TIA : STAR

2006

★ STANDARDS AND TECHNOLOGY ANNUAL REPORT

TIA®

ADVANCING GLOBAL COMMUNICATIONS

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The Telecommunications Industry Association is the leading trade association for the information, communications and entertainment technology industry. TIA serves more than 600 global suppliers and their service provider and enterprise customers through leadership in collaborative standards development, member-driven U.S. and international policy advocacy, and facilitation of business opportunities through NXTcomm and other marketplace events and summits. For more information on TIA benefits and programs, please contact **membership@tiaonline.org**

Rob Pullen-Tellabs
TIA Chairman

Grant Seiffert
TIA President

"TIA's standards program is world-class in every respect. It is accredited by the American National Standards Institute, the conduct of its standards development is completely transparent, and it is open to participation by any interested party."

When company executives evaluate their participation in TIA's various programs…the value derived, the cost/benefits and the applications to their products…we often hear that the association's standards development effort is particularly important. It's important to individual companies, important to the overall industry and important to the global consumer who seeks—actually expects—complete compatibility and interoperability for products and services anywhere, any time. In fact, many of our members report that they joined TIA because of our standards program.

TIA's Board of Directors and members have regularly ranked standards as a top priority for the association. We consider standards work to be one of the three primary pillars underpinning the services we provide, along with public policy and market development. The latter, of course, is through vehicles such as NXTcomm, June 18-21 at Chicago's McCormick Place, and via our USA Pavilions in global trade shows such as those organized by the International Telecommunication Union.

Our industry has seen its sales wax and wane in recent years after the strong growth we enjoyed at the beginning of the 21st century, but sales of TIA's standards have remained robust. In fact, the royalties we receive from those sales cover a major part of the association's expense in operating the program. In effect, those sales provide a window to see and a tool to measure the strong level of support by members and non-members. The other measure of support is the active participation of subject matter experts from TIA members and non-members alike in each of TIA's standards activities, including both the domestic and international aspects. TIA thanks those individuals and companies that support our programs.

The roots of TIA's standards development efforts trace to the formation of the Radio Manufacturers Association in 1924. That group, now known as the Electronic Industries Alliance (EIA), merged one of its sectors with TIA's forerunner in 1988. Actually, we can say we have been in the standards development arena for literally more than 60 years. The priorities continue to be speeding the cycle of development and globalizing the efforts to keep pace with technological changes.

Standards are important in many industry sectors, but for our sector they are vital to assure successful communications and interoperability…not only for public safety and homeland security, but also to enable global communications. TIA's standards program is world-class in every respect. It is accredited by the American National Standards Institute, the conduct of its standards development is completely transparent, and it is open to participation by any interested party. At the end of 2006, TIA was ANSI's fourth largest Standards Development Organization, measured by the number of approved American National Standards developed.

The efforts of more than 1,100 people serving on more than 70 TIA Engineering Committees, Subcommittees, Working Groups and Ad Hoc Groups, along with the Technical Advisory Groups (TAGs) we support and the Third-Generation Partnership Project (3GPP2), have led to the creation of a library of more than 1,000 standards documents and specifications. On behalf of the association and the industry, we thank the hundreds of volunteers who work long hours to develop our standards and their companies and organizations for letting them participate.

Sincerely,

Robert W. Pullen
TIA Chairman

Grant E. Seiffert
TIA President

As the role of technology continues to permeate almost every sector of industry and of the ordinary consumer's life, the need for standardization continues to gain importance. Accepted industry-wide standards have become the foundation for information exchange, communications and entertainment (ICE). The growth and demand for information and new and innovative ICE technology around the globe have fueled the proliferation of critical market-driven standards developed by both accredited standards developers and consortia. These standards define technical networks, devices, equipment and interoperability requirements that enable a myriad of products to work together in a growing number of scenarios.

The ANSI-accredited TIA Standards Program with its 1,100 volunteers involved in 70 committees is recognized as a leading developer of technology standards in the industry and supports the market with timely standards specifications in many areas, including voice over Internet, hearing aid compatibility, wireline and wireless broadband services, next generation networks, mobile TV, public safety communications, cabling performance and installation, and telecommunications equipment performance.

TIA continues to recognize the importance of collaboration internationally and actively participates in the Third Generation Partnership Project 2 (3GPP2) for mobile broadband and Project MESA for public safety standards. Neither of these projects would have existed without the Global Standards Collaboration (GSC) serving as the backdrop in previous years for cooperation across participating SDOs. The 11th meeting of GSC was hosted by TIA in Chicago in June 2006 and was attended by more than a hundred leaders from ICT standards bodies and major fora around the world to address a wide range of subjects including healthcare ICT, public safety and entertainment, among other key areas, and to continue harmonizing their standards activities and increasing the collaboration in the global community.

Recognizing the rapid pace of development of technology, and global interdependence and the need for seamless interoperability of equipment, the TIA standards program continues to identify emerging areas of technology to explore for standardization and is re-examining how its program can be more efficient to enhance the effort of the hundreds of volunteers from member companies who participate.

Anil Kripalani
TIA Technical Committee Chair

TIA's Technical Committee, which oversees the TIA Standards program, has examined emerging technologies and identified several topics that will be of growing importance to the industry, such as telematics/intelligent transportation, healthcare ICT, emergency communications and notification, identity management and smart buildings.

In 2006, TIA accepted the role of Administrator of the U.S. Technical Advisory Group (TAG) to the International Standards Organization Technical Committee 204, Intelligent Transport Systems (ITS), (ISO TC-204). ITS-related activities are providing emerging and important cross-cutting opportunities for the global automotive and communications industries and are seen as part of the next-generation landscape involving connectivity or networking, mobility and nomadic capabilities, in addition to important public safety advancements including crash notification and avoidance.

Furthermore, in order to better meet the needs of the committee leadership and volunteers who interface regularly with the TIA standards department, TIA has changed its operations and reorganized its standards staff into a vertical model that allows each committee to be supported by a single point of contact for all standards-related issues from the start of the project to publication.

As the Technical Committee Chair, I also want to thank those companies, organizations and subject matter experts that support our standards program at TIA. On behalf of the association and the industry, we thank all those who dedicate their time and expertise to develop TIA standards that benefit the entire industry and are used throughout the world.

Sincerely,

Anil Kripalani
TIA Technical Committee Chair

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 types of systems addressed by these standards include business and industrial dispatch applications, as well as public safety (such as police, ambulance and fire fighting) applications.

The TR-8 Committee is the standards-formulating group for Private Land Mobile Radio Systems. The technology covered by the standards generated by TR-8 includes systems and equipment for business, industrial and transportation communications, as well as public safety communications. These communications systems can range from the traditional analog frequency modulated (FM) voice systems, to digital voice and data systems, to broadband communications networks. In many cases, these systems are used in mission-critical applications. Thus, issues such as communications reliability, security, coverage and interference immunity are of importance. All aspects of the radio networks are covered, including antenna systems and combining networks, radio propagation and coverage prediction, interference protection, and radio frequency (RF) exposure verification and reporting. In addition, the scope of these systems covers not only radio communications, but also fixed-network communications including dispatch console centers, communications among wide area deployed radio networks and intercommunications among communications networks from multiple jurisdictions.

Much of the work carried on in TR-8 has to do with the formulation of standards for the digital radio system known as Project 25. This is a suite of standards covering public safety systems and includes standards for over-the-air radio communications, as well as various fixed network interfaces. An important requirement of public safety systems is the ability of users from different jurisdictions to communicate with each other, either in routine operation or in emergency situations. The Project 25 standards facilitate this ability to interoperate. As such, there has been continued interest in the work of TR-8, not only from equipment

manufacturers, but also from many of the radio users. TR-8 is special, in that the user community plays a big part in the work of the committee, and in many cases establishes the requirements for the technology being standardized. Participation in the work of TR-8 is, in effect, an equal partnership between manufacturers and the user community.

2006 Activities

The various subcommittees within TR-8 continue to maintain a high level of activity. TR-8 and its subcommittees met together five 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 National Association of State Telecommunications Directors (NASTD); and federal government agencies. Much of the work in drafting the documents was done outside of the five meetings and was accomplished through face-to-face working sessions, teleconferences and other electronic working methods. In fact, the pace of the work within the various committees was such that it was not uncommon to have as many as seven teleconference working sessions within a week. Electronic means, including electronic document sharing at the meetings, and the use of the TIA FTP site increased productivity.

Many of the subcommittees continue to work on the Project 25 standards for digital private radio. The suite of Project 25 standards currently consists of 39 documents, with numerous additional documents planned for publication within the next year. Some of the

work of the subcommittees this year has been in the maintenance, upgrade and redrafting of some of these documents. The **Encryption Subcommittee, TR-8.3**, has published TIA-102.AACC-A, *Conformance Tests for Project 25 Over-the-Air-Rekeying Protocol*, an upgrade to the Over-The-Air-Rekeying (OTAR) conformance document. The **Vocoder Subcommittee, TR-8.4**, has approved for publication TSB-102.BABE, *Project 25 Vocoder Evaluation Mean Opinion Score Test* document on vocoder evaluation for Project 25. A great deal of work has gone on within the **Trunking and Conventional Control Subcommittee, TR-8.10**, to upgrade and clarify some of the trunking standards to avoid some potential interoperability issues. Toward that end, three addenda have been published and two more were approved for publication. Various other subcommittees have also been working on maturation of the P25 standard suite.

One major area of activity has been in the development of some of the fixed network standards for Project 25. These include interface standards for the Inter Sub-System Interface (ISSI), Console Interface and the Fixed Station Interface. The **Wireline System Interface Subcommittee, TR-8.19**, along with several of the Project 25 working groups, put an extraordinary effort into bringing these standards to publication. The TIA-102.BACA, *Project 25 Inter-RF Subsystem Interface Messages and Procedures for Voice Services* on ISSI messages and procedures and TIA-102.BAHA, *Project 25: Fixed Station Interface Messages and Procedures* documents were published. In addition, seven new documents were approved for ballot. The result of this effort has been a collection of fixed network standards that are reaching a state of maturity.

As a result of multiple manufacturers deploying trunked system equipment and subscriber equipment, a number of interoperability issues surfaced. Initially, a group of these manufacturers came together under the auspices of the Project 25 Steering Committee to resolve the issues. It was decided, however, that a more formal way of dealing with these issues was needed. In response to this need, a new group, the **Compliance Assessment Subcommittee, TR-8.25,** was formed. In addition to handling interoperability issues, this subcommittee was tasked to formulate the various standards needed to be able to test, for conformance to the various standards, documents in order to ensure interoperability.

A suite of wideband data standards was developed several years ago in response to the need for interoperability standards for wideband data in the 700 MHz frequency band. Several are approaching five years since publication and need reaffirmation or upgrade. To that end, the **Signaling and Data Transmission Subcommittee, TR-8.5**, has been working on upgrades to several documents. To date, TIA-902.BAAE-A, *Wideband Air Interface–Logical Link Control (LLC) Layer Specification* has been balloted and approved for publication. The **Equipment Measurement Procedures Subcommittee, TR-8.1**, has approved for publication a standard for wideband data for Isotropic Orthogonal Transform Algorithm (IOTA) modulation. The **Equipment Performance Recommendations Subcommittee, TR-8.6**, is drafting the companion performance recommendations standard for the IOTA modulation.

Much of the advanced work on standards drafting occurs in the Project 25 and Project 34 working groups. This is particularly true in the areas of Broadband Data and Phase II for Project 25. A great deal of interest is being shown in the area of broadband data systems for Public Safety use. In particular, with the allocation of the 4.9 GHz spectrum for Public Safety usage, a need for interoperability standards has been established. User requirements for the technology are being developed by the Project 34 committee. Initial standards drafting work is ongoing within working groups. Final formulation of standards will be done by the **Broadband Data Systems Subcommittee, TR-8.8**. Additionally, much work has been done on a standard for Phase II of Project 25. The goal of Phase II is to develop TDMA standards that offer channel efficiency of one voice path per 6.25 kHz of spectrum. To date, most of the initial system design has been accomplished within the TDMA working group. Final formulation of the standards will be done by the **Two-Slot TDMA Systems Subcommittee, TR-8.12**.

TR-8 is also involved in other aspects of land mobile radio systems. Work has continued in the **Antenna Systems Subcommittee, TR-8.11**, on the development of a standard for vehicular antennas. A standard for signal boosters has been published, and an addendum to that document is undergoing balloting. The **Radio Frequency (RF) Exposure Subcommittee, TR-8.17**, has published TSB-159 *Private Land Mobile Radio Two-Way Mobile Equipment Radio Frequency (RF)*

Electromagnetic Exposure (EME) Test Report Guidelines for reporting EME test data. Work is continuing in **Wireless Systems Interference and Coverage Subcommittee, TR-8.18**, on issues of interference prediction and spectrum compatibility. A major upgrade to the document *Wireless Communications Systems – Performance in Noise and Interference – Limited Situations – Recommended Methods for Technology – Independent Modeling, Simulation and Verification*, is in development. In addition, a document characterizing radio wave path loss is in the process of being balloted for publication as a TSB.

TR-8 is the longest standing of all of the TIA standards committees, tracing its roots to the early days of land mobile radio. TR-8 continues to be a vital committee, developing standards for the next generation of mission-critical communications systems. TR-8 continues to grow in support from organizations that have traditionally participated in the work of the committee and from new entities representing emerging technologies. Participation in the work of TR-8 has consistently grown over the years. The continuing need for reliable and interoperable communications systems, as well as the allocation of new frequency bands and new technology opportunities, continues to spark interest in the work of TR-8. The committee anticipates an equally challenging and exciting year of growth and productivity in 2007.

Chair, TR-8
John Oblak
E.F. Johnson Co.

Vice Chair, TR-8
Alan Wilson
Tyco Electronics

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: John Lambrou
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
Tyco Electronics

TR-8.17   RF Exposure
Chair: Robert Speidel
Tyco Electronics

TR-8.18   Wireless Systems Interference and Coverage
Chair: Tom Rubinstein
Motorola, Inc.

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

TR-8.25   Compliance Assessment
Chair: Tess Zagaruyka
RELM Wireless

Engineering Committee TR-14 is responsible for standards and recommended practices related 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 Subcommittee TR-14.7, Structural Standards for Steel Antenna Towers and Antenna Supporting Structures, was active in 2006.

2006 Activities

ANSI/TIA-222-G, *Structural Standard for Antenna Supporting Structures and Antennas* was effective January 1, 2006. Ten years in development, Revision G is intended to set minimum criteria for the design, fabrication and construction of antenna-supporting structures. The objective of the TIA-222 Standard is to provide recognized literature for antenna-supporting structures and antennas pertaining to minimum load requirements and design criteria for steel and concrete. The standard provides the requirements for the structural design and fabrication of new and the modification of existing structural antennas, antenna-supporting structures, mounts, structural components, guy assemblies, insulators and foundations. The TR-14.7 Subcommittee's intent was to create an internationally recognized and acceptable standard that can be implemented beyond the North American market. The Standard's F version was incorporated by reference in the International Building Code, which means that by default it became the most widely recognized tower standard of most countries, states and municipalities for their building codes.

Craig Snyder of Sioux Falls Tower & Communications served as chair of TR-14 faithfully from January 16, 1998, to October 10, 2006. As chair, he presided over the G Revision of the TIA-222 Standard. His leadership, dedication and commitment to the advancement of telecommunications industry standards is greatly appreciated. Brian Reese of AeroSolutions LLC was elected chair of TR-14.7 at the San Francisco meeting in

October. He previously served as vice chair and secretary of the subcommittee since 2001. John Erichsen of EET LLC was elected vice chair and secretary during the same meeting.

TR-14.7 Subcommittee on Structural Standards for Steel Antenna Towers and Antenna Supporting Structures developed an Addendum to Revision G for release in early 2007. The addendum includes various minor editorial changes and other adjustments with respect to cantilevered structures, shielding factor and modified bearing factor for foundations.

TR-14.7 continued work on the revision to TIA-1019, *Structural Standards for Steel Gin Poles Used for Installation of Antenna Towers and Antenna Supporting Structures*. First released in 2004, the standard was intended to provide minimum criteria for the design and use of steel gin poles for installation of antennas and antenna-supporting structures. The standard is being updated to provide minimum loading requirements for towers under construction, alteration or maintenance, and address specialized equipment such as gin poles, frames, hoists and the temporary supports necessary to safely complete those tasks, along with the design requirements for a gin pole. It will consider special requirements and processes commonly used when removing an existing antenna from an existing tower or removing all or a portion of an existing tower. The revised standard will be titled *Structural Standards for Installation, Alteration and Maintenance of Communication Towers, Antenna and Antenna Supporting Structures*.

TR-14.7 has a newly formed task group, Structural Reliability, dealing with structural performance and reliability issues pertinent to the structures utilized in the telecommunications industry. As the support structures in the industry continue to age, reliability and maintenance issues will be crucial to the longevity of the industry's infrastructure.

The 2007 goals include working on Revision H of the TIA-222 Standard with meetings planned around the country.

Chair, TR-14
Brian Reese
AeroSolutions, LLC

Vice Chair, TR-14
John Erichsen
EET LLC

Subcommittee:

TR-14.7   Structural Standards for Steel Antenna Towers and Antenna Supporting Structures
Chair: Brian Reese
AeroSolutions, LLC

Vice Chair: John Erichsen
EET LLC.

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 multimedia gateways, the telephone and voice-over-Internet protocol (VoIP) networks and other DCE and facsimile systems.

2006 Activities

The 2006 year was successful for TR-30 and its subcommittees, with four meetings being held. The subcommittees 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, continued to work in coordination with the ITU-T Study Group 16, "Multimedia Services, Systems and Terminals," Question 11 Rapporteurs group "Voiceband Modems: Specification and Evaluation Performance." Subcommittee TR-30.1 routinely invites the participants of the Question 11 Rapporteurs group to participate in the subcommittee discussions on this work, thereby providing a seamless work environment between the groups. This coordinated effort resulted in the approval by ITU-T of Recommendation V.151 "Procedures for the end-to-end connection of analogue PSTN text telephones over an IP network utilizing text relay," which will provide for reliable transport of text telephony over IP networks. This work is based upon TIA-1001, *Transport of TIA-825-A Signals over IP Networks*, which was approved in 2004. 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 for the reliable transport of text telephony telecommunications devices for the deaf (TDD) and teletypewriters (TTY) over Internet protocol (IP) networks. TIA-1001 was developed in response to difficulties that had been
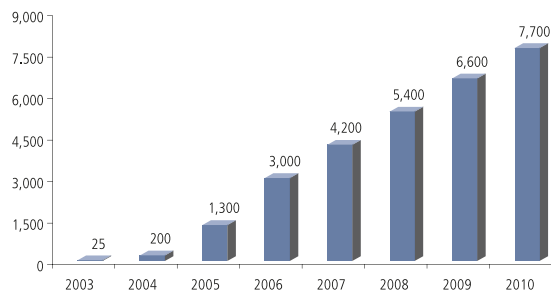
experienced with reliable operation of TDDs over IP networks with different levels of quality of service. The loss of packets in IP networks and voice compression algorithms has also been seen to limit proper operation of TDDs. With the approval of ITU-T V.151, TR-30.1 has initiated a project, PN-3-0098-RV1, to revise TIA-1001 to assure interoperability with V.151. Subcommittee TR-30.1 made excellent progress on its first Home Networking over Power Lines project, PN-3-4643, during 2006. The ballot for PN-3-4643, *Medium-Speed (up to 14 mbps) Power Line Communications (PLC) Modems Using Windowed OFDM* (to be published as TIA-1113), closed in December with a number of comments. The subcommittee will be resolving those comments in early 2007. This standard represents one of a number of technologies that provide home networking over power lines. TR-30.1 anticipates that some of the other technologies will be brought to the subcommittee for standardization.

Subcommittee TR-30.2, DTC-DCE Interfaces and Protocols, continues to operate primarily in a maintenance mode. During 2006, Subcommittee TR-30.2 initiated reaffirmation ballots on six standards. In addition, new Standard PN-3-0222, *Electrical Characteristics of Very-Low Voltage Differential Signaling (V-LVDS) Interface Circuits* (to be published as TIA-1086) is being developed under Subcommittee TR-30.2's electrical characteristics working group. It is expected that this standard will be completed during 2007.

TR-30

Subcommittee TR-30.3, Data Communications Equipment Evaluation and Network Interfaces, had a very busy year. The major effort during 2006 was the revision of TIA Standard TIA-921, *Network Model for Evaluating Multimedia Transmission Performance over Internet Protocol*, to include wireless and cable modem access models. 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. This standard can be used by operating companies, service providers, manufacturers, design engineers, test houses, magazines and product reviewers 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 gateway; ITU-T Recommendation V.152 Voice Band Data over IP gateways and ITU-T Recommendation V.151. TR-30.3 continues to contribute to the work in ITU-T Study Group 12, "Performance and quality of service" on their work on network model recommendations. In addition, TR-30.3 has established a liaison and working relationship with ITU-T Study Group 9, "Integrated broadband cable networks and television and sound transmission."

Chair, TR-30
Fred Lucas
FAL Associates

Subcommittee:
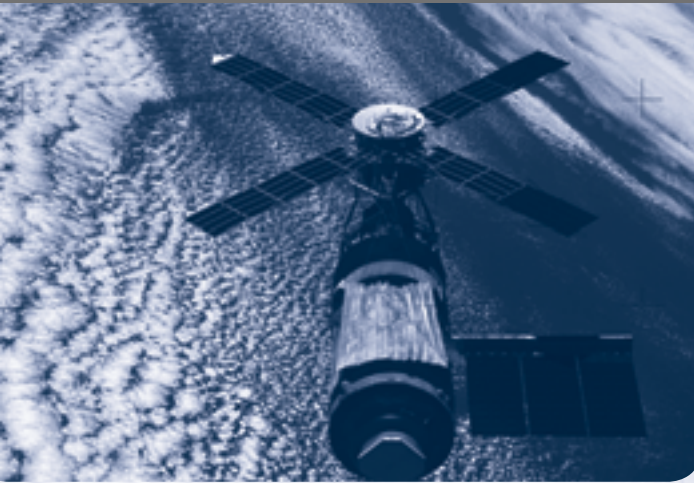
TR-30.1 Modems
Chair: Keith Chu
Mindspeed Technologies

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 Douglas
Spirent Communications

U.S. Residential VoIP Revenue ($ Millions)

Year	Revenue
2003	25
2004	200
2005	1,300
2006	3,000
2007	4,200
2008	5,400
2009	6,600
2010	7,700

Source: *TIA's 2007 Telecommunications Market Review and Forecast*

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 on standards for 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 inter-service spectrum sharing to developing standards for achieving interoperability between satellite systems, as well as among satellite and terrestrial systems, networks and services.

2006 Activities

The primary focus of TR-34 during 2005 and continuing in 2006 was the development and approval of TIA/EIA-1073 *Satellite Network Modem System (SNMS)* standard. 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 Digital Video Broadcasting — Return Channel via Satellite (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 defined the requirements of the TDM and MF-TDMA based SNMS. The SNMS standard includes the TIA-developed TIA-157, *IP Modem Functional Capabilities Description*; TIA-1073.000, *Satellite Network Modem System (SNMS) General Requirements*; TIA-1073.001, *Satellite Network Modem System (SNMS) Network Layer Standard* and TIA-1073.002, *Satellite Network Modem System (SNMS) Encryption Requirements*. In addition, the SNMS Standard references European Telecommunications Standards Institute (ETSI) Standards on DVB-RCS (EN 301 790), the DVB-RCS Guidelines (TR 101 790) and DVB-S2 (EN 302 307).

The group also looked at how Connection Control Protocol (C2P) inputs from ETSI/DVB could be utilized in the SNMS Standard. TR-34 took the lead in developing the "C2P for SNMS" (PN-3-0226, *SMCP: Satellite Network Modem System (SNMS) Mesh* [to be published as TIA-1088])

standard, which was approved for balloting. The group continues to work toward the publication of a joint TIA and 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 (RCSTs) 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 2006, was that the IP Modem FCD Standard had passed, the SNMS General Requirements document had passed and the SNMS Network Requirements, SNMS Mesh Control Protocol (SMCP) and SNMS Standard Security documents had been approved for balloting.

On December 1, 2006, joint work with ETSI Satellite Earth Stations (SES) Broadband Satellite Multimedia (BSM) was initiated with TIA TR-34.1 including a liaison with DVB-RCS and Satlabs.

The focus of the joint activity was to be a Connection Control Protocol for satellite earth station mesh interconnectivity.

Joint meetings were held between TIA and ETSI on February 9, April 27, July 13, October 19 and December 7, 2006.

Subcommittee TR-34.1 Communications and Interoperability held four meetings during 2006: January 12, March 23, May 18 and September 14.

The following documents were published in 2006:

TIA-157, *IP Modem Functional Compliance Description* (May 2006)

TIA-1008-A, *IP over Satellite (IPoS)* (May 2006)

TIA-1039, *QoS Signaling for IP QoS Support* (May 2006)

TIA-1040.1.07, *RSM-A part 7 Synchronization* (May 2006)

TIA-1040.2.02, *RSM-A part 2 MAC Layer* (May 2006)

TIA-1073, *Satellite Network Modem System (SNMS) General Requirements* (April 2006)

TIA-1073.001, *Satellite Network Modem System (SNMS) Network Layer Standard* (July 2006)

TIA-1073.002, *TIA Standard, Satellite Network Modem System (SNMS) Encryption* (July 2006)

TIA-1088, *SMCS: Satellite Network Modem System (SNMS) Mesh* (May 2006)

Jack Rieser of Viasat was elected by acclamation as vice chair of TIA TR-34.1 at the September 14 meeting.

The TIA Standard TIA-1008-A *IP over Satellite*, was subsequently published by ETSI SES as TSS-B v2 (TS 102 354) at TC-SES #68 September 27-29.

Ongoing activities include the cooperative effort to develop the C2P protocol with ETSI SES BSM.
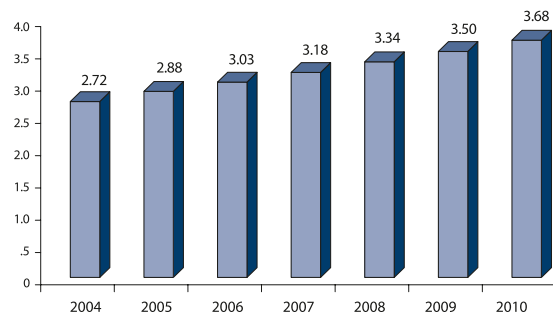
Chair, TR-34
Prakash Chitre
Viasat, Inc.

Subcommittees:

TR-34.1   Communications and Interoperability
Chair: Tony Noerpel
Hughes Network Systems

Vice Chair: Jack Rieser
Viasat, Inc.

Global Mobile Satellite Services Revenue ($ Billions)

Year	Revenue
2004	2.72
2005	2.88
2006	3.03
2007	3.18
2008	3.34
2009	3.50
2010	3.68

Source: *TIA's 2007 Telecommunications Market Review and Forecast*

Committee TR-41 addresses 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 environmental considerations for user premises equipment and addressing the administrative aspects of product approval processes. In addition, TR-41 develops criteria for preventing harm to the telephone network; these 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 weeklong meetings during the year with its subcommittees and their working groups. Additional interim meetings were conducted via teleconference as needed. TR-41 underwent some structural changes during the year. Most notable was the decision to place Subcommittee TR-41.1, Telephony Aspects of Multi-Line-Telephone-System (MLTS) and Voice-over-Internet-Protocol (VoIP) Equipment, into inactive status following the August meeting. In addition, the TR-41.9.2 Working Group was dissolved, and the TR-41.9.1 Working Group was re-activated.

The TR-41 leadership also underwent some changes. Joanne McMillen of Avaya was elected Chair of TR-41.4 in February after having served as its Vice Chair. Roger Britt of Nortel was elected as the new Vice Chair. Al Baum of Uniden was elected Vice Chair of TR-41.3 in August to fill a vacancy that occurred in 2005. Greg Slingerland announced in September that he would have to resign as Chair of TR-41.9 because of a change in employment. An election to fill that position will be held at the February 2007 meeting.

TR-41 has decided to hold semi-annual events to recognize those who have contributed to the development of standards published in the prior six months. These dinner events were held during the May and November meetings. A total of 85 recognitions were made to 60 people covering eight different standards. In addition to providing a certificate to the individual, Chair Steve Whitesell offered to e-mail a letter of thanks to the management of each recipient expressing TIA's appreciation for the support provided by the company to the individual. This aspect of the recognition program was very well received.

In addition to the recognitions for standards development, three individuals were presented with plaques honoring their many years of service to TR-41. Former TR-41.1 Chair Tailey Tung attended and was recognized at the May event. Former TR-41.4 Chair Bob Bell and long-time contributor Cliff Chamney were recognized in absentia at the November meeting.

TR-41 exchanged liaison information with a number of standards bodies, consortia and councils during 2006. These include the Digital Subscriber Line (DSL) Forum, 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), the IEEE 802.11 Wireless Local Area Network (W-LAN) Working Group, the International Telecommunication Union – Telecommunication Standardization Sector (ITU-T) Study Group 12 on Performance and quality of service, the National Emergency Number Association (NENA), and three Alliance for Telecommunications Industry Solutions (ATIS) groups: the Network Interface, Power and Protection Committee (NIPP); the Packet Technologies and Systems Committee (PTSC); and the Emergency Services Interconnection Forum (ESIF).

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 CSA's Bi-National Working Group (BNWG) on the Safety of Information Technology Equipment. Liaison was re-established with the TR-42 Engineering Committee, and the TR-41.4 Subcommittee was designated to provide input to the Next Generation Networks Formulating Group (NGN FG) established under the TIA Technical Committee.

2006 Activities

Subcommittee TR-41.1, Telephony Aspects of MLTS and VoIP Equipment, published three documents early in the year. TSB-116-A, *Voice Quality Recommendations for IP Telephony*, was a minor revision to remove normative text from the document. TIA-123-A, *North American Test Plan for Multivendor QSIG Interoperability Testing*, was an upgrade of the document from TSB status because it contained normative text. TIA-1062, *1544 kbps Interface Requirements for Packet-Based Gateways,* is a new standard that had been successfully balloted the previous year and was published in April. Work was also completed on TIA-1063, *Analog Telephone Port Requirements for Packet-Based Terminal Adapters*. With TR-41.1 going inactive following the August meeting, responsibility for the document was turned over to TR-41.3. It will be published in early 2007 after some final editorial cleanup.

Subcommittee TR-41.3, Analog and Digital Wireline Terminals, placed top priority on the development of SP-3-0219, *Handset Magnetic Measurement Procedures and Performance Requirements* (to be published as TIA-1083). This project addresses magnetic interference problems experienced by hard of hearing people who try to couple digital cordless telephones to their hearing aids in the T-coil mode. Comments received on an earlier committee ballot and the results of a parametric study on hearing aid user perception of magnetic noise and signal-to-noise ratios conducted during the mid-year Hearing Loss Association of America (HLAA) convention were used to create a document that was submitted for ANSI ballot in late October. This ballot closed in early December with all votes to either approve or approve with comments. The comments are expected to be resolved at the February 2007

meeting and the document published shortly thereafter. A related new project PN-3-0271, *Guidelines for Marking and Labeling CPE Complying with TIA Standards* (to be published as TSB-177), has been opened to create a TSB addressing marking and labeling guidelines for identifying products that comply with this standard.

Work continues in several TR-41.3 Working Groups to add additional documents to the TIA-470 series. TR-41.3.9 completed its work on TIA-470.320-C, *Telecommunications Telephone Terminal Equipment Cordless Telephone Operation and Feature Performance Requirements*. The additional projects include requirements for speakerphone acoustic performance (TR-41.3.10), headset acoustic performance (TR-41.3.11) and features unique to answering systems (TR-41.3.12). In addition, the TR-41.3.3 Working Group completed its work on TIA-810-B, *Transmission Requirements for Narrowband Digital Telephones*, and kicked off another project to revise TIA-920, *Transmission Requirements for Wideband Digital Wireline Telephones*.

Subcommittee TR-41.4, IP Telephony Infrastructures, published two standards that had been on hold because of Intellectual Property Rights (IPR) concerns. 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. TIA-811-A, *Performance and Interoperability Requirements for Voice-over-IP (VoIP) Feature Telephones*, is a major revision and upgrade of TSB-811.

TR-41.4 has several other projects nearing completion. The revision of TSB-146, *IP Telephony Support for Emergency Calling Service*, has been approved for publication and should be available in early 2007. Work on two documents is being coordinated with their counterpart ETSI versions. PN-3-0202, *Synchronization in IP Networks – Methods and User Perception* (to be published as TSB-160), will be aligned with ETSI TR 103 010 v1.1.1. The revision of TIA-912-A, *Voice Gateway Transmission Requirements*, is being coordinated with ETSI ES 202 020. Good progress has been made on both documents, and they are also expected to be published in early 2007. PN-3-0103, *Requirements for Wireless LAN Based IP Telephony Endpoints* (to be published as TIA-1003), is now ready for ballot and should be completed in the coming year.

Subcommittee TR-41.7, Environmental and Safety Considerations, continued its efforts on two main projects. TR-41.7.4 has completed its work on revising TIA-571-A, *Environmental*

Considerations, and the document has been approved for publication as TIA-571-B. The TR-41.7.5 Working Group is also nearing completion of its document on overcurrent protection devices used in telecom networks and terminal equipment. It will be submitted to UL as a seed document for creating a safety standard for these components. The person from UL who will be receiving the document has been participating in recent meetings and providing guidance.

The TR-41.7.1 Working Group that deals with harmonization of international safety standards has been following a proposal that would allow inappropriate test procedures for receive acoustic limiting tests in UL 60950-1. The Working Group sent a letter to the convener of the UL Standards Technical Panel (STP) expressing its concerns about this proposal.

**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. The Fourth Addendum to TIA-968-A, *Technical Requirements for Connection of Terminal Equipment to the Telephone Network*, was approved for publication and submission to ACTA. It provides additional network harms criteria for various types of DSL modems and removes the exception that allowed products to be approved as having a "Z-type" ringer if they failed to meet the on-hook impedance requirements. The amendment also deletes the

specifications for mechanical characteristics and dimensions of plugs and jacks, which have been moved to a new document, TIA-1096, *Connector Requirements for Connection of Terminal Equipment to the Telephone Network*. This document combines those requirements with the gold plating specifications from TSB-31-B, *Part 68 Rationale and Measurement Guidelines*.

Working Group TR-41.9.2 was dissolved after completing its revision of TSB-31-B, but a default ballot will be needed to resolve one comment before publishing the document with a new title as TSB-31-C, *Rational and Measurement Guidelines for U.S. Network Protection*. 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.

TR-41.9 has also launched a major revision of TIA-968-A to incorporate all of the addenda into the document and to reorganize it by interface type. The TR-41.9.1 Working Group has been revived to handle this effort. In addition, TR-41.9 provides industry responses to questions about TIA-968-A and Part 68. The list of Frequently Asked Questions (FAQs) and their answers can be found on the TR-41 page at the TIA web site. There is also a link to it from the ACTA web site.

Enterprise Voice and Data Equipment Revenue in the United States ($ Billions)

Year	Revenue
2004	92.0
2005	97.6
2006	103.7
2007	110.2
2008	115.5
2009	120.2
2010	126.9
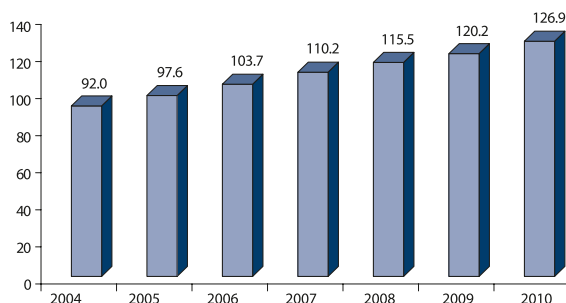
Source: *TIA's 2007 Telecommunications Market Review and Forecast*

Chair, TR-41
Stephen R. Whitesell
VTech Communications

Vice Chair,
Roger Britt
Nortel

Subcommittees:

TR-41.1   Telephony Aspects of MLTS and VoIP Equipment

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

Vice Chair: Al Baum
Uniden America Corporation

TR-41.4   IP Telephony Infrastructures
Chair: Joanne McMillen
Avaya, Inc.

Vice Chair: Roger Britt
Nortel

TR-41.7   Environmental and Safety Considerations
Chair: Randy Ivans
Underwriters Laboratories

Vice Chair: Phillip Havens
Littelfuse, L.P.

TR-41.9   Technical and Administrative Regulatory Considerations
Chair: Vacant

Vice Chair: Phillip Havens
Littelfuse, L.P.

Engineering Committee TR-42 develops and maintains voluntary standards for telecommunications cabling infrastructure in user-owned buildings, such as commercial buildings, residential buildings, homes, data centers and industrial buildings. The generic cabling topologies, design, distances and outlet configurations as well as specifics for these locations are addressed. The committee's standards work covers requirements for copper and optical fiber cabling components (such as cables, connectors and cable assemblies), installation and field testing, in addition to the administration, pathways and spaces to support the cabling.

The demands of today's increasingly-connected populations are placing ever-increasing demands on the telecommunications cabling to support them. The network performance of the office is expected at home and on the road. Committee TR-42 addresses the needs of end-users, installers, designers and component manufacturers through a cooperative effort to produce working standards for the cabling to meet the needs of today and tomorrow and for new technologies in cabling technology.

Recent activities in TR-42 have focused on the cabling infrastructure requirements of higher bandwidth applications, such as 10 Gigabit Ethernet on twisted-pair cabling, and the growing use of IP-based technologies, such as VoIP. Additionally, TR-42 is creating a third revision to the popular TIA-568 Standard. This revision process involves the creation of a new standard, TIA 568-C.0, which should simplify the use of the TR-42 documents and enable easier and faster creation of new standards for customer-owned telecommunications cabling in new markets such as health care facilities and large facilities.

TR-42 works closely with other standards formulating organizations (such as ISO and CENELEC), application developers (such as IEEE), component organizations (IEC, ICEA and others) and cabling designers (BICSI) to formulate positions and proposals for harmonization within these organizations. The activities and global influence of TR-42 help end-users increase trade, reduce costs and keep abreast of the latest changes in technology.

2006 Activities

The TR-42 Engineering Committee is organized into nine subcommittees, each responsible for a specific area of premises telecommunications cabling.

The TIA-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. One recent addendum addressed the requirements for using new technologies in high-density optical fiber connectivity (array connectors), which has become a key component in data center cabling.

A significant effort to address the requirements of the new 10 Gigabit Ethernet on twisted-pair (10GBASE-T) cabling has been applied to two projects — one TSB and one addendum. TSB-155, *Additional Guidelines for 4-Pair 100W Category 6 Cabling for 10GBASE-T Applications* was published to address the capabilities of existing twisted-pair cabling to support 10GBASE-T. The tenth addendum to TIA-568-B.2 is being developed to define a new twisted-pair cabling, augmented Category 6, to support 10GBASE-T to the distances often required in user-owned networks; it should be finished in 2007.

Several projects continue in the subcommittees. Two addenda on coaxial cabling (one for residential applications and one for data center applications) and one on additional administration requirements for data centers should be complete in 2007. A standard for industrial buildings has gone to ballot, and the subcommittee continues to work on this new standard.

In addition to these documents, TR-42 addressed industry issues such as Power-over-Ethernet on telecommunications cabling (using data cables to provide low-voltage power to devices connected to the cabling) and the use of pulling lubricants on data cables.

An ongoing project is the drafting of a TSB, to define the additional requirements for health care facility cabling. This TSB is expected to roll over into a standard after the release of TIA-568-C.0, a new standard that defines the generic cabling foundation upon which additional types of premises standards can be based. Revisions to the TIA-568-B.1 (plus six addenda), TIA-568-B.2 (plus 11 addenda) and TIA-568-B.3 (plus one addenda) standards continue as well.
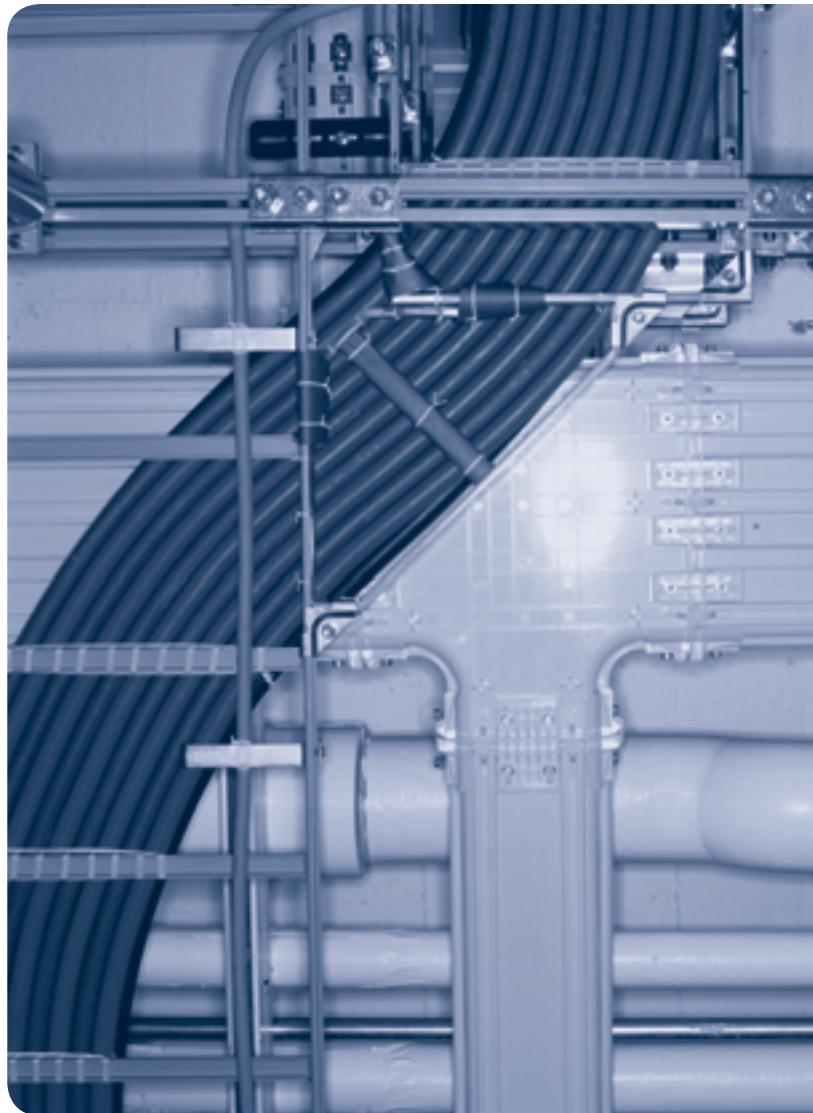
Chair, TR-42
Herb Congdon
Tyco Electronics

Vice Chair, TR-42
Bob Jensen
Fluke Networks

Subcommittees:

TR-42.1 Generic Telecommunications Cabling and Premise Cabling
Chair: Henry Franc
HF Consulting

Vice Chair: Glenn Sexton
Northwest Information Services

TR-42.2 Residential Telecommunications Infrastructure
Chair: John Pryma
Genesis Cable

Vice Chair: Tom Boucino
Commscope

TR-42.3 Commercial Building Telecommunications Pathways and Spaces
Chair: Steve Huffaker
JPMorgan Chase

Vice Chair: Ray Emplit
Wiremold

TR-42.4 Customer-owned Outside Plant Telecommunications Infrastructure
Chair: Henry Franc
HF Consulting

TR-42.5 Telecommunications Infrastructure Terms and Symbols
Chair: Paul Kish
Belden

Vice Chair: Henry Franc
HF Consulting

TR-42.6 Telecommunications Infrastructure and Equipment Administration
Chair: Steve Huffaker
JPMorgan Chase

Vice Chair: Jonathan Jew
J&M Consultants

TR-42.7 Telecommunications Copper Cabling Systems
Val Rybinski
The Siemon Company

Vice Chair: Sterling Vaden
SMP Communications

TR-42.8 Telecommunications Optical Fiber Cabling Systems
Chair: Bob Jensen
Fluke Networks

Vice Chair: Julie Roy
C2 Consulting

TR-42.9 Industrial Telecommunications Infrastructure
Chair: Bob Lounsbury
ODVA Rockwell

Vice Chair: Brian Shuman
Belden

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.

2006 Activities

TR-45 is comprised of five subcommittees and a number of standing ad hoc groups (AHGs) 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, Systems Beyond IMT-2000 and IMT-Advanced 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 industry standards and Telecommunications Systems Bulletins (TSBs) that provide the basis for mobiles and the mobile infrastructure for multiple radio interfaces. Highlights of the numerous projects, publications and activities of the subcommittees and AHGs are described below.

Subcommittee TR-45.2, Wireless Intersystem 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 TIA-41, and newer standards for Internet Multimedia Subsystem/Multimedia Domain (IMS/MMD) ("All IP" Core Network) and MMS (Multimedia Messaging Service). The subcommittee has responsibility for NGN standards within TR-45 to coordinate with the other subcommittees and AHGs on NGN initiatives. TR-45.2 works closely with 3GPP2 TSG-X and 3GPP2 TSG-S to transpose 3GPP2 specifications into TIA standards. 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.

Standards approved for publication by TR-45.2 in 2006 include the following:

- ANS J-STD-036-B, *E911 Phase 2 Enhancements*
- TIA-93-B-1, *Wireless Priority Service*
- TIA-93-B-2, *Wireless Telecommunication AI – DI Interfaces*
- ANS/TIA-124-E, *Data Message Handler*
- TIA-664.000-B-1, *Wireless Feature Description Introduction Addendum 1*
- TIA-881-1[E], *MAP Locations Services Enhancements*
- TIA-873-1, *All IP Core Network Multimedia Directive Overview*
- TIA-945, *MAP Support of Authentication: Key Agreement (AKA)*
- TIA-1055, *MAP Enhancements to Support Enhanced Message Waiting Notification (MWN)*
- TIA-1074-1, OTA *Support for MEID Addendum 1*

Subcommittee TR-45.3, Time Division Digital Technology, approved for publication in 2006 the following parts of 136-F, ANS/TIA-136 TDMA *Third Generation Wireless*, Revision F standards'.

- TIA/EIA-136-000-F, *TDMA Third Generation Wireless List of Parts*
- TIA/EIA-136-123-F, *TDMA Third Generation Wireless Digital Control Channel Layer 3*
- TIA/EIA-136-370-B, *TDMA Third Generation Wireless – Enhanced General Packet-Data Service EGPRS-136*
- TIA/EIA-136-376-B, *TDMA Third Generation Wireless – Enhanced General Packet-Data Service EGPRS-136 – Mobility Management (MM)*
- TIA/EIA-136-377-B, *TDMA Third Generation Wireless – EGPRS-136 Gs Interface Specifications*
- TIA/EIA-136-440-B, *TDMA Third Generation Wireless – Adaptive Multirate (AMR) Codec*

In 2006, TR-45.3 continued to work jointly with ATIS Wireless Technologies and Systems Committee 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.1457-6 and M.1458-7. In addition, TR-45.3 continued to provide feedback on industry initiatives such as Broadband Wireless Access and Project MESA.

Subcommittee TR-45.4, Radio to Switching Technology, continues to work closely with 3GPP2 TSG-A on the development of standards related to the Radio Access Network (RAN). Revision A, as well as Revision B of the IOS HRPD standards, TIA-878-A and TIA 878-B, *Interoperability Specifications (IOS) for High Rate Packet Data (HRPD) Radio Access Network Interfaces with Session Control in the Access Network* were published in 2006. Also approved for publication by TR-45.4 in 2006 were TIA-1070, *Interoperability Specifications (IOS) for Hybrid MS/AT (HAT) Authentication* and TIA-2006 *Interoperability Specifications (IOS) for Broadcast Multicast Services (BCMCS)*.

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, in conjunction with 3GPP2 TSG-C, continues working on the next revision of the *cdma2000® Standards for Spread Spectrum Systems* series. Numerous cdma2000®-related standards were published (or approved for publication) in 2006; among the published standards are those listed below:

- TIA-97-F-1, *Recommended Minimum Performance Standards for cdma2000® Spread Spectrum Base Stations – Addendum 1*
- TIA-98-F-1, *Recommended Minimum Performance Standards for cdma2000® Spread Spectrum Mobile Stations – Addendum 1*
- TIA-127-B, *Enhanced Variable Rate Codec Speech Service Option 3 and 68 for Wideband Spread Spectrum Digital Systems*
- TIA-707.12-B-1, *Data Service Option for Spread Spectrum Systems*
- TIA-856-A-2 [E], *cdma2000® High Rate Packet Data Air Interface Specification*
- IA-856-B, *cdma2000® High Rate Packet Data Air Interface Specification*
- TIA-871-1, *Markov Service Option for cdma2000® Spread Spectrum Systems*
- TIA-1011-A, *Multimedia Messaging Service (MMS) Media Formats and Codecs for cdma2000® Spread Spectrum Systems*
- TIA-1012, *Multimedia Streaming Service (MSS) for cdma2000®*
- TIA-1030-B, *Band Class Specification for cdma2000® Spread Spectrum Systems*
- TIA-1043, *Over the Air Interoperability Specification for cdma2000® Air Interface*
- TIA-1054-1, *High Rate Packet Data Supplemental Packet Data Services*
- TIA-1054-A, *High Rate Packet Data Supplemental Packet Services*
- TIA-1094, *Interworking Specification for cdma2000® 1X and High Rate Packet Data Systems*
- TIA-1110, *Circuit Services Notification Application Specification for cdma2000® High Rate Packet Data*

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

During 2006, TR-45.5 provided updates to the ITU-R WP8F Global Core Specifications (GCS) and Roadmap as well as Recommendations M.1457-6 and M.1457-7 relative to CDMA MC. Furthermore, the subcommittee continued to review and provide comments on industry initiatives such as Project MESA and Broadband Wireless Access.

Subcommittee TR-45.6, Adjunct Wireless Packet Data Technology, is chartered with developing performance, compatibility and interoperability 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 is charged with developing 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.

The projects completed for publication in 2006 include TIA-835-C and TIA-835-D *cdma2000® Wireless IP Network* standards; TIA-1041 *cdma2000® Broadcast and Multicast Services* and TIA-1092 *Tunneling Support in Simple IP*.

Projects under way include PN-3-0261 *HRPD Fast Handoff* (to be published as TIA-1115); PN-3-0262 *Mobile IP Enhancements (IMIPv4)* (to be published as TIA-1116); Mobile IP Enhancements (MIPv6) (to be published as TIA-1117); Alternate PPP (to be published as TIA-1100); LAES for cdma2000® Packet Data Services; WLAN Interworking (to be published as TIA-1050); PPP Free Operation, and cdma2000® Wireless IP Network standard (to be published as TIA-835-E).

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. In 2006, the AHAG and TR-45 approved for publication the following standards:

- TIA-1085, *IP-Based LCS Security Framework*
- TIA-1091, *IMS Security Framework*
- TIA-1097, *Security Mechanisms Using Generic Bootstrapping Architecture (GBA)*
- TIA-1098, *GBA Framework*
- TIA-946-1, *Enhanced Cryptographic Algorithms*

The **TR-45 Ad Hoc on Electronic Serial Number (ESN)/User Identification Module ID (UIM)/ Mobile Equipment Identity (MEID) (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 Global Hexadecimal Administrator (GHA) Assignment Guidelines & Procedures*.

The primary issues addressed by the EUMAG during 2006 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, though the ESN resource is anticipated to exhaust in 2007.

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 website at **http://www.tiaonline.org/standards/resources/esn** and **http://www.tiaonline.org/standards/resources/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, namely the ANS J-STD-025-B. This revision was published, and a second addendum to ANS J-STD-025-B has been approved for publication. After publication as an American National Standard 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, LAES activity has been elevated to Committee TR-45 level and the Ad Hoc Group has been disbanded.

The **TR-45 Ad Hoc 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 the AHEM continued to champion during 2006 include a web-based calendar, an electronic database of contributions, Internet access at meetings and electronic sign-in at meetings.

TR-45, Chair
Cheryl J. Blum
Alcatel-Lucent

TR-45. Vice Chair
Gerry Flynn
Verizon Wireless

TR-45. Secretary
Jane Brownley
Alcatel-Lucent

Subcommittees:

TR-45.2 **Wireless Intersystem Technology**
Chair: Lewis Milton
Motorola, Inc.

TR-45.6 **Adjunct Wireless Packet Data Technology**
Chair: Brent Hirschman
Sprint Nextel

TR-45-3 **Time Division Digital Technology**
Chair: Peter Musgrove
Cingular

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

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

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

TR-45.5 **Spread Spectrum Digital Technology**
Chair: Jean Alphonse
Alcatel-Lucent

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

Engineering Committee TR-47 is responsible for development and maintenance of downlink standards for a terrestrial mobile multimedia multicast (TM3) system. These standards are intended to be employed by 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. The committee works with other national and international standards development organizations in promoting standards harmonization. Work items are encouraged that are not duplicative of wireless data services architecture, interface and protocol development such as done in 3GPP, 3GPP2 and Open Mobile Alliance, among others. The committee'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.

2006 Activities

2006 was the first full year of work for TR-47 after an inaugural meeting on September 9, 2005. All committee expectations were exceeded in 12 months of significant work.

The two TR-47 subcommittees, **TR-47.1 TM3 Based on Forward Link Only Technology** and **TR-47.2 TM3 Based on DVB-H Technology**, developed several important specifications for publication. The committee participants worked at an accelerated pace, with an average of one meeting every six weeks in 2006. This accelerated pace was a reflection of industry interest in deploying TM3 based services.

With deployments of TM3 systems within the United States expected in 2007, the standards created by the committee participants will be at the forefront of this emerging market.

The committee is interacting with a number of external organizations including Mobile DTV Alliance, ETSI, 3GPP, DVB Project and the FLO Forum. This high level of global cooperation is expected to continue in 2007 to meet growing TM3 market needs.

Subcommittee TR-47.1, Terrestrial Mobile Multimedia Multicast Based on Forward Link Only Technology, is responsible for the development and maintenance of downlink standards for a subclass of TM3 systems. The subclass is characterized by the combination of the following features: purpose-built, high spectral efficiency, multiple simultaneous services, layered modulation and service support, advanced coding. Other features include 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 and support of different QoS for different services within a single RF channel and a single service. Further features are fast switching time between services, minimized receiver power consumption without sacrificing the time-diversity performance or the speed of service switching regardless of the service rate and a deterministic frame structure based on a time synchronizing signal such as GPS.

These standards are intended to be employed by 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.

The TR-47.1 subcommittee developed and ratified four specifications in 2006.

- TIA-1099, *Forward Link Only Air Interface Specification for Terrestrial Mobile Multimedia Multicast* (published August 2006)
- TIA-1102, *Minimum Performance Specification for Terrestrial Mobile Multimedia Multicast Forward Link Only Devices* (published December 2006)
- TIA-1103, *Minimum Performance Specification for Terrestrial Mobile Multimedia Multicast Forward Link Only Transmitters* (published December 2006)
- TIA-1104, *Test Application Protocol for Terrestrial Mobile Multimedia Multicast Forward Link Only Transmitters and Devices* (published December 2006)

Work continues into 2007 with an additional TR-47.1 project to develop a standard for the Link Only Transport Layer for Forward Link Only, PN-3-0270 *Forward Transport Specification* (if approved, to be published as TIA-1120). Additional new and significant projects are anticipated for 2007.

Subcommittee TR-47.2, Terrestrial Mobile Multimedia Multicast Based on DVB-H Technology, is responsible for the development and maintenance of downlink standards for a subclass of terrestrial mobile multimedia multicast (TM3) systems based on digital video broadcasting for handheld devices technology.

TR-47.2 specifications encompass but are not limited to transmission systems, implementation guides, validation of transmission systems and appropriate ETSI documents related to digital video broadcasting for handheld devices. These standards are intended to be employed by 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.

The TR-47.2 subcommittee developed and ratified one specification in 2006.

- TIA-1105, *Terrestrial Mobile Multimedia Multicast Based on Digital Video Broadcasting for Handheld Devices System* (published October 2006)

Further projects are expected to start in 2007 and a number of liaisons are progressing with other organizations.

Chair, TR-47
Jerry Upton
Jerry Upton Consulting

Vice Chair, TR-47
Marlis Humphrey
Harris Corporation

Subcommittees:

TR-47.1 Terrestrial Mobile Multimedia Multicast (TM3) Based on Forward Link Only Technology
Chair: Carl Stevenson
WK3C Wireless LLC

TR-47.2 Terrestrial Mobile Multimedia Multicast (TM3) Based on DVB-H Technology
Chair: Carolyn Taylor
Motorola, Inc.

Vice Chair: Yoram Solomon
Texas Instruments, Inc.

Engineering Committee FO-4 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.

2006 Overview

The committee met in January 2006 in Las Vegas, Nevada, and in June 2006 at Niagara Falls, Ontario. The meetings were attended by participants of the subcommittees and working groups, as well as by the International Electrotechnical Commission (IEC) Technical Advisory Groups (TAGs) to IEC Technical Committee (TC) 86, Fibre Optics.

TIA 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 participated in the relevant TAGs 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; and
- ISO/IEC Joint Technical Committee 1/SC25 on Interconnection of Information Technology Equipment.

2006 Activities

In 2006 the **FO-4 Committee** agreed to collocate the 2007 meetings with TIA TR-42 User Premises Telecommunications Cabling Infrastructure, with the intent to consider a merger of FO-4 and TR-42 Engineering Committees.

Bob Jensen was named Acting Chair of FO-4 during the year. Steve Swanson was recognized for his work as FO-4 Chair by Stephanie Montgomery on behalf of the committee and TIA. It was also noted that TIA was reorganizing the Standards Department and would go from one secretariat to three committee administrators effective February 6. Marianna Kramarikova was hired as the TIA Standards Administrator supporting FO-4 and TR-42.

The committee started work on a revision of OFSTP-14 to include modification of the source launch characteristics for the measurement of Optical Power Loss Measurements of Installed Multimode Fiber Cable Plant. FO-4, also published a revision of TIA-455-127-A, *FOTP-127, Basic Spectral Characterization of Laser Diodes*.

The FO-4 Committee is committed to worldwide harmonization of fiber optic standards and continues to nationally adopt IEC published standards where possible. IEC 61282-6 – *Fibre Optic Communications Systems Design Guides – Part 6: Skew Design in Parallel Optical Interconnection System* (to be published as TIA-1027) was approved for adoption during the year.

The committee decided not to adopt the IEC Specifications 60793-2-10 and 60793-2-50 in favor of keeping to the general format of the existing TIA-492 series. The TIA-492 series will be revised and aligned with the international standards, but the flexibility of the TIA system remains of value.
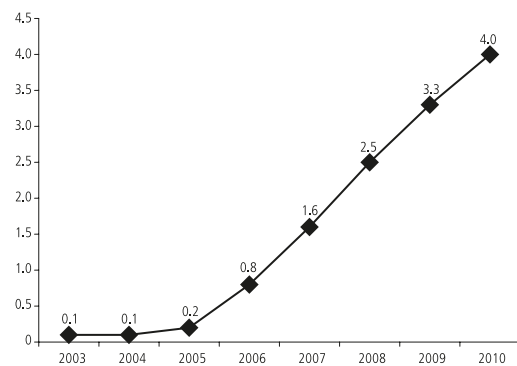
The subcommittees of FO-4 approved for publication FOTP-239 – *Fiber Optic Splice Loss Measurement Methods* (to be published as TIA-455-239). Five documents were balloted and 34 documents were approved for reaffirmation.

Carrier Spending on Fiber ($ Billions)
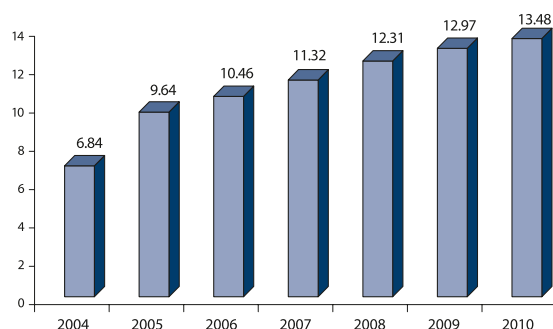
Source: *TIA's 2007 Telecommunications Market Review and Forecast*

U.S. Fiber-to-the-Home Subscribers (Millions)

Source: *TIA's 2007 Telecommunications Market Review and Forecast*

Chair, FO-4
Bob Jensen
Fluke Networks

Subcommittees:

FO-4.1   Optical Systems
Chair: James Matthews
Corning Incorporated

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

FO-4.2   Optical Fibers and Cables
Chair: Tom Hanson
Corning Incorporated

Vice-Chair: Mike Kinard
OFS

FO-4.3   Passive Optical Devices and Components
Chair: Andre Girard
EXFO

Co-Chair: Greg Sandels
OFS

FO-4.5   Fiber Optic Metrology
Chair: Lorenz Cartellieri
Experior Photonics, Inc.

Vice-Chair: Tim Drapella
NIST

TIA standards activities and programs are open to TIA members and non-members. TIA thanks the following companies for their 2006 participation.

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