna Supporting Structures.* The proposed name of the next revision to TIA-1019 will be *Structural Standards for Installation of Antennas and Antenna Supporting Structures.* The revised standard will broaden the work done previously by the committee to include several other tower and antenna installation considerations not part of the previous "Gin Pole" standard.

The committee's intent is to create internationally recognized and acceptable standards that can be implemented beyond North America.

<< CHAIR, TR-14
CRAIG SNYDER
Sioux Falls Tower Specialists

SUBCOMMITTEE:

TR-14.7 **Structural Standards for Steel Antenna Towers and Antenna Supporting Structures**
Chair: Craig Snyder
Sioux Falls Tower Specialists

Vice Chair: Brian Reese
Aero Solutions, LLC

TR-30

Engineering Committee TR-30 develops standards related to the functional, electrical and mechanical characteristics of interfaces between Data Circuit-Terminating Equipment (DCE), Data Terminal Equipment (DTE) and Multi-Media Gateways, the telephone and voice over Internet protocol (VoIP) networks, and other DCE and facsimile systems.

approved in 2004. ITU-T V.151 expands the transport to include international forms of text telephony used by the hearing-impaired community. Both TIA-1001 and ITU-T V.151 provide the reliable transport of text telephony (telecommunications device for the deaf [TDD] and teletypewriter [TTY]) over Internet protocol (IP) networks. TIA-1001 was developed in response to perceived difficulties with reliable operation of TDDs over IP networks with different levels of quality of service. The loss of packets in IP networks and voice compression algorithms has also been seen to limit proper operation of TDDs. Subcommittee TR-30.1 invites the participants of the ITU-T SG 16 Question 11 Rapporteurs group to participate in the discussions on this work, to provide a seamless work environment between the groups. Toward the end of 2005, Subcommittee TR-30.1 revitalized PN-3-4643, *Home Networking over Power Lines*, when a group of companies came forward proposing a standard. This work will progress during 2006 with a goal of completion of a draft standard for industry ballot by the end of the year.

2005 was another year of progress for TR-30 and its subcommittees, which continue to work closely with ITU-T Study Groups to advance their work, as well as developing ANSI/TIA standards.

Subcommittee TR-30.1, Modems and Facsimile Systems, continued to work with the ITU-T Study Group (SG) 16 "Multimedia Terminals, Systems and Applications," and the Question 11 Rapporteurs group "Voiceband Modems: Specification and Evaluation Performance" in the development of ITU-T Recommendation V.151 "Procedures for the end-to-end connection of analogue PSTN text telephones over an IP network utilizing text relay," designed to provide reliable transport of Text Telephony over IP Networks. This work is based upon TIA-1001, *Transport of TIA-825-A, Signals over IP Networks*,

Subcommittee TR-30.2, Data Transmission Interfaces and Protocols, continues to operate in a maintenance mode. In 2005, Subcommittee TR-30.2 revised TSB-89-A, *Application Guidelines for TIA/EIA-485-A*, and reaffirmed seven standards. In addition, a new project, PN-3-0222, was opened: *Electrical Characteristics of Very-Low Voltage Differential Signaling (V-LVDS) Interface Circuits.* This new standard is being developed under Subcommittee TR-30.2's Electrical Characteristics Working Group.

Subcommittee TR-30.3, Data Communications Equipment Evaluation and Transmission Interfaces, revised TSB-18-A, *The Mechanical/Functional Characteristics Between DCEs and Voiceband Analog Channels* and TSB-38, *Test Procedure for Evaluation of 2-Wire 4-KHz Voiceband Duplex Modems*. The

<< **Chair, TR-30**
Fred Lucas
FAL Associates

Subcommittee TR-30.3 has established liaisons and working relationships with TIA Subcommittee TR-41.4, ITU-T Study Group 9 "Integrated broadband cable networks and television and sound transmission" and ITU-T Study Group 12.

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Subcommittees:

TR-30.1 **Modems and Facsimile Systems**
  Chair: Keith Chu
  Mindspeed Technologies

TR-30.2 **DTE-DCE Interfaces and Protocols**
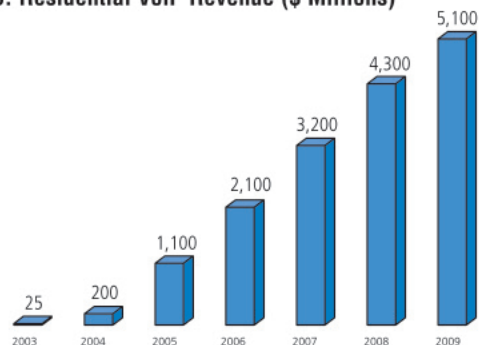 **Chair:** Fred Lucas
  FAL Associates

TR-30.3 **Data Communications Equipment Evaluation and Network Interfaces**
  Chair: Jack Douglass
  Spirent Communications

  Vice Chair: Philip Kyees
  Flykees

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major effort during 2005 was development of a new TIA standard TIA-921, *Network Model for Evaluating Multimedia Transmission Performance over Internet Protocol.* TIA-921 defines statistically-based network models and scenarios for evaluating and comparing communications equipment connected over converged wide-area networks. Test scenarios include public-switched telephone network (PSTN)-to-PSTN connections through a managed IP network; PSTN-to-IP connections and IP-to-IP connections. Operating companies, service providers, manufacturers, design engineers, test houses, magazines and product reviewers can use this network model to evaluate the performance of IP network devices such as TIA-1001, voice-over-IP (VoIP) gateways, IP telephones, ITU-T Recommendation T.38 "Procedures for real-time Group 3 facsimile communication over IP networks" facsimile devices/gateways, ITU-T Recommendation V.150.1 "Modem-over-IP gateways," ITU-T Recommendation V.152 "Voice band data over IP gateways" and ITU-T Recommendation V.151. The draft standard was completed by the end of the year and sent out for industry ballot. An earlier draft of the standard was presented to the ITU-T Study Group 12, "Performance and quality of service," where it was used as the basis of their new Recommendation G.1050, "network model for evaluating multimedia transmission performance over Internet protocol." This recommendation was approved by the ITU-T in October 2005. Subcommittee TR-30.3 has also expanded the scope of the project under which TIA-921 was developed, to include wireless and cable modem models in a future revision of the standard.

U.S. Residential VoIP Revenue ($ Millions)

Year	Revenue
2003	25
2004	200
2005	1,100
2006	2,100
2007	3,200
2008	4,300
2009	5,100

Source: *TIA's 2006 Telecommunications Market Review and Forecast*

TR-34

Engineering Committee TR-34 is responsible for standards and studies related to satellite communications systems, including both the space and earth segments. The committee focuses on standards for space-borne and terrestrial hardware; interfaces between satellite and terrestrial systems; and the efficient use of spectrum and orbital resources, including sharing between satellite and terrestrial services. Active projects range from studies on how best to accomplish interservice spectrum sharing to developing standards for achieving interoperability between satellite systems as well as among satellite and terrestrial systems, networks and services.

The primary focus of Engineering Committee TR-34 during 2005 was the development and approval of the Satellite Network Modem System (SNMS) standard TIA-1073. The SNMS standard defines the requirements for hub-spoke as well as mesh satellite network topologies operating over transponded/transparent satellite systems. In the hub-spoke topology, the hub provides a high rate DVB-S2 outbound channel and terminates the in-bound DVB-RCS channels. In the mesh topology, the SNMS permits terminals to communicate directly with each other without the need to go through a central hub.

The SNMS standard was developed in a hierarchical fashion as a collection of standards that when taken in total define the requirements of the TDM-and MF-TDMA-based SNMS. The SNMS standard includes the TIA-developed:

- IP Modem Functional Capabilities Description Document (TIA-157)

- SNMS General Requirements Document (TIA-1073-000)

- SNMS Network Layer Protocol Documents (TIA-1073-001)

- SNMS Encryption Requirements Document (TIA-1073-002)

- SNMS Mesh Control Protocol (TIA-1088)

In addition, the SNMS standard referenced ETSI standards on DVB-RCS (EN 301 790), the DVB-RCS Guidelines (TR 101 790), and DVB-S2 (EN 302 307).

Committee TR-34 also looked at how Connection Control Protocol (C2P) inputs from ETSI/DVB could be utilized in the Satellite Network Modem System standard. The committee took the lead in developing the SNMS Mesh Control Protocol (TIA-1088) standard, which was approved for balloting. TR-34 continues to work toward the publication of a joint TIA and European Telecommunications Standards Institute (ETSI) C2P standard for DVB/RCS and to further refine the standard to determine how connection request profiles relate to channel capacity and how Return Channel Satellite Terminals (RCST) determine their rate parameters from the profiles. It will also be important in the future to ensure that the C2P standard will
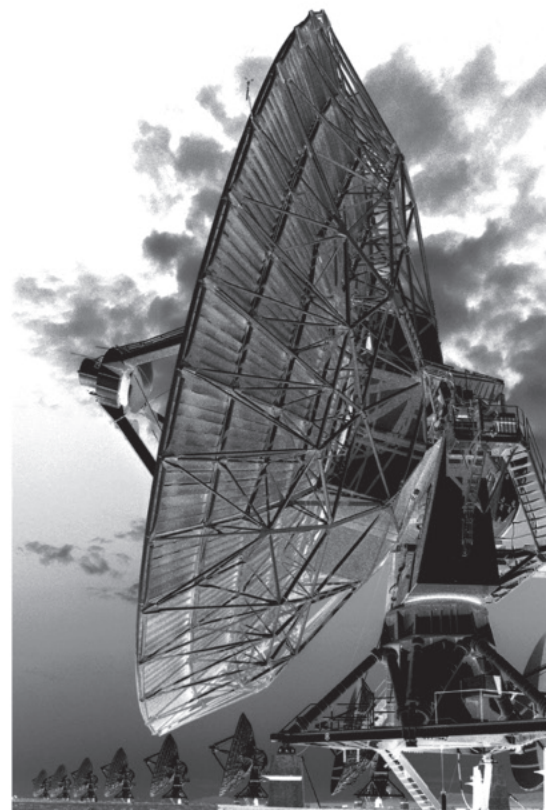
support important functionality such as Quality of Service (QoS), encryption and the generation of dummy traffic.

The balloting status for all of the SNMS-related standards, as of December 2005, was as follows:

- IP Modem FCD standard is approved

- SNMS General Requirements document is approved

- SNMS Network Requirements is in the process of being balloted

- SNMS Encryption Requirements document is in the process of being balloted

- SNMS Mesh Control Protocol (SMCP) is in the process of being balloted

During 2005, Committee TR-34 also worked on the development of the "IP over Satellite (IPoS)" standard (TIA-1008) to include a star-mesh topology, DVB-S2 interoperability and high-speed in-route channels. After several revisions, this standard was balloted and approved as TIA-1008-A.

Lastly, TR-34 also worked on the development of a "QoS Signaling for IPv6 QoS Support" standard TIA-1039-A. After incorporating certain revisions, this standard was balloted and also approved.
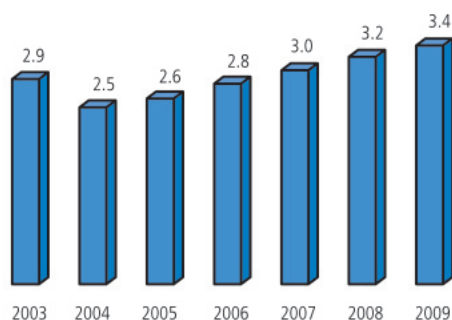
<< **CHAIR, TR-34**
PRAKASH CHITRE
ViaSat, Inc.

SUBCOMMITTEE:

TR-34.1 **Communications and Interoperability**

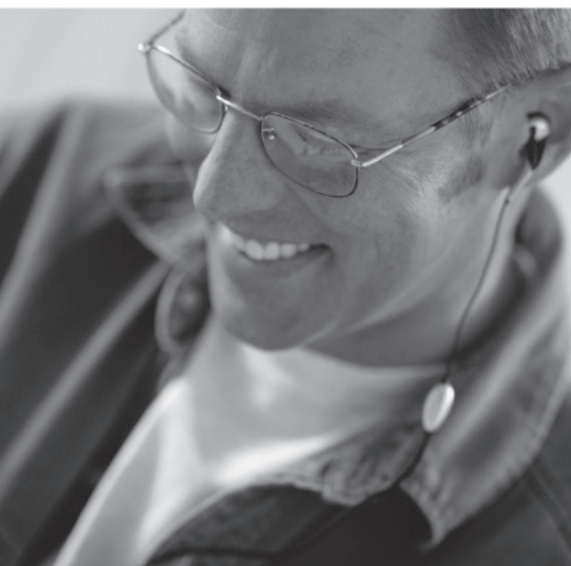**Chair:** Tony Noerpel

Hughes Network Systems

Global Mobile Satellite Services Revenue ($ Billions)

Year	Revenue
2003	2.9
2004	2.5
2005	2.6
2006	2.8
2007	3.0
2008	3.2
2009	3.4

Source: *TIA's 2006 Telecommunications Market Review and Forecast*

Engineering Committee TR-41 addresses voluntary standards for telecommunications terminal equipment and systems, specifically those used for voice service, integrated voice and data service, and Internet protocol (IP) applications. The work involves developing performance and interface criteria for equipment, systems and private networks, as well as the information necessary to ensure their proper interworking with each other, with public networks, with IP telephony infrastructures and with carrier-provided private-line services. It also includes providing input on product safety issues, identifying addressing the administrative aspects of product approval processes. In addition, TR-41 develops criteria for preventing harm to the telephone network, which become mandatory when adopted by the Administrative Council for Terminal Attachments (ACTA).

Committee **TR-41 develops** standards for wireline and IP telephony terminal equipment ranging from individual consumer telephones to large enterprise systems. TR-41 held four week-long meetings in 2005 with its five subcommittees and their working groups. Additional interim meetings were conducted via teleconference as needed.

The TR-41 leadership remained largely unchanged except for the creation of two vacancies due to resignations. Elections for TR-41 were held in August followed by those for its odd-numbered subcommittees in November. Although several individuals in leadership positions were completing their second two-year term, in many cases no new candidates stepped forward. Where the incumbent was willing to continue in office, a vote was taken to waive the two-term limitation rule, and the incumbent was reaffirmed by acclamation. This occurred for TR-41 Chair Steve Whitesell and Vice Chair Roger Britt, TR-41.3 Chair James Bress and TR-41.7 Chair Randy Ivans.

Joachim Pomy (Avaya Tenovis) was elected Vice Chair of TR-41.1 in May to fill a vacancy. Tailey Tung announced his resignation as TR-41.1 Chair in September as a result of taking his retirement from Siemens. In cases where elections were held,

Greg Slingerland was re-elected Chair of TR-41.9, and Phillip Havens was re-elected Vice Chair of both TR-41.7 and TR-41.9.

TR-41 maintains liaison relationships with a number of standards bodies, consortia and councils. These include the European Telecommunications Standards Institute's Speech Transmission Quality (ETSI STQ) Technical Committee, the Institute of Electrical and Electronics Engineers (IEEE) Subcommittee on Telephone Instrument Testing (STIT), and two Alliance for Telecommunications Industry Solutions (ATIS) groups: the Network Interface, Power and Protection Committee (NIPP); and the Performance, Reliability and Quality of Service Committee (PRQC). During 2005, the committee also had liaison with the IEEE 802.1 Higher Layer Local Area Network (LAN) Protocols Working Group, the Internet Engineering Task Force (IETF) Management Information Base (MIB) Experts Group, the Digital Subscriber Line (DSL) Forum and Ecma International. Informal liaison is also maintained through overlapping member participation in the IEEE 802.11 Wireless Local Area Network (W-LAN) Working Group, the IEEE 802.19 Coexistence Technical Advisory Group (TAG), and the National Fire Protection Association (NFPA) Panel 70, which maintains the National Electrical Code (NEC).

TR-41 takes a leadership role in providing support to the Administrative Council for Terminal Attachments (ACTA), both in terms of submitting technical criteria for ACTA adoption and by providing input on administrative matters. It also maintains liaison with Industry Canada's Terminal Attachment Program Advisory Committee (TAPAC), and the Telecommunication Certification Body (TCB) Council. In addition, TR-41 provides input to Underwriters Laboratories (UL), the Canadian Standards Association (CSA), and International Telecommunication Union - Telecommunication Standardization Sector (ITU-T) Study Group 12, Performance and Quality of Service. In this past year, it also provided input to ITU-T SG 9, Integrated Broadband Cable Networks and Televisions and Sound Transmission, and SG 16, Multimedia Terminals, Systems and Applications.

Subcommittee TR-41.1, Telephony Aspects of Multi-Line Telecommunications System and VoIP Equipment, was focused primarily on two new projects related to packet-based interfaces. It completed work on TIA-1062, *1544 kbps Interface Requirements for Packet-Based Gateways* and successfully balloted the document. It will be published early in 2006. The TR-41.1.1 Working Group made good progress on developing TIA-1063, *Analog Telephone Port Requirements for Packet Based Terminal Adapters* and expects to publish it by mid-2006.

TR-41.1 also dealt with three Telecommunications Systems Bulletin (TSB) documents that required attention because they contained mandatory "shall" requirements. TSB-123 was upgraded to a standard and approved for publication as TIA-123-A, *North American Test Plan for Multi-Vendor QSIG Interoperability Testing.* TSB-116 was revised to remove the normative text and approved as TSB-116-A, *Voice Quality Recommendations for IP Telephony.*

Subcommittee TR-41.3, Analog and Digital Wireline Terminals, completed its effort to revise TIA-470-B, *Performance and Compatibility Requirements for Telephone Sets with Loop Signalling.* With the publication of TIA-470.230-C, *Network Signaling Performance Requirements for Analog Telephones*, all the elements to replace TIA-470-B are now available. As a result, the TR-41.3.8 Working Group was made inactive.

Work continued in several TR-41.3 Working Groups to add additional documents to the TIA-470 series. This included requirements for hands-free acoustic performance (TR-41.3.10), headset acoustic performance (TR-41.3.11), features unique to cordless telephones (TR-41.3.9) and features unique to answering systems (TR-41.3.12). The TR-41.3.9 project, *Telecommunications Telephone Terminal Equipment Cordless Telephone Operation and Feature Performance Requirements*, was out for ballot and should be published in early 2006 as TIA-470.320-C. In addition, the TR-41.3.3 Working Group continued its efforts on revising TIA-810-A, *Transmission Requirements for Narrowband Voice over IP and Voice over PCM Digital Wireline Telephones.*

The effort that began last year in response to informal FCC complaints about digital cordless telephones causing interference with hearing aids developed into an official project. TR-41.3 members worked with a researcher from Gallaudet University to correlate objective measurements on a group of eight cordless telephones with subjective results reported by hearing aid users at the 2005 convention of Self Help for Hard of Hearing People. A first draft of TIA-1083, *Measurement Procedures and Performance Requirements for Handset Generated In-Band Magnetic Noise,* has been created, with the goal of completing the document by mid-2006.

Subcommittee TR-41.4, IP Telephony Infrastructures, completed its work on two projects. TIA-1057, *Link Layer Discovery Protocol for Media Endpoint Devices,* extends the IEEE 802.1AB, *Link Layer Discovery Protocol* standard for VoIP-specific applications, including a means of providing location information that can be used for E911 services. The other document was TIA-811-A, *Telecommunications-Telephone Terminal Equipment-Performance and Interoperability Requirements for Voice-over-IP (VoIP) Feature Telephones,* a major revision and upgrade of TSB-811.

TR-41.4 has several other open projects in various stages of development. The revision of TSB-146, *Telecommunications-IP Telephony Infrastructures-IP Telephony Support for Emergency Calling Service,* is nearing completion. Good progress is now being made on the draft of TIA-1003, *Requirements for Wireless*

LAN-Based IP Telephony Endpoints. Several submissions have also been received for a new project on *Technical Assessment of Synchronizations Methods in IP Networks from a Quality Experience Perspective.*

Subcommittee TR-41.7, Environmental and Safety Considerations, continued its efforts on two main projects. TR-41.7.4 has completed its effort to revise TIA-571-A, *Environmental Considerations,* and will be sending the document to ballot once some editorial cleanup is completed. The TR-41.7.5 Working Group has the core requirements in place for its document on overcurrent protection devices used in telecom networks and terminal equipment. It is working to refine those requirements and will then submit the document to UL and CSA for their consideration in creating a safety standard for these components.

New regulations on the efficiency of external power adapters that were enacted by the California Energy Commission were brought to the attention of TR-41.7 participants at the May meeting and set off a flurry of activity. The industry response to these regulations is being by supported from TIA's User Premises Equipment Division (UPED).

The TR-41.7.1 Working Group, which deals with harmonization of international safety standards provided input on Article 830 of the National Electric Code to the National Fire Protection Association concerning remote powering for certain classes of customer equipment. In particular, they suggested provision be made for allowing equipment that complies with UL 60950-21. They also sent a letter to the UL/CSA Bi-National Working Group seconding the concerns raised in a liaison input from the IEEE Subcommittee on Telephone Instrument Testing (STIT) about a proposal that would allow reverting to inappropriate test procedures for receive acoustic limiting tests in UL 60950-1.

Subcommittee TR-41.9, Technical and Administrative Regulatory Considerations, continued its Federal Communications Commission (FCC) Part 68-related work of creating updates to technical criteria for preventing harm to the network and submitting the documents to ACTA. The Third

Addendum to TIA-968-A, *Telecommunications-Telephone Terminal Equipment–Technical Requirements for Connection of Terminal Equipment to the Telephone Network,* was published and adopted by ACTA. It provides network harms criteria for all Spectrum Management classes of DSL modems identified in T1.417-2003, *Spectrum Management for Loop Transmission Systems.* Work was started on a fourth addendum, which is expected to be the last prior to initiating work on a complete revision of the document.

U.S. Enterprise Voice and Data Equipment Revenue ($ Billions)

Year	Revenue
2003	86.3
2004	92.0
2005	98.3
2006	104.5
2007	110.5
2008	116.5
2009	121.7
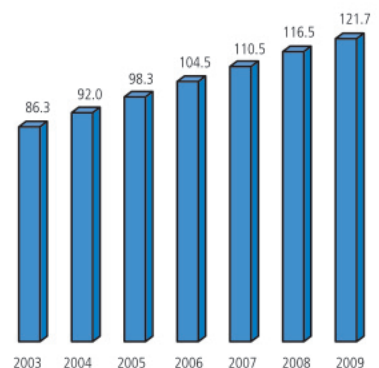
Source: *TIA's 2006 Telecommunications Market Review and Forecast*

Working Group TR-41.9.2 is nearing completion of its efforts to revise TSB-31-B, *Part 68 Rationale and Measurement Guidelines.* The updated document will include suggested measurement methods for demonstrating compliance with all technical criteria in TIA-968-A and its addenda, as well as the criteria for terminal equipment retained by the FCC in its Part 68 rules. A new project was initiated to overcome an issue about the document containing mandatory plating requirements for connectors. The new TIA-1096, *Telecommunications-Telephone Terminal Equipment Connector Requirements for Connection of Terminal Equipment to the Telephone Network,* will combine the plating requirements from TSB-31-B with the requirements on mechanical characteristics and dimensions of plugs and jacks from TIA-968-A.

TR-41.9 also provides industry responses to questions about TIA-968-A and Part 68. The list of Frequently Asked Questions (FAQs) and their answers on the TR-41 page at the TIA Web site was updated and a link to them was created on the ACTA Web site. TR-41.9 also provided ACTA with a spreadsheet *Summary of Technical Criteria and Labeling Criteria Dates,* which ACTA published on its own Web site.

<< **Chair, TR-41**
STEPHEN R. WHITESELL
VTech Communications

VICE CHAIR:
ROGER BRITT
Nortel

SUBCOMMITTEES

TR-41.1 **Telephony Aspects of MLTS and VoIP Equipment**
Chair: Vacant
Vice Chair: Joachim Pomy
Avaya Tenovis

TR-41.3 **Analog and Digital Wireline Terminals**
Chair: James Bress
AST Technology Labs, Inc.
Vice Chair: Vacant

TR-41.4 **IP Telephony Infrastructures**
Chair: Bob Bell
Cisco Systems, Inc.
Vice Chair: Joanne McMillen
Avaya, Inc.

TR-41.7 **Environmental and Safety Considerations**
Chair: Randy Ivans
Underwriters Laboratories
Vice Chair: Phillip Havens
Littelfuse

TR-41.9 **Technical and Administrative Regulatory Considerations**
Chair: Greg Slingerland
Mitel Networks
Vice Chair: Phillip Havens
Littelfuse

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Engineering Committee TR-42 develops and maintains voluntary premises telecommunications systems requirements standards for copper and optical fiber cabling, pathways and spaces, administration and related systems in commercial buildings, residential, industrial and other premises. The committee's standards work covers telecommunications cabling including component requirements, field-test and installation requirements, cabling distances, telecommunications outlet configurations, and recommended topologies.

Committee TR-42's work addresses the requirements for the design and construction of telecommunications cabling systems for commercial buildings, single-family and multi-dwelling residential, data centers and industrial environments, including customer-owned outside plant. Telecommunications cabling systems include the pathways into which telecommunications cabling is placed, as well as the rooms and areas associated with buildings and outside plant structures used to terminate cables and to install telecommunications equipment. The standards work also applies to mobile homes, marine construction and other buildings to the extent practicable. TR-42 additionally formulates positions and proposals for harmonization with international standards bodies and maintains an ongoing liaison with application developers, such as the Institute of Electrical and Electronics Engineers (IEEE), and building cabling designers, such as Building Industry Consulting Service International (BICSI).

The latest documentation from TR-42, its subcommittees and working groups is evolving to meet the increased bandwidth demands of future applications. The mega-gigabit era has introduced many new challenges for cabling, such as lower loss limits for optical fiber cabling and increased requirements for copper cabling. The activities within TR-42, along with the committee's global influence on international standards, help increase trade and reduce cost for end users, who in turn must also keep abreast of these latest changes in technology to ensure making the right cabling systems decisions.

2005 ACTIVITIES

The TR-42 Engineering Committee is organized into nine subcommittees and three working groups, each responsible for a specific area of premises telecommunications cabling needs. TR-42's efforts covered a broad range of activities during 2005, including several additional publications to the TIA/EIA-568-B, *Commercial Building Telecommunications Cabling Standard,* series of standards: TIA/EIA-568-B.1, *Commercial Building Telecommunications Cabling Standard; Part 1 General Requirements,* specifies general requirements for telecommunications cabling in commercial buildings; TIA/EIA-568-B.2, *Commercial Building Telecommunications Cabling Standard; Part 2 Balanced Twisted-Pair Cabling Components,* specifies detailed requirements for copper cabling; and TIA/EIA-568-B.3, *Optical Fiber Cabling Components Standard,* specifies detailed requirements for optical fiber cabling.

The TIA/EIA-568-B series of standards recognizes balanced twisted-pair copper and optical fiber cabling that, when used together in a system, can provide a robust and high-performance network. Optical fiber is used principally for backbone cabling between buildings on a campus, between networking equipment on different floors of a building or in feeding a telecommunications enclosure that serves a smaller area of a building. Laser-optimized multimode fiber is a primary choice that supports up to 10 Gb/s data transmission for distances up to 300 meters using serial data transmission and cost-effective Vertical Cavity Surface Emitting Lasers (VCSELs). Array connector polarity specifications for parallel optics applications such as for use in data centers have also been finalized. Balanced twisted-pair copper is used primarily for horizontal distribution between networking equipment in a telecommunications room or telecommunications enclosure and work area equipment, such as between a switch and a personal computer or telephone. Category 6 cabling, which became a standard in June 2002, has had additional requirements approved as an addendum to ANSI/TIA/EIA-568-B.2. In addition, a Telecommunications Systems Bulletin (TSB) is being written to help explain the role of category 6 cabling with 10GBASE-T. The bandwidth of copper cabling is being further expanded up to 500 MHz as "augmented" category 6 cabling is being developed within TR-42.7. This elevation in bandwidth is envisioned to continue copper cabling as the horizontal medium of choice, as it will enable users to keep up with the growing demands of bandwidth-intensive networking. As an example, the cabling system of optical fiber in the backbone and copper in the horizontal can aid the delivery of streaming video images for the medical profession.

To complement the TIA-568-B Series, TR-42 developed TSB-162: *Telecommunications Cabling Guidelines for Wireless Access Points.* This TSB will assist designers of telecommunications cabling systems to identify locations for wireless access points, the cabling needed to connect them, and the testing needs associated when using long cords and power over Ethernet. The grid layout uses cabling deployed from a telecommunications room, or the access point may fit within a telecommunications enclosure.

ANSI/TIA-942, *Telecommunications Infrastructure Standard for Data Centers,* was approved and published in 2005. This standard is being well received by data center designers and professionals and feedback indicates it is giving the data center industry consistency in deploying networks. Not only does this standard provide a cabling topology and cabling requirements, but it also provides needed information for disaster recovery and a scaling better known as "tiers."

ANSI/TIA 570-B, the *Residential Telecommunications Infrastructure Standard,* was published in 2004 through the efforts of the TR-42.2 Subcommittee. This technical work has taken on growing importance in 2005 as more homeowners take advantage of digital conveniences in the home, including home entertainment, home control systems, networking and telecommuting. Further work is underway in TR-42.2 to better define coaxial cabling needs, such as ensuring that the correct coaxial cable will be used in a specific area, that the connector will be compatible with the cable, and that the cabling is qualified to ensure systems (e.g., high-definition television to a plasma display) will indeed work.

TR-42 will continue to grow in scope and diversity with a focus on developing globally applicable standards. At the subcommittee and working group levels there is an ongoing technical exchange and dialogue with international experts in the field of cable, connector and system performance, and testing from the International Electrotechnical Commission (IEC) Technical Committee 46 "Cables, Wires, Waveguides, R.F. Connectors, and accessories for Communication and Signalling" and Technical Committee 86 "Fibre optics." TR-42 has also been very active in providing input to the Joint Technical Committee (JTC)-1, Subcommittee 25, "Interconnection of information technology equipment," WG3, "Customer premises cabling." The intent is to ensure that TIA cabling standards are a technically compatible subset and fully harmonized with international standards.

In addition to the existing standards maintained by TR-42 and its subcommittees, a new standard is also under development for industrial buildings, to become TIA-1005.

Subcommittees:

TR-42.1 **Commercial Building Telecommunications Cabling**
Chair: Mr. Herb Congdon
Tyco Electronics
Vice Chair: Ms. Julie Roy
C^2 Consulting

TR-42.2 **Residential Telecommunications Infrastructure**
Chair: Mr. Bob Jensen
Fluke Networks
Vice Chair: Mr. John Pryma
Honeywell

TR-42.3 **Commercial Building Telecommunications**
Pathways and Spaces
Chair: Mr. Steve Huffaker
JP Morgan Chase
Vice Chair: Mr. Glenn Sexton
Northwest Information Services

TR-42.4 **Outside Plant Telecommunications Infrastructure**
Chair: Mr. Henry Franc
HF Consulting

TR-42.5 **Telecommunications Infrastructure Terms**
Chair: Mr. Peter Sharp
Giffels Associates Limited
Vice Chair: Mr. Steve Huffaker
JP Morgan Chase

TR-42.6 **Telecommunications Infrastructure Administration**
Chair: Mr. Peter Sharp
Giffels Associates Limited
Vice Chair: Mr. Steve Huffaker
JP Morgan Chase

TR-42.7 **Telecommunications Copper Cabling Systems**
Chair: Mr. Paul Vaanderlaan
Belden/CDT
Vice Chair: Ms. Val Rybinski
The Siemon Company

TR-42.8 **Telecommunications Optical Fiber Cabling Systems**
Chair: Mr. Herb Congdon
Tyco Electronics
Vice Chair: Ms. Julie Roy
C^2 Consulting

TR-42.9 **Industrial Telecommunications Infrastructure**
Chair: Mr. Shadi Abu Ghazaleh
Hubbell Premise Wiring
Vice Chair: Mr. Bob Lounsbury
ODVA Rockwell

Engineering Committee TR-45 develops performance, compatibility, interoperability and service standards for mobile and personal communications systems. These standards pertain to, but are not restricted to, service information, wireless terminal equipment, wireless base station equipment, wireless switching office equipment, ancillary apparatus, auxiliary applications, inter-network and intersystem operations, interfaces and wireless packet data technologies.

TR-45 is comprised of five subcommittees and a number of standing ad hoc groups that focus on various aspects of wireless mobile and Personal Communications Systems (PCS) specifications and standards. In addition to maintaining and enhancing standards for legacy cellular and PCS, the committee continues to support the International Telecommunication Union (ITU) with inputs to the Recommendations for International Mobile Telecommunications (IMT)-2000 and Systems Beyond IMT-2000 and to work in conjunction with the Third Generation Partnership Project 2 (3GPP2) on development of standards for the Next Generation Networks (NGN).

Committee TR-45 and its subcommittees published many key standards and Telecommunications Systems Bulletins (TSBs) that provide the basis for mobiles and the mobile infrastructure for multiple radio interfaces. In addition to its many publications, several key decisions and initiatives were undertaken by Committee TR-45 in 2005.

- A pivotal revision was made to responsibilities with TR-45 regarding Lawfully Authorized Electronic Surveillance (LAES). Due to overlaps between the Electronic Surveillance work in Subcommittee TR-45.2 (Core Network Technology) and Subcommittee TR-45.6 (cdma2000® Wireless Packet Data Technology), TR-45.2 voluntarily relinquished its responsibilities, allowing work to be concentrated in TR-45.6.

- Electronic surveillance work within the committee was further restructured so that TR-45 continued to look to TIA to address higher-level issues, while the TR-45 Lawfully Authorized Electronic Surveillance (LAES) Ad-Hoc Group maintained the J-STD-025 electronic surveillance series of standards and Subcommittee TR-45.6 addressed the development of standards related to cdma2000® packet data network technologies.

- The TR-45 Electronic Serial Number (ESN)/User Identification Module ID (UIM)/ Mobile Equipment Identity (MEID) Ad-Hoc Group (EUMAG) was extremely active, addressing ESN exhaust and MEID migration administration, transition issues, and continues to raise industry awareness on the impacts of this transition, with MEID implementation anticipated mid-2006.

- Subcommittee TR-45.2, Core Network Technology, continued as the lead group for NGN standards within TR-45 to coordinate with the other subcommittees and ad hoc groups (AHGs) on NGN. In coordination with 3GPP2, TR-45 produced documents to support NGN (IMS/MMD) architecture and framework and continues to work on convergence via 3GPP2 and the Third Generation Partnership Project (3GPP). Additionally, the

NGN work continues to support convergence relative to LAES and Enhanced 911 (E911).

- Standards work applicable to the principles of Project MESA (Mobility for Emergency and Safety Applications) and to the needs of public safety were identified by the subcommittees, with member company contributions submitted to Project MESA meetings in 2005.

- The committee continues to actively support the Global Standards Collaboration (GSC) initiative. TR-45 group, once again prepared contributions for the GSC-10 conference held in May 2005 in Sophia Antipolis, France. In addition, TR-45 looks forward to continuing participation in the TIA-hosted GSC-11 meeting in May 2006 in Chicago, Ill.

- New leaders were elected and confirmed for a number of subcommittees and AHG chair and vice-chair positions.

Highlights of these and numerous other projects, publications and activities of the subcommittees and AHGs are described below.

Subcommittee TR-45.2, Core Network Technology, provides support for multiple radio interfaces within TR-45 and is the lead group for the development of wireless core network standards, including the widely-used ANSI/TIA-41 series, and newer standards for IMS/MMD ("All IP" Core Network) and MMS (Multimedia Messaging Service). The subcommittee has responsibility for NGN standards within TR-45 and coordinates with the other subcommittees and ad-hoc groups on NGN initiatives. Subcommittee TR-45.2 works closely with 3GPP2 Technical Specification Group (TSG)-X: Core Networks and 3GPP2 TSG-S: Service and System Aspects, to convert 3GPP2 specifications into TIA standards. Subcommittee TR-45.2 is responsible for standards to fulfill U.S. government mandates for Enhanced 911, Wireless Priority Service (an optional government service) and Local Number Portability for CDMA, TDMA and analog systems.

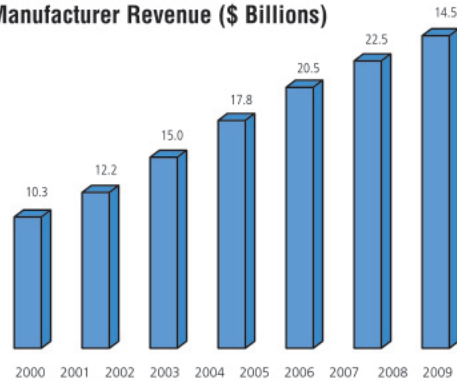Standards approved for publication by TR-45.2 in 2005 were:

- TIA-868 TIA/EIA-41-D *Network Enhancements to Support CDMA SIM Roaming to GSM*

- TIA-124-E *Wireless Radio Telecommunication Intersystem Non-Signaling Data Communication DMH (Data Message Handler)*

- TIA-664 *Wireless Features Description;* 7 parts

- TIA-41 *Revision E Wireless Radiotelecommunications Intersystem Operations-Introduction to TIA/EIA-41*

- TIA-928 Addenda 1 and 2 TIA-41 *Support for the Mobile Equipment Identity (MEID)*

- J-STD-036 Revision B *Enhanced Wireless 9-1-1 Phase 2*

- TIA-873 *(MMD/IMS for cdma2000®)*

- TIA-945 *MAP Support of Authentication and Key Agreement (AKS)*

- TSB-100-A Addendum 1 *Wireless Network Reference Model*

- TIA-93-B Addendum 1 *Wireless Telecommunications Ai-Di Interfaces Standard*-Addendum 1

- TIA-1055 *MAP Enhancements to Support Enhanced Message Waiting Notification (MWN)*

- TIA-1074 *OTA Support for MEID*

- TIA-1020 *(IP-based Location Services)*

Subcommittee TR-45.3, Time Division Digital Technology
approved for publication in February 2005 the enhanced addenda to five parts of 136E, TIA-136 TDMA Third Generation Wireless, Revision E standards.

- SP-3-4027-030-RV2-AD1: an addendum to TIA Standard TIA/EIA-136-030-B, *TDMA Third Generation Wireless – R-UIM Overview and Operation – Release B – Addendum 1* (published as TIA/EIA-136-030-B-1[E])

U.S. Wireless Device Manufacturer Revenue ($ Billions)

Source: *TIA's 2006 Telecommunications Market Review and Forecast*

- SP3-4027-370-RV1-AD1: an addendum to TIA Standard TIA/EIA-136-370-A, *TDMA Third Generation Wireless – Enhanced General Packet-Data Service (EGPRS-136) – Release A - Addendum 1* (to be published as TIA/EIA-136-370-A-1[E])

- SP-3-4027-376-RV1-AD1: an addendum to TIA Standard TIA/EIA-136-376-A, *TDMA Third Generation Wireless – Enhanced General Packet-Data Service (EGPRS-136) – Mobility Management (MM) – Release A - Addendum 1* (published as TIA/EIA-136-376-A-1[E])

- SP-3-4027-377-RV1-AD1: an addendum to TIA Standard TIA/EIA-136-377-A, *TDMA Third Generation Wireless – EGPRS-136 Gs Interface Specifications – Release A - Addendum 1* (published as TIA/EIA-136-377-A-1[E])

- SP-3-4027-440-RV1-AD1: an addendum to TIA Standard TIA/EIA-136-440-A, *TDMA Third Generation Wireless – Adaptive Multirate (AMR) Codec – Release A - Addendum 1,* (published as TIA/EIA-136-440-A-1[E])

TR-45.3 initiated a work item on ANSI/TIA/EIA-136 Revision F that also will be comprised of multiple documents.

* cdma2000® is a registered trademark and certification mark of the Telecommunications Industry Association (TIA-USA).

TR-45.3 continued to work jointly with the Alliance for Telecommunications Industry Solutions (ATIS) Wireless Technologies and Systems Committee (WTSC) (formerly T1P1), to complete input to the ITU-R Working Party 8F on the submission of materials for TDMA – Single Carrier (SC) in Recommendation ITU-R M.1457-5 by the May 2005 and October 2005 deadlines. For 2006, TR-45.3 initiated a new work item for a TDMA-SC update for M.1457-6. TR-45.3 continued to work on a number of TR-45-remanded items. Of particular concern to TR-45.3 were the items related to ESN exhaust, the proposed ESN reclamation of TDMA/analog manufacturer codes and the use of MEIDs and pseudo-ESNs. In addition, TR-45.3 weighed in on items related to NGN and Project MESA.

Subcommittee TR-45.4, Radio to Switching Technology, continued to work closely with 3GPP2 TSG-A (Access Network Interfaces) on the development of standards related to the Radio Access Network (RAN). The Interoperability Specifications (IOS) for Hybrid Mobile Station/Access Terminal (HAT) Authentication, Using the Algorithm were approved for publication as TIA-1070 in 2005.

Revision A of the IOS HRPD standards, TIA-878-A, *Interoperability Specifications (IOS) for High Rate Packet Data (HRPD) Radio Access Network Interfaces with Session Control in the Access Network* and TIA-1878-A, *Interoperability Specifications (IOS) for High Rate Packet Data (HRPD) Radio Access Network Interfaces with Session Control in the Packet Control Function* were approved for publication in December 2005. These standards included many new features and enhancements including HRPD-1x cdma2000® Circuit Services Notification Application (CSNA), multiple personalities in the session configuration protocol, muliflow and quality of service, data over signaling (DOS), GRE segmentation and many access network capabilities.

Numerous features were added to Revision D of TIA-2001.1-7-D *Interoperability Specification (IOS) for cdma2000® Access Network Interfaces IOS v5.0,* the standard published in 2005. The additions included support for R-PDCH (1xEV-DV) enhancements, support for MEID, Transcoder Free Operation (TrFO), Remote Transcoder Operation (RTO), support for packetized A1p/A2p interfaces, Voice Preference Over Packet (VPOP), enhancements for the PDSN Selection Algorithm, Circuit Switched Video Conferencing Calls, Wideband Speech Codec, Flow Control, enhancements to Short Data Burst and much more. Additionally, a decision was made to develop a point release to TIA-2001.1-7-D with publication targeted for December 2005 as TIA-2001.1-7-D-1.

Interoperability Specification (IOS) for Broadcast Multicast Services (BCMCS) is under development with publication planned during early 2006.

Subcommittee TR-45.5, Spread Spectrum Digital Technology, continues to be the industry leader in the publication of standards for Third Generation (3G) cdma2000®. TR-45.5 approved over 100 documents for ballot in 2005. Several of the key standards published (or *approved for publication) are listed here.

- TIA-637-C* *Short Message Services (SMS)*

- TIA-683-D* *Over the Air Service Provisioning of Mobile Stations in Spread Spectrum Standards*

- TIA-707-B* *Data Service Options for Spread Spectrum Systems*

- TIA-856-A-1 *cdma2000® High Rate Packet Data Air Interface Specification*

- TIA-820-A-2 [E] *Removable User Identity Module for Spread Spectrum Systems*

- TIA 894 *Selectable Mode Vocoder Minimum Performance Specification: Option 56 for Wideband Spread Spectrum Digital Systems*

- TIA-1011-1* *Multimedia Messaging Service (MMS) Media Formats and Codecs for cdma2000® Spread Spectrum Systems -Addendum 1*

- TIA-1006-1 [E] *High Rate Broadcast Packet Data Air Interface Specification*

- TIA-1017 *Minimum Performance Specification for the Source Controlled Variable Rate Multimode Wideband Speech Codec (VMR-WB) Service Option for Spread Spectrum System*

- TIA-1042 *Electro-Acoustic Recommended Minimum Performance Specification for cdma2000® Mobile Stations*

- TIA-1054* *High Rate Packet Data Supplemental Packet Data Services*

- TIA-1082 *MEID for cdma2000® Spread Spectrum Systems*

- TIA-2000.1~6-D-1 *cdma2000® Standards for Spread Spectrum Systems series of standards*

TR-45.5, in conjunction with 3GPP2 TSG-C (cdma2000®), is continuing to work on the next revision of the cdma2000® Standards for Spread Spectrum Systems series of standards. Active projects in TR-45.5 include USIM Integrated Circuit Card–Terminal Interface (PN-3-0186), Broadcast and Multicast Service Codecs and Transport Protocols Performance Characterization (PN-3-0211), Broadcast and Multicast Service Codecs and Transport Protocols (PR-3-0212), Multimedia Streaming Service Performance Characterization (PN-3-0214), Over-The-Air Interoperability Specification for cdma2000® Air Interface (PN-3-0163), High Rate Broadcast Packet Data Air Interface Specification (TIA-1006-A) and many more.

During 2005, TR-45.5 provided updates to the ITU-R Global Core Specifications and Roadmap as well as Recommendations M.1457-5 relative to CDMA MC. The subcommittee also continued to review and provide comments on industry documents such as the Intelligent Transport Systems portion of the family of standards for CALM (Communications, Air-interface, Long and Medium Range).

Subcommittee TR-45.6, cdma2000® Wireless Packet Data Technology, is chartered with developing performance, compatibility and inter-operability standards for equipment that supports wireless packet data services, which may be deployed as an integral part of a cdma2000® system. In addition, TR-45.6 was charged to develop standards relative to cdma2000® packet data network technologies and lawfully authorized electronic surveillance standards for VoIP, Push-to-talk over Cellular (PoC),

and the IMS/MMD, while TR-45 continues to look to TIA to address the higher-level legal regulatory issues.

Projects under way in TR-45.6 include the *cdma2000® Wireless IP Network* standard (TIA-835-D, approved for publication January 2006), *cdma2000® Wireless IP Network* standard addenda (TIA-835-C-2); *Tunneling Support in Simple IP* (TIA-1092); altPPP (TIA-1100); LAES for VoIP (TIA-1066); *Broadcast and Multicast Service cdma2000®* Wireless IP Network (TIA-1041); *Broadcast and Multicast Services Phase II* (TIA-1041-A); 3GPP2 *System to Wireless Local Area Network Interworking* (TIA-1050); *WLAN Interworking Phase II* (TIA-1050-A); *LAES Capabilities beyond CALEA* (TIA-1018); *IP Multimedia Subsystem Electronic Surveillance – Technical Aspect* (TIA-1071); and *Lawfully Authorized Electronic Surveillance (LAES) for cdma2000® Push-to-Talk (PoC) over Cellular* (TIA-1072). Work culminated with the approval for publication in TR-45.6 of TIA-1068 *cdma2000®/GPRS Data Roaming* late in 2005.

The **TR-45 Ad Hoc Authentication Group (AHAG)** continued to develop drafts of procedures and conduct reviews of requirements related to a number of security and authentication related topics and issues. An addendum to *Enhanced Cryptographic Algorithms* developed by the AHAG was approved for publication as TIA-946-1[E] in December 2005.

AHAG continues to work closely with 3GPP2 TSG-S Working Group 4 as well as coordinate with 3GPP TSG-SA Working Group 3 (SA3). The current SA3 and AHAG joint control agreement for Authentication and Key Agreement (AKA) remains valid. The AHAG work is underway on several new security documents based on the 3GPP2 TSG-S documents on IP-Based Location Services Security Framework, IMS Security Framework and the Generic Bootstrap Architecture Security Framework.

The **TR-45 Electronic Serial Number (ESN)/User Identification Module ID (UIM) /Mobile Equipment Identity (MEID) Ad Hoc Group (EUMAG)** continues to support TIA on global numbering issues and administrative initiatives. Vis-à-vis TIA, the EUMAG has led the industry by providing recommendations on topics of utmost importance to the

industry including ESN manufacturer codes, ESN reclamation, ESN re-use, ESN administration, UIM ID manufacturer codes, UIM administration, MEID global hexadecimal administration and MEID guidelines. The EUMAG continues to serve as editor of the TIA *ESN Assignment Guidelines & Procedures* and editor of the *MEID GHA Assignment Guidelines & Procedures.*

The primary issues addressed by the EUMAG during 2005 were ESN exhaust and reclamation, UIM ID designation and the issues related to MEID deployment. The EUMAG worked closely with the ESN and UIM ID Administrators to maintain the assignment guidance plan and discuss ESN assignments with UIM IDs derived from ESNs, paying particular attention to the distribution sequence in anticipation of ESN exhaust. As a leader in the industry, the EUMAG has educated the industry through outreach awareness programs in the management of the ESN exhaust timeline and transition to MEID. Thanks to the conservation efforts of the EUMAG and the TIA ESN Administrator, the expected timeframe for ESN exhaust has been extended.

Per the direction of TR-45, the EUMAG continues to work in conjunction with 3GPP2 on MEID and on other topics such as an expanded UIM ID – all related to global numbering. TIA has posted the ESN and MEID documents developed by the EUMAG and related information on the TIA Web site at **www.tiaonline.org/standards/esn** and **www.tiaonline.org/standards/meid** (including a frequently asked question sheet, the ESN migration to MEID milestones and a timeline document).

The **TR-45 Lawfully Authorized Electronic Surveillance (LAES) Ad Hoc Group** worked closely with ATIS to coordinate the balloting of the next American National Standards revision of the *Lawfully Authorized Electronic Surveillance* standard, ANSI J-STD-025B. This revision was approved for publication at the end of January 2006. After publication as an American National Standard (ANS) is completed (other than maintenance of this series of standards), the J-STD-025 series of standards will be capped at Revision B.

Going forward, Subcommittee TR-45.6 will work on other Lawful Intercept (LI) standards, where most of the subject matter

experts are normally in attendance, and will continue to develop the standards related to the cdma2000® packet data network technologies.

The **TR-45 Ad Hoc Group on Electronic Media Documentation (AHEM)** continues to investigate and recommend the use of electronic methods to support the work of Committee TR-45. Electronic methods that the AHEM continued to champion during 2005 include a Web-based calendar, an electronic database of contributions, Internet access at meetings and electronic sign-in at meetings.

SUBCOMMITTEES:

TR-45.2 Wireless Intersystem Technology
Chair: David Crowe
QUALCOMM

TR-45.3 Time Division Digital Technology
Chair: Peter Musgrove
AT&T Wireless Services

TR-45.4 Radio to Switching Technology
Chair: George Turnipseed
Sprint

TR-45.5 Spread Spectrum Digital Technology
Chair: Jean Alphonse
Lucent Technologies Inc.

TR-45.6 Adjunct Wireless Packet Data Technology
Chair: Parviz Yegani
Cisco Systems

TR-45 Ad Hoc Authentication Group (AHAG)
Chair: Frank Quick
QUALCOMM

TR-45 Ad-Hoc Group on Lawfully Authorized Electronic Surveillance (LAES)
Chair: Terri Brooks
Consultant

TR-45 Ad-Hoc Group on UIM/ESN/MEID
Chair: Gary Pellegrino
CommFlow Resources

TR-45 Ad-Hoc on Electronic Media Documentation (AHEM)
Chair: Peter Nurse
Lucent Technologies

Engineering Committee TR-47 is responsible for the development and maintenance of downlink standards for a terrestrial mobile multimedia multicast system. "Multicast" is defined as an audio or video communication made to a select group of multiple destinations simultaneously, or two-way communication such as videoconferencing, teleconferencing or e-mail. These standards are intended for users and suppliers to promote compatible and interoperable systems to support multicast audio, video and data requirements for a wide range of commercial and public services. TR-47 works with other national and international standards development organizations in promoting standards harmonization. TR-47's focus is on standards for radio interfaces, testing methodologies, performance and reliability standards, and equipment design guides as they relate to terrestrial mobile multimedia multicast.

Committee **TR-47** held its inaugural meeting September 9, 2005. The formation of TR-47 was in response to the growing industry interest in mobile TV and multimedia service offerings. The segment directly addressable by TR-47, TM3 technologies, is expected to grow from 5 percent to 15 percent of United States wireless data revenues by 2009. The segment potentially addressable by TM3 technologies is expected to grow from 19 percent to 30 percent of United States wireless data revenues by 2009.

The Engineering Committee developed and received approval for its scope, elected leadership and determined a committee structure.

The committee is interacting with other external organizations and has received contributions from the Digital Video Broadcasting (DVB) Project, FLO Forum and Consumer Electronics Association (CEA). As a reflection of industry interest in deploying TM3-based services, committee participants expect work to proceed at an accelerated pace.

Subcommittee TR-47.1, TM3 Forward Link Only Air Interface, is responsible for the development and maintenance of downlink standards for a subclass of TM3 systems. That subclass is characterized by the combination of the following features, among others:

- Purpose-built

- High spectral efficiency

- Multiple, simultaneous services

- Layered modulation

- Layered service support

- Advanced coding

- Customized transport methods, not limited to Internet protocol encapsulation

- Statistical multiplexing of variable-rate services

- High-quality audio, video and data

- Content protection

- Multiple coverage areas (wide and local) within a single RF channel

- Support different QoS for different services within a single RF channel

- Support different QoS for different components within a single service

- Fast switching time between services

- Minimization of receiver power consumption without sacrificing the time-diversity performance or the speed of service switching, regardless of the service rate

- Deterministic frame structure based on a time synchronizing signal such as GPS

These standards are intended for users and suppliers to promote compatible and interoperable systems to support

<< **Chair, TR-47**
Jerry Upton
Jerry Upton Consulting

Vice Chair, TR-47
Marlis Humphrey
Harris Corporation

multicast audio, video and data requirements for a wide range of commercial and public services.

At its inaugural meeting, Subcommittee TR-47.1 leadership was elected and the subcommittee's scope was approved. PN Number 3-0239 *Forward Link Only Air Interface Specification for Terrestrial Mobile Multimedia Multicast* (if approved to be published as TIA-1099) was approved. The subcommittee's work is progressing and its first technical contributions are being reviewed.

Subcommittee TR-47.2, TM3 Digital Video Broadcasting for Handheld Air Interface, is responsible for the development and maintenance of downlink standards for a subclass of TM3 systems based on digital video broadcasting for handheld devices technology.

TR-47.2 specifications will encompass, but would not be limited to, the following:

- Transmission systems for digital video broadcasting for handheld devices

- Implementation guides for digital video broadcasting for handheld devices

- Validation of transmission systems for digital video broadcasting for handheld devices

- Appropriate ETSI documents related to digital video broadcasting for handheld devices

These standards are intended for users and suppliers to promote compatible and interoperable systems to support multicast audio, video and data requirements for a wide range of commercial and public services.

At its inaugural meeting, TR-47.2 leadership was elected and the subcommittee's scope was approved.

SUBCOMMITTEES:

TR-47.1 **Terrestrial Mobile Multimedia Multicast Based on Forward Link Only Technology**
Chair: Carl Stevenson
WK3C Wireless LLC

Vice Chair: Alan Wolfe
Verizon Wireless

TR-47.2 **Terrestrial Mobile Multimedia Multicast Based on DVB-H Technology**
Chair: Carolyn Taylor
Motorola, Inc.

Vice Chair: Yoram Solomon
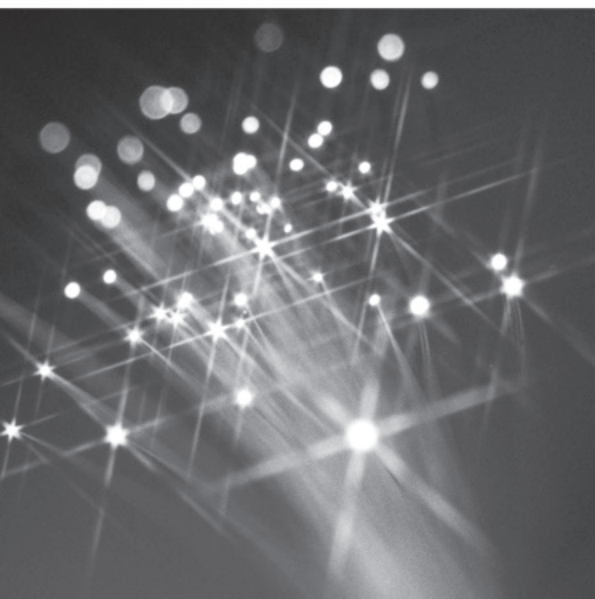Texas Instruments, Inc.

FIBER OPTICS

Engineering Committee FO-4, Fiber Optics, is comprised of four subcommittees and eight working groups covering a wide range of fiber optic standardization subjects. The committee's goals include the timely development of high quality standards meeting the needs of manufacturers, end users and applications employing fiber optic components and systems. The committee meets formally twice a year and is open to all interested parties.

Committee FO-4 met twice in 2005. Both events were full meetings of FO-4, its subcommittees and working groups. Committee FO-4 also met in conjunction with the meetings of the US Technical Advisory Group (TAG) to the International Electrotechnical Commission's (IEC) Technical Committee (TC) 86, Fibre Optics.

Committee FO-4 takes an active interest in the ongoing activities of both domestic and international standards organizations and continued to establish liaisons with organizations having mutual interests. In North America, these included the Alliance for Telecommunications Industry Solutions (ATIS), the Institute of Electrical and Electronics Engineers (IEEE), the Insulated Cable Engineers Association (ICEA), International Electronics Manufacturing Initiative (iNEMI), and IPC Optoelectronic Packaging.

Internationally, the committee developed several technical contributions in support of work in the International Telecommunication Union Telecommunication Standardization Sector (ITU-T). The committee also worked cooperatively with the technical advisory groups of the International Organization for Standardization (ISO) and the IEC including:

- IEC TC 86 and its Subcommittees;
  - Subcommittee 86A, Fibre and Cables
  - Subcommittee 86B, Fibre Optic Interconnecting Devices
  - Subcommittee 86C, Fibre Optic Systems and Active Devices
- ISO/IEC Joint Technical Committee 1/SC25 on Interconnection of Information Technology Equipment.

FO-4.4, Subcommittee on Fiber Optic Amplified Systems, Active Components and Reliability, was disbanded and the work of that subcommittee combined into FO-4.1.

FO-4 plans to work closely with the National Institute of Standards and Technology (NIST) on an initiative to create a strong private-public partnership that identifies America's measurement needs and strengthens the U.S. infrastructure for innovation. The initiative is based on gathering information to develop a strategic plan for the system. This roadmap will describe the needs and required actions to meet gaps and challenges.

Information gathering has two major components:
- Ongoing public workshops held to discuss and identify issues

- The integration of existing industry roadmaps that have measurement and standards content

The major output will be regular reports describing the state of the United States metrology system. Ideally, benefits from this work will include early identification of issues and a coordinated response for addressing them. Articulating the consequences of not acting will allow decision-makers to understand the impacts and effects in time.

The current timetable includes completing the first report at the end of 2006 and providing subsequent reports every four years.

Agreement has been reached on polarization mode dispersion measurement methods in both the IEC and ITU; the current draft of IEC 60793-1-48, Optical Fibres-Part 1-48: Measurement Method and Test Procedures-Polarization Mode Dispersion, is being revised and will be nationally adopted by FO-4.2, replacing three fiber optic test procedures (FOTPs) with a consolidated test method.

TIA has adopted the following Insulated Cable Engineers Association (ICEA) Fiber Cable Standards after completing a memorandum of understanding (MoU) with ICEA:

KEY DEVELOPMENTS IN 2005

Several individuals were recognized for their long-time support of the FO-4 Committee, including Thomas Ball, Tom Ball Consulting Agency; Matthew Brown, CommScope Network Division; Bruce LeFevre, OFS; Peter Pleunis, Draka Comteq Optical Fiber; and Pin Su, Xtellus Dynamic Optics. TIA staff members Susan Hoyler and Jenni Franz were also recognized for all their support of FO-4. The Engineering Committee welcomed Henry Cuschieri as TIA's new Senior Director of Standards and Technology and Suzanne White as the new Standards Secretariat.

FO-4 adopted several new operational policies during the year, including separate locations for informative and normative references in all publications, as well as adoption of a new cover sheet for all contributions. The committee was also apprised of the new policy on digital rights management.

FO-4 held broad discussions on the standards needs for fiber-to-the-premises (FTTP). The committee sees FTTP as a key opportunity to add value to the advancing access market. Each subcommittee was delegated the task of proposing new work in support of FTTP. A new working group under FO-4 was formed to gather the information.

- TIA-472F000, designated as the drop cable specification for FTTP, was adopted from ICEA S-110-717, Optical Fiber Drop Cable

- TIA-472C000-B was adopted from ICEA S-83-596, Optical Fiber Premises Distribution Cable

- TIA-472E000 was adopted from ICEA S-104-696, Indoor-Outdoor Optical Fiber Cable

- TIA-472D000-B was adopted from ICEA S-87-640, Optical Fiber Outside Plant Communications Cable

TIA is also developing a memorandum of understanding (MoU) with the International Electronics Manufacturing Initiative (iNEMI), and FO-4 is collaborating with iNEMI on some visual inspection standards.

The FO-4 Engineering Committee is committed to worldwide harmonization of fiber optic standards and continues to adopt IEC published standards nationally where possible.

U.S. Fiber to the Home (Millions)

Year	Value
2003	0.1
2004	0.2
2005	0.3
2006	0.9
2007	1.6
2008	2.4
2009	3.2
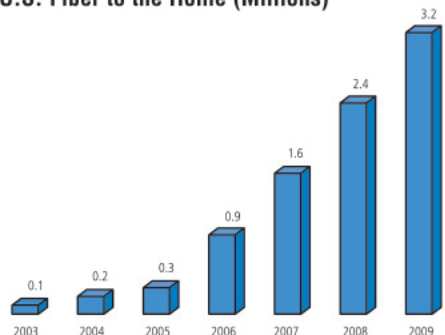
Source: TIA's 2006 Telecommunications Market Review and Forecast

U.S. Carrier Spending on Fiber ($ Billions)

Year	Value
2003	4.2
2004	6.8
2005	9.5
2006	10.4
2007	11.2
2008	12.2
2009	12.9
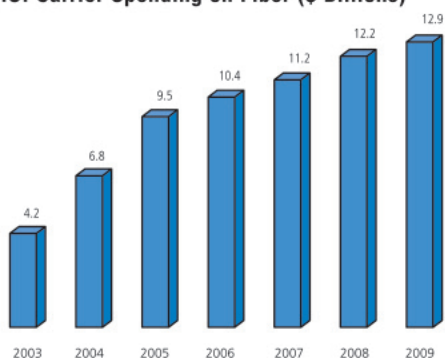
Source: TIA's 2006 Telecommunications Market Review and Forecast

<< CHAIR, FO-4
STEVEN SWANSON
Corning Inc.

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Corning Incorporated
Vice Chair: Gair Brown
U.S. Navy Surface Warfare, DoD

FO-4.2   Optical Fibers and Cables
Chair: Tom Hanson
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OFS

FO-4.3   Passive Optical Devices and Components
Co-Chair: Tom Ball
Tom Ball Consulting Company
Co-Chair: Andre Girard
EXFO

FO-4.5   Fiber Optic Metrology
Chair: Lorenz Cartellieri
Experior Photonics, Inc.
Vice Chair: Tim Drapella
National Institute of Standards and Technology

TIA standards activities and programs are open to TIA members and non-members. TIA thanks the following companies for their 2005 participation.

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ETRI

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FBI	NeuStar Inc.	Terri Brooks Consulting

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Tower Technology

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Valmont Communications

Walker Engineering Inc.

Weisman Consultants

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APCO/Quantum Telecommunication

Alliance for Telecommunications Industry Solutions

Bureau of Land Standards Management

CSA International

CTIA

Defense Information Systems

Defense Supply Center, Columbus

Federal Communications Commission

Gallaudet University

IEEE

Industry Canada

NASA/GSFC

NATE

National Interagency Fire Center

National Institute of Standards and Technology

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