

Standards and Technology Annual Report 2002



Telecommunications Industry Association



Committee TR-8 develops 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 (police, ambulance, fire fighting, etc.) applications.

Committee TR-8 has been the standards formulation committee for Private Land Mobile Radio Systems, which traditionally has involved frequency modulated (FM) analog technology. The past decade has seen the development of standards for digital radio systems of various technologies. This transition has increased the sophistication of radio systems and, as a result, has necessitated an increased level of standardization for many of the components of these systems. In addition, as new technologies are deployed, issues of compatibility and interoperability are of prime importance. In communications systems for public safety and emergency services, reliability and interoperability are especially important. Officers from various

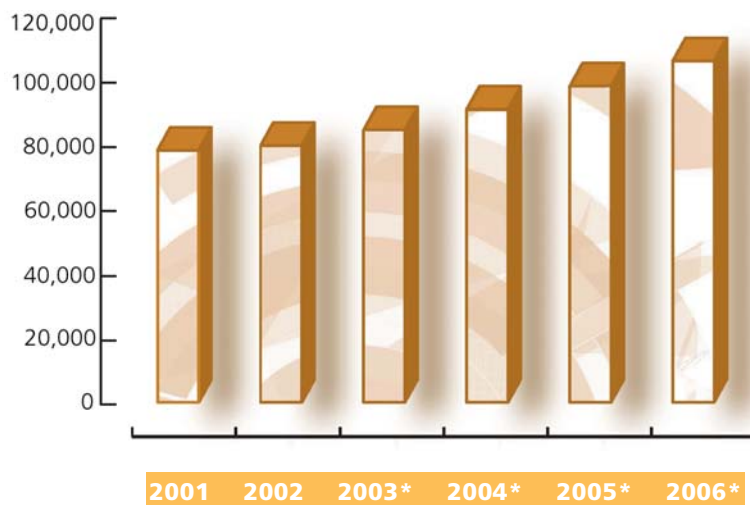
agencies find they need to communicate among themselves more frequently. The criticalness of these communications also requires the avoidance of unwanted interference. All these requirements have caused Committee TR-8 to assume a wider scope in the standards being developed.

2002 Activities

Several key projects have resulted in a high level of activity for the TR-8 subcommittees. The National Coordination Committee (NCC), an advisory committee to the Federal Communications Commission (FCC), has requested that TR-8 develop interoperability standards for wideband data systems for the 700 MHz frequency band. The time frame for this project has caused some of the subcommittees to accelerate their activities. In addition, new spectrum allocations, combined with requirements for more spectrally efficient interoperable communications systems, have resulted in heightened interest in developing standards in an expeditious manner.

TR-8 and its subcommittees met five times during the year. The meetings were held in conjunction with the APCO/NASTD/FED

U.S. Spending on Voice/Data Equipment (\$ Millions)



Source: TIA's 2003 Telecommunications Market Review and Forecast
* Projected

Project 25 meetings. (APCO/NASTD/FED is a collective group of the Association of Public Safety Communications Officials International, Inc. [APCO]; the Association for Telecommunications and Technology Professionals Serving State Government; and federal government agencies.) In addition, many of the subcommittee working groups met throughout the year, either via teleconference or at various locations. Improved working methods using email reflectors and the migration from distribution of documents in hard copy to soft copy using a local area network at the meetings for the past two years have resulted in improved communication and document distribution.

Work continued on Project 25 digital private radio standards by many of the TR-8 subcommittees. This suite of standards currently consists of 35 published documents plus addenda to 10 documents. The majority of work consisted of upgrading the standards suite of Telecommunications Systems Bulletins (TSBs) and Interim Standards to ANSI/TIA/EIA standards and of publishing addenda to existing standards. Within the year, four documents were upgraded and published as ANSI/TIA/EIA standards. In addition, two standards were revised and two TSBs and five addenda were published. Work also began on the development of standards for a two-slot Time Division Multiple Access (TDMA) system as a part of Phase II of Project 25. An initial Air Interface Physical Layer document has been published.

The ANSI/TIA/EIA-603-B document, *Land Mobile FM or PM Communication Equipment Measurement and Performance Standards*, has been updated and published. This latest revision was the result of the FCC's adding requirements for the 700 MHz frequency band.

Subcommittee TR-8.11, Antennas, has been working on revisions to its two existing documents: one that replaces TIA/EIA-329-B-1, *Minimum Standards for Communication Antennas, Part II: Vehicular Antennas* for mobile antennas, and one that updates TIA/EIA-329-B *Minimum Standards for Communication Antennas, Part 1: Base Station Antennas*. Additional work on standardized formats for specifying filtering and transmission components has been initiated.

The establishment of the 700 MHz frequency band necessitated the development of data standards. TR-8 has started developing interoperability standards for the wideband data system. In order to meet the NCC time schedule of February 2003, **Subcommittee TR-8.5, Signaling and Data Transmission**, expedited its work. Within the year, four TIA standards were published. In addition, four documents are in the drafting or ballot process. Work has also begun in other subcommittees toward formulating standards for method of measurement and performance requirements. This has resulted in two documents being balloted.

Work has continued in **Subcommittee TR-8.17, Radio Frequency (RF) Exposure**, toward the development of guideline documents for compliance with FCC mandated RF exposure limits for mobile, portable and base station equipment. A document for the product labeling and user training for mobile and portable equipment has been drafted and has been approved for publication as TSB-133, "Private Land

John Oblak

Chair, TR-8
Chief Engineer
E.F. Johnson

Vice Chair: Alan Wilson
Motorola, Inc.



SUBCOMMITTEES

TR-8.1	Equipment Measurement Procedures Chair: John Oblak E.F. Johnson	TR-8.11	Antennas Chair: Louis Meyer Decibel Products
TR-8.3	Encryption Chair: Richard Brockway Thales Communications, Inc.	TR-8.12	Two-Slot TDMA Systems Chair: Dominick Arcuri RCC Consultants
TR-8.4	Vocoder Chair: Jim Holthaus E.F. Johnson	TR-8.15	Common Air Interface Chair: Alan Wilson Motorola, Inc.
TR-8.5	Signaling and Data Transmission Chair: Jeff Anderson Motorola, Inc.	TR-8.17	RF Exposure Chair: Nick Buris Motorola, Inc.
TR-8.6	Equipment Performance Recommendations Chair: Al Wiczorek Motorola, Inc.	TR-8.18	Wireless Systems Interference and Coverage Chair: Bernie Olson Motorola, Inc.
TR-8.10	Trunking and Conventional Control Chair: Jim Holthaus E.F. Johnson	TR-8.19	Wireline Systems Interface Chair: Jerry Drobka Motorola, Inc.

Mobile Radio (FCC Part 90) Two-Way Mobile and Portable Equipment RF Exposure (EME) Labeling, Product Manual, User Awareness, and Control Information To Meet FCC MPE/SAR Guidelines.” TSB-133 will provide a template that can be used in developing the FCC-mandated training required for operation of the equipment consistent with FCC emission limits.

Work is continuing within **Subcommittee TR-8.18, Wireless Systems Interference and Coverage**, on issues of interference prediction and spectrum compatibility. TSB-88, *Wireless Communications Systems — Performance in Noise and Interference Limited Situations — Recommended Methods for Technology-Independent Modeling, Simulation, and Verification*, is undergoing revision. One of the issues addressed in the document upgrade is the interference potential between systems incorporating some of the newest digital technologies. An addendum to that

document has been published. In addition, the subcommittee has been active in providing input to the FCC on interference protection issues.

TR-8 has continued to monitor international standards activities through the participation of committee members and TIA staff. **Working Group 8.20, International Activities**, is focusing on standards harmonization and spectrum issues.

2002 has been a year of accelerated activity within TR-8. The public safety community’s needs for reliable, interoperable communications systems, the authorization of the 700 MHz frequency band, and advances in technology have caused a surge in activity. Despite the uncertain economic climate, interest and activity in the work of TR-8 remains high. The coming year is expected to be one of even more interest and increased participation.



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 structure, only **Subcommittee TR-14.7, Structural Standards for Steel Antenna Towers and Antenna Supporting Structures**, was active in 2002. The subcommittee is completing editorial revisions of the updated “bible” for the tower industry: ANSI/TIA/EIA-222, *Structural Standards for Steel Antenna Towers and Antenna Support Structures*. The current standard is the sixth incarnation of ANSI/TIA/EIA-222, 1996 Version F, which was reaffirmed in 2001 to preserve the cycle and to allow additional time for the completion of its successor. TR-14.7 is close to unveiling a major expanded revision of this structural standard for towers and antenna support.

It is anticipated that Version G of ANSI/TIA/EIA-222 will be submitted for balloting and comment in the spring of 2003. Final adoption is forecast for late in the third quarter of 2003.

For sheer volume of information, the 222-G standard will surpass 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. The large amount of material

contained in this version will require electronic versions to also be made available. All new tower construction and major renovations of existing structures must conform to 222-G after its adoption. Existing towers will not be affected unless physical alterations are made or antenna loading exceeds the original approved design. Which standard applies is usually a decision of the engineer of record.

Revision G will contain new material and expanded content. Comprising 16 chapters, it has been 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.

As an example of changes in the new standard, there are revisions to geotechnical definitions, such as “normal soil,” for determining lateral load capacities, bearing load capacities and resistance to pull-out. “Normal soil,” at this time, is defined as a set of parameters always intended for bidding purposes. Over the years, this definition has become practice, and in some instances foundations were actually installed for it. The committee has eliminated the term and is going to give values that are representative of a soil type, similar to those used in building codes (e.g., values representative of sand, clay, etc.). The committee’s aim is to determine real-world, conservative values. The intent is to drive purchasers toward the use of a geotechnical report to solve all initial installation problems and economics.

Other issues such as safety and climbing requirements have also been addressed in the latest version. The committee has been working simultaneously on a new gin pole standard (PN 4860, *Structural Standards for Steel Gin Poles Used for the Installation of*

SUBCOMMITTEES

- TR-14.3** Station Grounding
Inactive
- TR-14.6** Standard Microwave Transmission Systems
Inactive
- TR-14.7** Structural Standards for Steel Antenna Towers and Antenna Supporting Structures
Chair: Craig Snyder
Sioux Falls Tower Specialists
- TR-14.10** Electrical Performance Standards for Television Relay Facilities
Inactive
- TR-14.11** Interference Criteria for Microwave Systems in the Safety and Special Radio Services
Inactive
- TR-14.12** Waveguide Components
Inactive



Craig Snyder

Chair, TR-14
President
Sioux Falls Tower Specialists

Antenna Towers and Antenna Supporting Structures). Gin poles are used in tower erection and this standard will allow tower erectors and designers to merge these technologies to ensure efficiency and safety.

Revision G will be the most sweeping change in the 222 standard since Revision D was implemented 20 years ago. The committee's intent is to create an internationally recognized and acceptable standard that can be implemented beyond the North American market. The committee believes the standard will eclipse the state of the art in any other

standard in the world. The standard is incorporated by reference in the International Building Code, which means that by default it becomes the most widely recognized tower standard of most countries, states and municipalities for their building codes, although there is often a lag of two to three years for the local level to catch up.



Committee TR-30 develops standards related to the functional, electrical and mechanical characteristics of interfaces between Data Circuit-Terminating Equipment (DCE) and Data Terminal Equipment (DTE), the telephone and Voice over Internet Protocol (VoIP) networks and other DCE and Facsimile Systems.

2002 Activities

Once again in 2002 TR-30 focused a good deal of its attention on developing contributions to input to International Telecommunication Union — Telecommunication Standardization Sector (ITU-T) Study Group (SG) 16 “Multimedia Services, Systems and Terminals.” Particular emphasis was on contributions to the development of new ITU-T Recommendations for Modem over IP (V.150.0 and V.150.1). TR-30 has had a long-standing close relationship with the various rapporteurs in ITU-T SG 16 and continued this in 2002, with the work on V.MoIP (V. Modem over IP) progressing seamlessly between meetings of TR-30.1 and the Question 11 rapporteur in SG 16. Extending this relationship, starting in 2003 TR-30.5 has invited the experts of Question 14 “Facsimile Terminals (Group 3 and Group 4)” in SG 16 to work together in progressing V.34 fax capability in Recommendation T.38,

Procedures for Real-Time Group 3 Facsimile Communication over IP Networks.

Subcommittee TR-30.1, Modems, focused on its close working arrangement with ITU-T SG 16 and the work already completed on SG 16 Question 11 “Evaluation” to progress work on the new ITU-T Recommendations for MoIP (V.150.0 and V.150.1). Numerous contributions to this effort were developed and approved by TR-30.1/TR-30 to the ITU-T process. This work is continuing with the development of enhancements to the V.150 family of Recommendations. In addition, TR-30.1 continues to be the major contributor to refining ITU-T Recommendations V.44, *Data Compression Procedures*, V.59, *Managed Objects for Diagnostic Information of Public Switched Telephone Network Connected V-Series Modem DCEs* and the V.9x series (related to digital modems).

Growing from its experience with the development of ITU-T Recommendation V.150.1 (V.MoIP), TR-30.1 is addressing the recently identified issues on Text Telephony (Telecommunications Device for the Deaf [TDD] and teletypewriter [TTY]) over VoIP networks. This technology uses the acronym ToIP (Text over IP). The committee will be providing input to this work in ITU-T SG 16 and has agreed to develop an interim TIA standard to address the transport of *A Frequency Shift Keyed Modem for Use on the Public Switched Telephone Network* (TIA/EIA-825) over IP, which will address this issue for networks in the United States. The difficulties that have been experienced with TDDs over IP concern IP networks with various Quality of Service issues. Packet loss in IP networks and voice compression algorithms have been seen to limit proper operation of TDDs. The work in TR-30.1 will be to develop a

standard that will provide reliable transport of TDDs over various IP networks.

This past year, TR-30.1 approved a new standard, TIA/EIA-939, *Procedures for Automatic Interworking Between T.30, V.18, V.8bis, V.8, and V.32/Annex A Automode Modems and V.32bis, V.32, V.22bis, V.22, V.21, V.23, 212-Type and 103-Type Modems*, and revised the existing standard TIA/EIA 825, *A Frequency Shift Keyed Modem for Use on the Public Switched Network*.

Subcommittee TR-30.2, DTE-DCE Interfaces and Protocols, withdrew the following standard, since many of its provisions were incorporated into ITU Recommendations.

- TIA/EIA-615, *Data Transmission Systems and Equipment — Serial Asynchronous Automatic Dialing and Control — Extended Command Syntax*

In addition, the following standard was reaffirmed during 2002:

- TIA/EIA-232 F, *Interface Between Data Terminal Equipment and Data Circuit-Terminating Equipment Employing Serial Binary Data Interchange*.

Subcommittee TR-30.3, Data Communications Equipment Evaluation and Network Interfaces, continued to focus on network models and equipment evaluation for data communications equipment in 2002.

TIA-876, *Network Access Transmission Model for Evaluating xDSL Modem Performance*, was released for publication. Service providers, vendors and users can use this statistically accurate portrait of the North American access network and the Network Model Coverage (NMC) methodology to compare the performance of different models or manufacturers of Digital Subscriber Line (DSL) systems (DSLAMs [Digital Subscriber Line Access Multiplexer] and modems) or different technologies. Formal liaison has been established with the Digital Subscriber Line Forum (DSL Forum), ITU-T SG 15 “Optical and Other Transport Networks” Question 4 “Transceivers for Customer Access and In-premises Phone Line Networking Systems on Metallic Pairs,” and European Telecommunications Standards Institute (ETSI) TM6 “Transmission and Multiplexing” to develop international versions of the standard.

TR-30.3 continued its revision of TSB-38, *Test Procedures for Evaluating Modem Performance*. This project involves a major revision of the existing document to align it with today’s technologies and to expand it to include MoIP.

Work was started on PN-3-0062 (TIA/EIA-921), *Network Model for Evaluating Modem Over Internet Protocol (MoIP) Transmission Performance*. This project defines the network

SUBCOMMITTEES

TR-30.1 Modems

Chair: Keith Chu
Conexant Systems

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
JLD Associates
Vice Chair: Phil Kyees
Paradyne Corp.

TR-30.5 Facsimile Terminal Equipment and Systems

Vacant

model, test equipment, setup and parameter values that can be used to evaluate and compare MoIP systems.

In 2002, Subcommittee TR-30.5, *Facsimile Terminal Equipment and Systems*, focused on the ITU-T Recommendation T.38, *Procedures for real-time Group 3 facsimile communication over IP networks*. The primary focus has been to add V.34 fax capability to T.38. Other aspects for enhancing T.38 are being considered (e.g., use of improved packet network transport layer protocols, secure facsimile, interoperability with V.MoIP). A number of contributions to ITU-T SG 16 in support of this effort were approved through the TR-30.5/TR-30 process.

During 2002 TR-30.5 reaffirmed the following standard:

- TIA/EIA-605, *Facsimile DCE-DTE Packet Protocol Standard*

In addition, TR-30.5 withdrew the following standards:

- TIA/EIA-465-A, *Group 3 Facsimile Apparatus for Document Transmission*

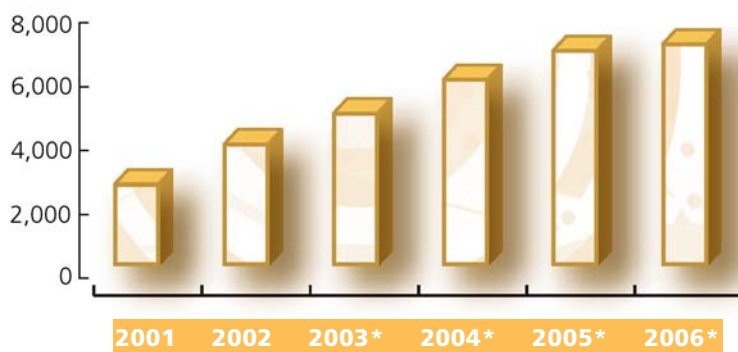
Fred Lucas

Chair, TR-30
FAL Associates



- TIA/EIA-466-A, *Procedures for Document Facsimile Transmission*
- EIA-497, *Facsimile Glossary*
- TIA-538, *Facsimile Coding Schemes and Coding Control Functions for Group 4 Facsimile Equipment*
- TIA/EIA-614, *Binary File Transfer Format for Group 3 Facsimile*

U.S. Spending on Cable Modem Services (\$ Millions)



Source: TIA's 2003 Telecommunications Market Review and Forecast
* Projected

Wireless consumer communications devices, such as cordless telephones and Citizens Band (CB) radios, were the core products within Committee TR-32's purview. The Committee's work in the past included maintaining standards, recommending new projects and reviewing work programs for new standards.

2002 Activities

No issues required the work of Committee TR-32 during 2002. Due to declining participation in the work of TR-32, the TIA Technical Committee voted in 2002 to retire TR-32 at the end of 2002 and transfer its cordless telephone-related activities to TR-41, since cordless telephone manufacturers are active in that committee. In fact, the coexistence of cordless telephones in the same spectrum as Wireless Local Area Networks (WLANs) was a cordless issue that was teed up for continuing work.

However, the CB equipment standards TR-32 had generated did not fit within TR-41. Thus, after consultation with the remaining CB manufacturers of TIA, a decision was made to have those few standards withdrawn.

TR-32 had a proud tradition of serving the personal radio equipment market, and some of that work will go on in TR-41, but as part of the right-sizing of TIA's standards program, TR-32 retired at the end of 2002.

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.

In addition to developing industry standards specifically for satellite communications equipment, Committee TR-34 has been working with other Standards Development Organizations (SDOs) to ensure that the standards it produces are acceptable for satellite services. In particular, Subcommittee TR-34.1, Communications and Interoperability, has

been working closely with the ATM (Asynchronous Transfer Mode) Forum and the Internet Engineering Task Force (IETF) to ensure the standards developed by these bodies take the special requirements of satellite communications into consideration.

2002 Activities

As in the previous several years, Committee TR-34's 2002 activities were concentrated in two major areas: developing standards for satellite communications systems, with a major focus on the Internet, ATM and Global System for Mobile Communications (GSM) and their seamless operation over satellite; and developing interference criteria and interservice frequency-sharing methodologies. This work is accomplished in two subcommittees — TR-34.1, **Communications and Interoperability**, and TR-34.2, **Spectrum and Orbit Utilization**.

Subcommittee TR-34.1 accomplishes its tasks through five Ad Hoc Working Groups, all of which address issues related to the interoperability of the satellite and terrestrial components of communications systems, centered primarily on existing and future standards development, including Internet, ATM and GSM and their seamless operations





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over satellite transmissions paths and common air interfaces. Currently, the TR-34.1 Ad Hoc Working Groups are

configured as follows:

- Internet Protocols over Satellite
- Common Air Interface for Processing Satellites
- IP Multicast over Satellite
- Common Air Interface for Satellite Systems for Residential Market
- TCP Protocol for the IPSEC Environment

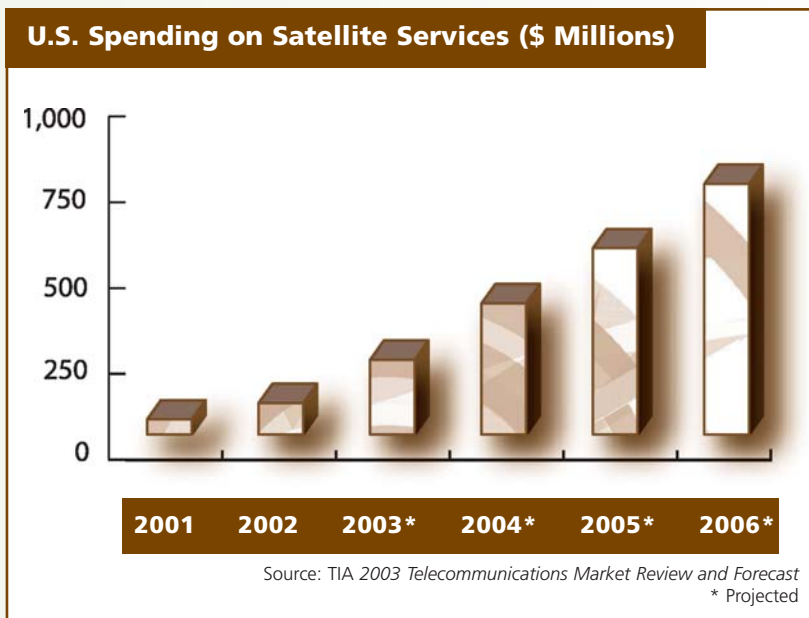
The output of TR-34.1 generally consists of TIA Telecommunications Systems Bulletins (TSBs), Interim Standards (ISs) and American National Standards (ANSs). Working groups collaborate, when delegated, with appropriate national or international standards bodies.

Subcommittee TR-34.1 also continued its relationship with the ATM Forum and was active in the Wireless ATM (WATM) Group of the ATM Forum, working to ensure that ATM standards consider satellite requirements. Recently, the Working Group (WG) on Common Air Interface: ATM Via Satellite achieved a major milestone, completing its work on ATM over point-to-point satellite links and publishing IS-787, *Common ATM Satellite*

Interface (CASI) Interoperability Specification, detailing frame format, acquisition and synchronization procedures, and dynamic and adaptive coding.

The Working Group on Internet Protocols over Satellite continued its liaison with the IETF Transmission Control Protocol-Satellite (TCP-Sat) WG, with the goal of ensuring that Internet protocols will not preclude the use of satellites for Internet access. The TCP-Sat WG's remaining work has been rolled into the Performance Implications of Link Characteristics (PILC) WG, which has developed a draft IETF submission on the risks and impacts of TCP spoofing. Other TR-34.1 Working Groups' closely coordinated work with ETSI and the ITU Telecommunication Standardization Sector (ITU-T) extended throughout 2002, a trend that will be a continuing facet of TR-34.1 standards development efforts in subsequent years.

Subcommittee TR-34.2 and its TIA oversight bodies, the Spectrum and Orbit Utilization Section (SOUS) and the Satellite Communications Division (SCD), have participated in expressing their views to the



Federal Communications Commission (FCC) regarding:

- *Revision of Part 15 of the Commission's Rules Regarding Ultra-Wideband Transmissions Systems (ET Docket 98-153) Adopted: February 14, 2002; Released: April 22, 2002.*

During 2002, TR-34.2 members and interested parties in the SCD had extensive discussions concerning the potential for interference from Ultra-Wideband (UWB) devices into satellite earth station receivers operating in the 3.7-4.2 GHz Fixed-Satellite Service (FSS) bands. TR-34 discussions were ignited by the National Telecommunications and Information Administration's (NTIA) report (*NTIA Special Publication 01-43, Assessment of Compatibility between Ultrawideband Devices and Selected Federal Systems, January 2001*), which alluded to the possibility of UWB interference affecting FSS earth stations in the 4 GHz range; the NTIA analyses used generally accepted sharing criteria and analysis methodologies that are equally applicable to commercial satellite systems.

On July 26, 2001, the SCD, with input from TR-34.2, transmitted a letter to the Secretary of the FCC urging the commission to consider the FSS interference issue when developing possible rules and operational requirements for the deployment of UWB devices and to adopt a specific technical regulatory framework to govern UWB devices that protect FSS systems from harmful interference.

Following the issuance of the letter regarding UWB, it was decided in the SCD and the SOUS that there were no other requirements for TR-34.2 to develop technical standards and/or studies addressing specific spectrum issues at this time; therefore TR-34.2 would stand down from holding quarterly meetings for the rest of 2002, until SOUS calls for TR-34.2 to re-activate in order to address a new, specific technical spectrum/standards issue.

SUBCOMMITTEES

- TR-34.1** Communications and Interoperability
Chair: Prakash Chitre
Lockheed Martin Global
Telecommunications
Vice Chair: Ferit Yegenoglu,
Lockheed Martin Global
Telecommunications
- TR-34.2** Spectrum and Orbit Utilization
Chair: Jeffrey B. Binckes
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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 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 criteria become mandatory when adopted by the Administrative Council for Terminal Attachments (ACTA), www.part68.org.

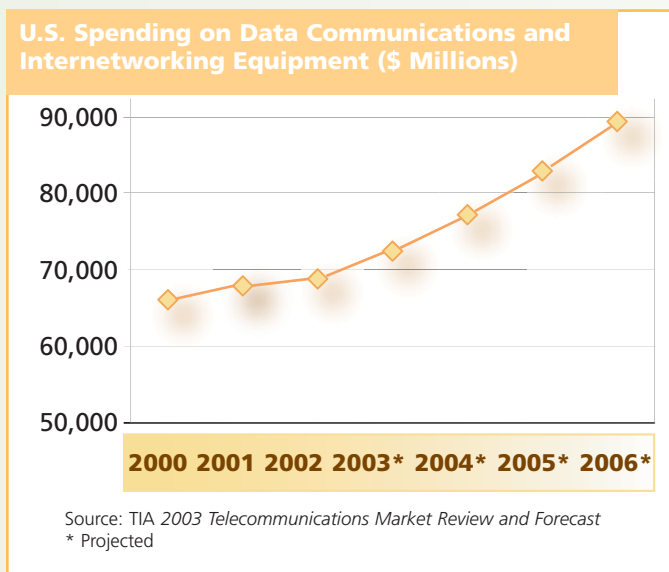
2002 Activities

Committee TR-41 is dynamic and resurgent in nature, with some projects concluding and new ones springing up in their place. It completed the year with six active subcommittees and 10 working groups. One subcommittee wrapped up its work and went into inactive status

during the year. Three working groups were dissolved after completing their tasks, while five new working groups were formed. The subcommittee leadership remained stable in the chair position, with one person re-elected. However, there was some turnover in the vice chair positions, with two individuals resigning because of job changes and two others elected. The year ended with one vice chair position unfilled. TR-41 meets with its subcommittees and working groups for a week four times per year.

TR-41 has continued its leadership role in supporting ACTA by submitting revised technical criteria for the prevention of harm to the network and by providing input on administrative matters. It has also continued its leadership in developing Voice over Internet Protocol (VoIP) standards. A report on this work was very well received at the Signaling for VoIP Summit hosted by the Alliance for Telecommunications Industry Solutions (ATIS)- and American National Standards Institute (ANSI)-accredited Standards Committee T1, Telecommunications, in August 2002. Another area in which TR-41 subcommittees have been active is emergency preparedness and support for Emergency 911 (E911) by both multiline terminal systems and VoIP enterprise networks.

TR-41 enjoys a close liaison with Technical Subcommittee T1E1, Interfaces, Power & Protection of Networks, co-locating three of its four meetings in 2002. TR-41 also maintains liaison with Industry Canada's Terminal Attachment Program Advisory Committee (TAPAC), the European Telecommunications Standards Institute's Speech Transmission Quality (ETSI STQ) Technical Committee, the Internet Engineering Task Force (IETF) and the



Telecommunication Certification Body (TCB) Council. In addition, it provides input to other international Standards Development Organizations (SDOs) such as Underwriters Laboratories (UL), the Canadian Standards Association (CSA), and Technical Subcommittee T1A1, Performance, Reliability, and Signal Processing.

Subcommittee TR-41.1, Multiline Terminal Systems, completed work on the revision of its Private Branch Exchange (PBX) standard and published the document as TIA-464-C, *Requirements for PBX Switching Equipment*. It also succeeded in getting its adoption of IEC/ISO 11573, *Information technology — Telecommunications and information exchange between systems — Synchronization methods and technical requirements for private Integrated Services Networks*, published as TIA-594-A, *Synchronization Methods and Technical Requirements for Private Integrated Services Networks*. The subcommittee reviewed a number of older documents, deciding to reaffirm three and rescind four. TR-41.1 balloted TIA-689-A, *PBX and KTS Support of Enhanced 911 Emergency Service Calling*, and expects to publish the revised document early in 2003. François Pinier from Alcatel was elected to fill the vacant vice chair position at the November meeting.

Subcommittee TR-41.3, Analog and Digital Wireline Terminals, agreed to take responsibility for issues dealing with the Radio Frequency (RF) performance of cordless telephones that formerly belonged to Engineering Committee TR-32, Personal Radio Equipment, and the work was assigned to TR-41.3.9. This change was made at the suggestion of the User Premises Equipment Division (UPED), which sponsors both TR-41 and TR-32, since TR-32 has become inactive, and cordless telephone manufacturers participate in the work of TR-41. As a result of this change, TR-41.3

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Chair, TR-41

Senior Technical Consultant - Standards
VTech Communications

Vice Chair:

Roger Britt
Nortel Networks

Chair, TR-41 (retired)

Charles Berestecky
Consultant
Lucent Technologies



became an advocate for the creation of TIA's new policy on unlicensed spectrum use.

Although documents are balloted and approved at the subcommittee level, TR-41.3 uses working groups to do their actual drafting. TR-41.3.1 submitted TIA-777-A, *Caller Identity and Visual Message Waiting Indicator Equipment Performance Requirements*, for industry ballot. It is expected that TIA-777-A will be published early in 2003 following a default ballot to resolve comments received. The revised document will replace both TIA-716 and TIA-777, which contain Type 1 and Type 2 caller identification requirements, respectively.

TR-41.3.3 produced TIA-920, *Transmission Requirements for Wideband Digital Wireline Telephones*. TIA-920 complements the narrowband standard, TIA/EIA-810-A, previously produced by the working group, and completes its assignments. As a result, TR-41.3.3 was dissolved following the November meeting.

The former TR-41.3.5 Working Group dealing with the revision of TIA/EIA-470-B, *Telecommunications – Telephone Terminal Equipment – Performance and Compatibility Requirements for Telephone Sets with Loop Signaling*, was split into five new working groups (TR-41.3.5, 41.3.6, 41.3.7, 41.3.8,

41.3.9), each aligned with a specific part of the revision of this document for analog wireline telephones. The new TR-41.3.5 submitted TIA-470.110-C, *Handset Acoustic Performance Requirements*, for industry ballot. TR-41.3.7 submitted TIA-470.220-C, *Alerting Response and Acoustic Performance Requirements*, for industry ballot. TR-41.3.9 submitted TIA-470.310-C, *Cordless Telephone Range Measurement Procedures*, for a second industry ballot after substantial revisions were made to resolve comments received on the first ballot. TR-41.3.6 is nearing completion of its draft of TIA-470.210-C, *Resistance and Impedance Performance Requirements*. TR-41.3.8 was established but has not begun active work on the Network Signaling Performance Requirements document that will become TIA-470.230-C.

TR-41.3.9 was already addressing issues unique to cordless telephones, and thus the responsibility for RF performance issues was transferred from TR-32 and added to the workplan of TR-41.3.9. A liaison relationship has been established with the Institute of Electrical and Electronics Engineers (IEEE) 802.19, Coexistence Technical Advisory Group, to discuss possible ways cordless telephones and wireless local area networks

can avoid interfering with each other when operating in the frequency bands they share.

Subcommittee TR-41.4, IP Telephony Infrastructure, reaffirmed Bob Bell of Cisco as chair and elected Richard Hatherill of Mitel as vice chair at its February meeting. Unfortunately, Hatherill was not able to fulfill his term because of a job change; therefore, Joanne McMillen of Avaya was elected as replacement vice chair at the November 2002 meeting. TR-41.4 published two documents: TIA-912, *IP Telephony Equipment Voice Gateway Transmission Requirements*, and TSB-146, *IP Telephony Support for Emergency Calling Service*. The fast-paced world of IP telephony being what it is, work has already started on the revision of both documents.

TR-41.4 also has a project dealing with the security framework for IP telephony. The subcommittee made a liaison request to the IETF security sector to consider developing a security protocol suite suitable for devices with limited resources, such as VoIP telephones. In the interim, Mitel has developed a protocol that may be suitable and has offered to put it in the public domain. The TR-41.4.4 working group, VoIP Terminals, continued work on its revision and upgrade of TIA/EIA/IS-811, *Performance and Interoperability Requirements for Voice-over-IP (VoIP) Telephone Terminals*. Progress on the work has been somewhat hampered by turnover in participants due to industry changes.

Subcommittee TR-41.7, Environmental and Safety Considerations, also uses working groups to create documents it then ballots and approves at the subcommittee level. TR-41.7.1 identified an inconsistency between the construction and testing methods for showing compliance with the overvoltage criteria in UL-60950, *Safety of Information*



Technology Equipment. The discrepancy was communicated to the UL Standards Technical Panel (STP) responsible for UL-60950 with an offer to provide help in resolving it; however, the STP chose not to make any change in its standard.

The revision of the bonding and grounding standard that had been made jointly by the former TR-41.7.2 Working Group and the T1E1.7 Electrical Protection Working Group was submitted through the ANSI ballot process and published as J-STD-607-A, *Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications*. TR-41.7.3 completed its revision and publication of TIA-631-A, *Radio Frequency Immunity Requirements*, and the working group was subsequently dissolved.

TR-41.7 decided to undertake a revision of TIA/EIA-571-A, *Environmental Considerations*, and created a new working group, TR-41.7.4 for this purpose. Don McKinnon of AST Technology Labs produced a baseline document and agreed to serve as editor and interim chair. TR-41.7 also formed an ad hoc group to look into safety requirements for telecom circuit over-current protectors. A liaison letter has been sent to UL advising it of this activity and encouraging participation, with the expectation that the outcome of the work will result in a new UL standard for these devices. This ad hoc group is expected to become an official working group in 2003.

Subcommittee TR-41.9, Technical Regulatory Considerations, undertook a revision and upgrade to ANS status of the criteria for prevention of harm to the network. The initial version of these criteria was published in July 2001 in TIA/EIA/IS-968, *Telecommunications — Telephone Terminal Equipment Technical Requirements for Connection of Terminal Equipment to the*

Telephone Network, and was required by the Federal Communications Commission (FCC) to be identical to the former FCC Part 68 rules. The revision included a relaxation of the signal power criteria for 56K modems, inclusion of the criteria for Asynchronous Digital Subscriber Line (ADSL) modems and stutter dial tone detection devices that were initially required to be published separately, and extension of the frequency range for metallic signal power criteria to 30 MHz. The document was published as TIA-968-A, *Technical Requirements for Connection of Terminal Equipment to the Telephone Network*, and submitted to ACTA for adoption. A recommendation was also made that ACTA allow an 18-month transition period during which products can be approved either to the new document or to the TIA/EIA/IS-968 and TIA/EIA/IS-883 documents it replaces.

TR-41.9 has two working groups. TR-41.9.1 functions as an extension of TR-41.9 for the purpose of detailed review of contributions proposing changes to the harms to the network criteria. A new TR-41.9.2 Working Group, chaired by Greg Slingerland of Mitel Networks, was formed to revise TSB31-B, *Part 68 Rationale and Measurement Guidelines*. This effort quickly identified issues related to there no longer being a single Part 68 rules document, or even a single SDO developing harms to the network criteria. At the current time, there are criteria requiring measurement procedures in Part 68 itself, in TIA/EIA/IS-883 and TIA/EIA/IS-968, in TIA-968 A that replaces them, and the T1E1 document T1.TRQ.6-2001, *Technical Requirements for SHDSL, HDSL2, HDSL4 Digital Subscriber Line Terminal Equipment to Prevent Harm to the Telephone Network*.

TR-41.9 and T1E1 have agreed to develop two joint standards. One (designated to be J-STD-068) will contain all the technical

criteria for preventing harms to the network developed by the two organizations. The other will provide the corresponding measurement procedures for the technical criteria described in J-STD-068. Both will be published as multi-part documents, with the SDO that has the relevant expertise taking the lead for its part in both documents.

Subcommittee TR-41.10, Private Integrated Services Networks, did not meet in 2002. It was placed in inactive status at the TR-41 meeting held in May 2002.

Subcommittee TR-41.11, Administrative Regulatory Considerations, completed and published TSB-129-A, *U.S. Network Connections Regulatory Approval Guide*. This document provides guidance to the regulatory engineer in obtaining approval for connecting equipment to the telephone network using either the Supplier's Declaration of Conformity (SDoC) or the Telecommunication Certification Body (TCB) process. It replaced

the original TSB-129 document that dealt only with SDoC and the former Part 68 Application Guide that was of some use for the TCB process.

TSB-129-A was submitted to ACTA with the request that it be adopted in place of the group's Guidelines and Procedures document. ACTA members agreed the document had much to offer but chose not to adopt it because of anticipated difficulties in making changes to a procedures document not under its control. An agreement was reached to undertake a joint effort by an ACTA ad hoc committee and TR-41.9.2 to identify items that could be retained in a revision of TSB-129-A that ACTA could consider endorsing, while removing those items ACTA felt should be more directly under its control. This work was launched in fourth quarter 2002.

TR-41.11 has also undertaken an effort to revise TSB-168, *Labeling Requirements*. This document has been adopted by ACTA to

define the labeling requirements for equipment approved for connection to the network. The main goal of the revision of TSB-168 is to reduce the number of equipment classifications to a more manageable level and to facilitate greater consistency in their use. The revised document is expected for ballot in first quarter 2003.

SUBCOMMITTEES

TR-41.1 Multiline Terminal Systems
Chair: Tailey Tung
Siemens Information and Communications Networks Inc.
Vice Chair: François Pinier
Alcatel

TR-41.2 Conformity Assessment
Inactive

TR-41.3 Analog & Digital Wireline Terminals
Chair: James Bress
AST Technology Labs Inc.
Vice Chair: Harry Van Zandt
ECS Technologies

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

TR-41.5 Multimedia Building Distribution Systems
Inactive

TR-41.6 Wireless User Premises Equipment
Inactive

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

TR-41.9 Technical Regulatory Considerations
Chair: Phillip Havens
Teccor Electronics
Vice Chair: Anh Nguyen
Underwriters Laboratories

TR-41.10 Private Integrated Services Networks
Inactive

TR-41.11 Administrative Regulatory Considerations
Chair: Greg Slingerland
Mitel Networks
Vice Chair: John Shinn
Sanmina-SCI Corporation

Engineering Committee TR-42 develops voluntary standards for telecommunications infrastructure (cabling and its pathways and spaces), specifically those used for, but not limited to, voice, video and data networking. The committee's standards work covers telecommunications cabling including component requirements, field-test and installation requirements, cabling distances, telecommunications outlet/connector



configurations, and recommended topologies for commercial buildings, residential, data centers, industrial environments and between buildings in a campus environment.

TR-42's work addresses the design and construction of telecommunications infrastructure for commercial buildings, single-family and multi-dwelling residential, data centers and industrial environments, including customer-owned outside plant. Telecommunications infrastructure includes the pathways into which telecommunications media are 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 other 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 BICSI, which train and certify technicians for design and installation of voice and data.

2002 Activities

The TR-42 Engineering Committee is organized into nine subcommittees and three working groups, each responsible for a specific area of premises telecommunications infrastructure.

The committee held elections in February 2002 for itself and all even-numbered subcommittees.

Committee TR-42's efforts covered a broad range of activities during 2002, including several additions to the TIA/EIA-568-B, *Commercial Building Telecommunications Cabling Standard*, series of standards. TIA/EIA-568-B.1, *Part 1: General Requirements*, which specifies overall requirements for telecommunications cabling in commercial buildings; TIA/EIA-568-B.2, *Balanced Twisted Pair Cabling Components*, which specifies detailed requirements for copper cabling; and TIA/EIA-568-B.3, *Optical Fiber Cabling Components Standard*, which specifies detailed requirements for optical fiber cabling were addressed.

The TIA/EIA-568-B series of standards continues to recognize both twisted pair copper and optical fiber media and provides guidelines on cable selection and distance limits. Optical fiber is used principally for backbone cabling between buildings on a campus or between networking equipment on

Bob Jensen

Chair, TR-42
Fluke Networks

Vice Chair:

Paul Kish
NORDX/CDT

different floors of a building, but has been gaining recognition for use in horizontal cabling. A new laser-optimized fiber that supports 10 Gb/s data transmission rates for

distances up to 300 meters using serial data transmission and cost-effective Vertical Cavity Surface Emitting Lasers (VCSELs) has been added to the optical fiber-choice selections.

Twisted-pair copper is used primarily for horizontal distribution between networking equipment in a telecommunications closet and work area equipment, such as a personal computer or telephone. TIA/EIA-568.B.2-1, *Addendum 1 — Transmission Performance Specifications for 4-Pair 100 Ohm Category 6 Cabling*, which became a standard in June 2002, extended the bandwidth of copper twisted-pair to 250 MHz and is envisioned to be a leader in media choice. This document, also known as the “Category 6” standard, specifies requirements for insertion loss, near-end crosstalk loss, equal level far-end crosstalk, return loss, propagation delay and delay skew requirements for 100 Ohm 4-pair

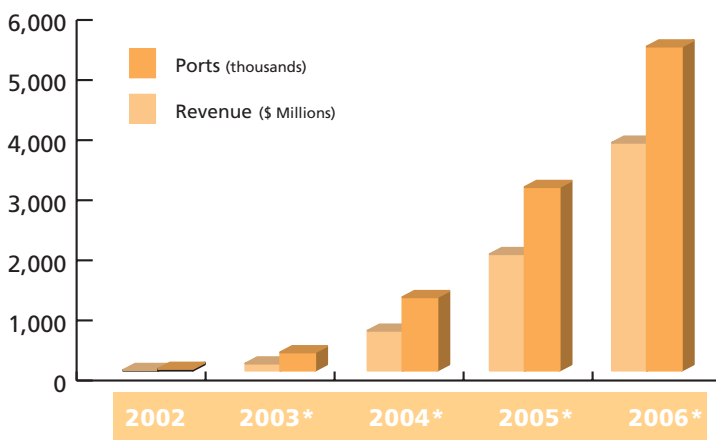
category 6 cabling, cables and connecting hardware. Significant work is also being realized with mid-span insertion of power for data terminal equipment, which will allow devices to be powered without the need to be plugged into an electrical outlet.

Two standards that have been well accepted by the telecommunications industry and international standards were published this past year. TIA/EIA-862, *Building Automation Systems Cabling Standard for Commercial Buildings*, is companion to the TIA/EIA 568 B series of standards, in that they fit within a complementary infrastructure. Also complementary to all of the TR-42 family of standards is TIA/EIA 606-A, *Administration Standard for Commercial Telecommunications Infrastructure*, which provides the user of this document with guidelines and choices of classes of administration for maintaining telecommunications infrastructure.

Three new addenda were published to TIA/EIA 570-A, *Residential Telecommunications Cabling Standard*, by Subcommittee TR-42.2, **Residential Telecommunications Infrastructure**. This technical work has taken on growing importance as more people take advantage of the benefits that can be obtained in the home, including entertainment in the

home, networking and telecommuting to the work office. Home networking includes interconnection of computers, peripheral devices, entertainment systems, security systems and control systems. The addenda provide the missing pieces to complete a total home networking solution and are now being incorporated into the next edition of the standard.

Worldwide 10 Gigabit Ethernet Usage



Source: 2003 Telecommunications Market Review and Forecast
* Projected

Subcommittee TR-42.3, Commercial Building Telecommunications Pathways and Spaces, has begun work to produce the next edition of TIA/EIA 569-A, *Commercial Building Standards for Telecommunications Pathways and Spaces*. This edition of the standard, to become TIA/EIA 569-B, will incorporate seven addenda that have been published, including the criteria developed for multi-tenant buildings. Architects, engineers and designers will use this standard as new and renovated buildings are planned for construction.

In addition to the work on laser-optimized 50/125 μm optical fiber contained in TIA/EIA 568.B.3-1, *Additional Transmission Performance Specifications for 50/125 μm Optical Fiber Cables*, **Subcommittee TR-42.8, Telecommunications Optical Fiber Cabling Systems**, has published one Telecommunications Systems Bulletin, TSB-125, *Guidelines for Maintaining Optical Fiber Polarity Through Reverse Pair Positioning*, and is working on two other TSBs (TSB-136, *Guidelines for Maintaining Optical Fiber Polarity with Systems Utilizing MPO Connectors and 12-Fiber Ribbon Cables* and TSB-140, *Additional Guidelines for Field-*

SUBCOMMITTEES

- | | | | |
|----------------|--|----------------|--|
| TR-42.1 | Commercial Building Telecommunications Cabling
Chair: Herb Congdon
Tyco Electronics
Vice Chair: Julie Roy
NORDX/CDT | TR-42.5 | Telecommunications Infrastructure Terms
Chair: Peter Sharp
Giffels Associates
Vice Chair: Bob Jensen
Fluke Networks |
| TR-42.2 | Residential Telecommunications Infrastructure
Chair: Bob Jensen
Fluke Networks
Vice Chair: John Pryma
Genesis Cable | TR-42.6 | Telecommunications Infrastructure Administration
Chair: Tom Rauscher
Archi-Technology |
| TR-42.3 | Commercial Building Telecommunications Pathways and Spaces
Chair: Ray Keden
Erico, Inc.
Vice Chair: Steve Huffaker
BankOne | TR-42.7 | Telecommunications Copper Cabling Systems
Chair: Masood Shariff
Avaya Inc.
Vice Chair: Valerie Rybinski
Hitachi Cable Manchester |
| TR-42.4 | Outside Plant Telecommunications Infrastructure
Chair: Donna Ballast
BICSI
Vice Chair: Henry Franc
Bell Canada | TR-42.8 | Telecommunications Optical Fiber Cabling Systems
Chair: Herb Congdon
Tyco Electronics
Vice Chair: Chad Burel
Corning Cabling Systems |
| | | TR-42.9 | Industrial Telecommunications Infrastructure
Chair: Peter Sharp
Giffels Associates
Vice Chair: Bob Lounsbury
Rockwell Automation |

Testing Length, Loss and Polarity of Optical Fiber Cabling Systems.

TR-42 will continue to grow in scope and diversity with a global perspective. At the subcommittee and working group level, there is an ongoing technical exchange and dialogue with international experts in the field of cable, connector and system performance and testing, such as Joint Technical Committee (JTC) 1/Subcommittee 25, Interconnection of Information Technology Equipment, Working Group 3, Customer Premises Cabling. The intent is to ensure that the TIA cabling standards are a technically compatible subset and fully harmonized with international standards.

In addition, to ensure globalization and interoperability with other standards developers and industry groups, TR-42 has established liaisons with the Society of Cable Telecommunications Engineers (SCTE), Continental Automated Buildings Association

(CABA) and the Open DeviceNet™ Vendor Association (ODVA).

Several new standards are under development including:

- a cabling standard for industrial buildings, and
- a standard for network distribution nodes (data centers).

The gigabit era has introduced many new challenges. The communications world is in a period of change, and the latest documentation from TR-42, its subcommittees and working groups is evolving to meet the increased bandwidth demands of future applications. For the end user, it is important to keep abreast of these changes in technology to ensure correct decisions on cabling infrastructure issues.

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, internetwork and intersystem operations and interfaces.

2002 Activities

TR-45 is composed of six subcommittees and a number of ad hoc groups that focus on particular aspects of mobile and personal communications systems specifications and standards.

In addition to and in support of standards development during 2002, TR-45 was represented at or made significant contributions to a large number of initiatives and Joint Expert Meetings (JEMs) pivotal to the telecommunications industry. Among these initiatives were meetings held to discuss homeland security, visions beyond Third Generation (3G), core network harmonization, Mobile Equipment Identification (MEID), Wireless Local Area Network

(WLAN) interworking and security and more. Three of the top TR-45 activities during 2002 were related to global partnerships, 3G technologies and MEID. The anticipated exhaust of 32-bit ESN Manufacturer Codes continued to be addressed by the TR-45 subcommittees' and ad hoc groups' ongoing work to develop standards for MEID.

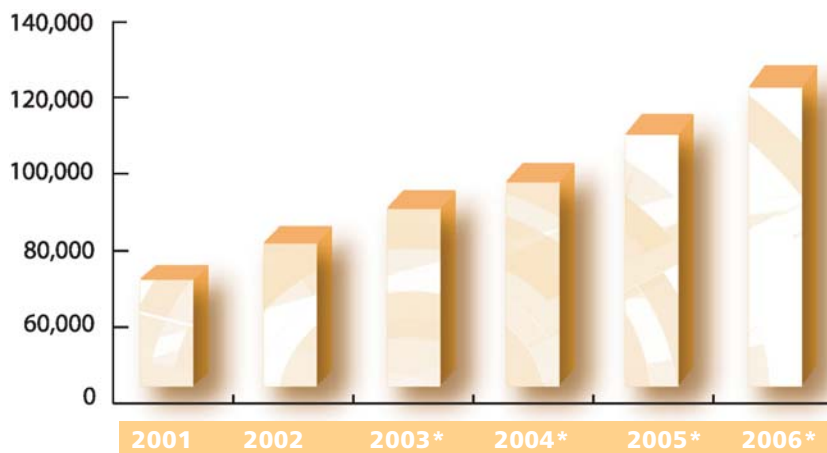
Subcommittees TR-45.3 and TR-45.5 both continued to meet all requirements for submission to the International Telecommunication Union — Radiocommunication Sector (ITU-R) Working Party (WP) 8F updates to M.1457, *Detailed Specifications of the Radio Interfaces of IMT-2000*, regarding the respective IMT-2000 3G technologies, UWC-136 and cdma2000®. In the spirit of global partnership, TR-45 continued to work closely with the Third Generation Partnership Project 2 (3GPP2), as appropriate, in support of developing specifications for the end-to-end cdma2000® network.

Moreover, Committee TR-45 and its subcommittees were instrumental in the publication of many standards and

Telecommunications Systems Bulletins (TSBs) in 2002. Noteworthy are the publications and activities of the subcommittees and ad hoc groups as described below.

Subcommittee TR-45.1, Analog Technology, submitted TIA/EIA/IS-817-1, *A Position*

U.S. Wireless Communications Services Spending (\$ Millions)



Source: TIA's 2003 Telecommunications Market Review and Forecast
* Projected



Cheryl J. Blum

Chair, TR-45
Lucent Technologies Inc.

Vice Chair:
Gerry Glynn
Verizon Wireless

Determination Standard for Analog Systems — Addendum 1, for TIA publication. TIA/EIA TSB-121-Rev.1, *2.5mm Audio Interface for Mobile Stations — TTY*, is expected to be published in early 2003. TR-45.1 worked closely with the Alliance for Telecommunications Industry Solutions (ATIS) TTY Technical Standards Implementation (TTSI) to develop this revision of TSB-121, which includes a connector specification for the handset and specifications for input impedance of teletypewriter (TTY) devices.

Subcommittee TR-45.2, Wireless

Intersystem Technology, approved several standards for publication during 2002. Among the published standards were TIA/EIA-41-D-1, *Cellular Radiotelecommunications Intersystem Operations — Addendum 1*; TIA-756-A-1, TIA/EIA-41-D *Enhancements for Wireless Number Portability, Phase II — Addendum 1*; TIA/EIA/IS-880, *TIA-41-D Based Network Enhancements for CDMA Packet Data Service (C-PDS) — Phase 1*; TIA-872, *IP Core Network — Legacy MS Domain (LMSD), Step-1*; and TIA-TSB29-E, *International Implementation of Wireless Telecommunications Systems Compliant with TIA/EIA-41*.

Works in progress include *Circuit Switched Call Precedence over CDMA Packet Data Session* and *Location Services Authentication/Privacy/Security and Enhancements* to be published as TIA-935 and TIA/EIA/IS-881, respectively, in early 2003. New TR-45.2

projects in support of specifications developed by the 3GPP2 address such topics as Multimedia Message Service (MMS), Open Service Access (OSA) and Application Programming Interface (API), and MEID. In 2002, TR-45.2 continued to work closely with the 3GPP2 Technical Specification Group on Core Networks (TSG-N) to develop specifications for standardization as it relates to the cdma2000® technology. Convergence with 3GPP specifications relative to these capabilities was a key driver for the projects.

Subcommittee TR-45.3, Time Division

Digital Technology, completed nearly 30 documents that are part of TIA/EIA-136, the TDMA third-generation wireless standards for publication. Among the parts published were TIA/EIA-136-271, *TDMA Third Generation Wireless — Mobile Stations Minimum Performance for Global Circulation*; TIA-EIA-136-350-C, *TDMA Third Generation Wireless — Data Service Control*; TIA/EIA-136-034-A, *TDMA Third Generation Wireless — R-UIM — ME Interface Procedures*; TIA/EIA-136-741, *TDMA Third Generation Wireless — System Assisted Mobile Positioning through Satellite (SAMPS)*; TIA/EIA-136-440-2, *Adaptive Multi-Rate (AMR) Codec — Addendum 2* and TIA/EIA-136-123-D, *TDMA Third Generation Wireless — Digital Control Channel Layer 3*.

TR45.3 continued to meet all requirements for submission to the International Telecommunication Union — Radiocommunication Section (ITU-R) Working Party 8F for updates of M.1457, *Detailed Specifications of the Radio Interfaces of IMT-2000*, related to the TDMA-SC IMT-2000 3G technology. The TR-45.3 updates to M.1457 were associated with revision D of TIA/EIA-136.

Subcommittee TR-45.4, Radio to Switching Technology, approved nearly a dozen documents for TIA publication during 2002. Significant were the publication of TIA-895-A, *CDMA Tandem Free Operation*, and TIA/EIA/IS-2001.B Parts 1 through 7 on various aspects of *Interoperability Specification (IOS) for cdma2000® Access Network Interfaces — Release B*. Upcoming and ongoing TR-45.4 initiatives are related to High Rate Packet Data (HRPD) Alternate Architecture and 1xEV-DV support. TR-45.4 continues its relationship with 3GPP2 relative to the impact of Internet Protocol (IP) in the Radio Access Network (RAN) and support of Voice over IP.

Regarding the prolific publication of standards, **Subcommittee TR-45.5, Spread Spectrum Digital Technology**, tops the list with more than 40 standards associated with third-generation cdma2000®. Most of these standards were developed in conjunction with 3GPP2.

Representative published standards were TIA/EIA/IS-2000, composed of parts 1-6 (with two revisions, B and C) related to various aspects of cdma2000® Spread Spectrum Systems; Addendum 2 (commonly known as IS-2000 composed of parts 1-6, Revision B, and IS-2000, composed of parts 1-6, Revision C); TIA-864, 866, and 856-1 related to cdma2000® High Rate Packet Data Access and Interface; TIA/IS-925, *Enhanced Subscriber Privacy for cdma2000® High Rate Packet Data*; TIA/IS-820-A, *Removable User Identity Module for Spread Spectrum Systems*; TSB-58-E, *Administration of Parameter Value Assignments for cdma2000® Spread Spectrum Standards*; TIA/IS-893, *Selectable Mode Vocoder Service Option for Wideband Spread Spectrum Communication Systems*; TIA-918, *Signaling Conformance Standard for cdma2000® Wireless IP Networks*; and TIA/IS-889, *Minimum Performance Specification for*

Text Telephone Signal Detector and Text Telephone Signal Regenerator.

It is important to note that in accordance with the TIA Engineering Manual, TR-45.5 continued to meet all requirements for submission to the ITU-R Working Party 8F for updates of M.1457 regarding the CDMA-Multi-Carrier (MC) IMT-2000 3G technology. Some of the new projects expected from TR-45.5 in 2003 include packet-based video-conference services, Multimedia Message Services (MMS), cdma2000® Wideband Speech Codec, and MEID.

Subcommittee TR-45.6, Adjunct Wireless Packet Data, submitted the revised standard TIA/EIA/IS-835-B, *cdma2000® Wireless IP Network Standard* for TIA publication. In addition, TR-45.6 reaffirmed the Cellular Digital Packet Data (CDPD) System Specifications. An ongoing project on the TR-45.6 workplan for 2003 is the Legacy Mobile Station Domain (LMSD) Step-1 for

SUBCOMMITTEES

- TR-45.1** Analog Technology
Chair: John Kay
Motorola, Inc.
- TR-45.2** Wireless Intersystem Technology
Chair: Chuck Ishman
Motorola, Inc.
- TR-45.3** Time Division Digital Technology
Chair: Peter Nurse
Lucent Technologies Inc.
- TR-45.4** Radio to Switching Technology
Chair: Dale Baldwin
Sprint PCS
- TR-45.5** Spread Spectrum Digital Technology
Chair: Jean Alphonse
Lucent Technologies Inc.
- TR-45.6** Adjunct Wireless Packet Data Technology
Chair: Ed Campbell
CommWorks Corporation

cdma2000® Packet Data Services. With TR-45.6 meetings co-located with 3GPP2 TSG-P (Technical Specifications Group on Packet Data), work continues on the next revision of the cdma2000® Wireless IP Network Standard, as well as on Lawfully Authorized Electronic Surveillance for Packet Mode Communications.

The **TR-45 Ad Hoc Authentication Group (AHAG)** continued to review and provide feedback on security- and authentication-related issues. Among the items were ITU-T Recommendations, TR-45 emergency services-related work, TR-45 ESN/MEID proposals, and 3GPP2 TSG-S proposed editorial changes to Enhanced Cryptographic Algorithm (ECA) Rev B. Based on the AHAG's recommendation, TR-45 plans to ballot the next revision of the ECA as a TIA standard based on the 3GPP2 specifications that incorporate AHAG changes. To foster global synergy, the AHAG periodically met jointly with the 3GPP S3 security group, as well as the 3GPP2 WG4 security group, in 2002.

Relative to global number administration in general, and the anticipated exhaust of 32-bit ESN Manufacturer Codes specifically, the TR-45 Universal Identity Module/Equipment Serial Number Ad Hoc Group (UIM/ESN AHG) continued to review various standards and industry concerns related to ESNs and UIMs. The UIM/ESN AHG provided recommendations to TR-45 on topics such as UIM ID manufacturer codes, UIM administration, ESN reclamation, ESN re-use, ESN administration, global number administration and MEID guidelines. Going into 2003, the UIM/ESN AHG will continue to represent TR-45 relative to global number administration, particularly at meetings to be held between the 3GPP2 and GSM/3GPP community.

The Ad Hoc Group on Lawfully Authorized Electronic Surveillance (AHG on LAES) made significant progress on the ANS J-STD-025-A, *Lawfully Authorized Electronic Surveillance*. In mid-2002, as a result of the release of the FCC Order on Remand (FCC 02-108, CC Docket 97-213), ANS J-STD-025-A (PN-4464) was taken out of suspension and work was completed by the AHG on LAES to prepare for ballot. J-STD-025-A provides the enhancements necessary to support FCC 99-2301, CC Docket No. 97-213, Third Report and Order, and FCC 02-108, CC Docket No. 97-213, Order on Remand, regarding the four vacated punch list items. An ANS ballot was issued that coincided with a Committee T1 ballot, with plans to complete the ballot resolutions in early 2003 and recommend for publication in



March 2003. Regarding ANS J-STD-025-B (PN-4465-RV1), the Stage 1 baseline text was made available in late 2002. The AHG on LAES continues development of this latest version of the LAES standard.

During 2002, a decision was made that the TR-45 Network Reference Model Ad-Hoc Group (NAG) would be rendered dormant until such time as contributions are submitted and there is support to update TIA/EIA-TSB-100-A, the TR-45 *Wireless Network Reference Model*.

TR-45 looks forward to a productive year for the publication of telecommunications standards in 2003. The committee will continue to address standards for lawfully authorized electronic surveillance for packet data surveillance capabilities, emergency services, wireless priority service, number pooling and number portability, MEID,

enhanced IMT-2000 3G technologies, cdma2000® and potentially new security services to support homeland security. Based on direction from the Technical Committee, cooperative efforts have also begun with 3GPP2 to address cdma2000® WLAN interoperability standardization with the Institute of Electrical and Electronics Engineers (IEEE).

cdma2000® has been registered in the United States Patent and Trademark Office by TIA.

This provides notice of federal registration in the USA.

Committee TR-46 develops and maintains performance, compatibility, interoperability and service standards for the Personal Communications Services (PCS) band, now commonly referred to as the 1900 MHz band.

The committee generates documents that cover systems engineering for the service descriptions, network architectures, and functional and physical aspects of personal communications for U.S. telecommunications networks. These are applicable to both wireless and wireline access and to the networking between systems. The committee also develops positions and technical contributions on related subjects under consideration in other domestic and international standards forums, including the International Telecommunication Union — Telecommunication Standardization Sector (ITU-T) and Radiocommunication Sector (ITU-R) Study Groups.

TR-46 additionally maintains a close liaison with other TIA engineering committees, particularly Committee TR-41, User Premises Telephone Equipment Requirements, and Committee TR-45, Mobile and Personal Communications Systems, as well as with external standards organizations, including the Alliance for Telecommunications Industry Solutions (ATIS) Committee T1, T1P1-Wireless/Mobile Services and Systems, the Institute of Electrical and Electronics Engineers (IEEE) and the European



Telecommunications Standards Institute (ETSI).

2002 Activities

TR-46 continued to contribute to TIA standards activities on both the national and international levels, with direct participation in international standards activities, continued enhancement and development of the PCS interference project, and the close relationship with T1P1 and TR-45 in the enhancement and development of network interoperability technology.

At the beginning of 2002, the chair requested the participants of **TR-46.2, Network Interfaces**, and **TR-46.3, Network Interoperability**, to evaluate their work programs moving forward. In July, TR-46.2 reported that it had completed the work that had been assigned and requested that its work program be closed and the subcommittee be disbanded. The TR-46 plenary agreed with the TR-46.2 recommendation and officially approved its disbandment.

TR-46.3 had been awaiting input from TR-45.2 on cdma2000® to update to J-STD-038 Revision B, *Network Interworking between DCS 1900/GSM and ANSI-41* since the beginning of 2002. The update on

U.S. Cellular/PCS Market			
Year	Services Spending (\$ Millions)	Subscribers (Millions)	Handsets Sold (Millions)
2001	61,625	111.9	52.6
2002	73,148	129.0	56.3
2003*	82,985	142.0	58.2
2004*	93,177	153.0	60.7
2005*	104,071	161.5	62.1
2006*	114,582	169.0	64.0

Source: TIA's 2003 Telecommunications Market Review and Forecast
* Projected

cdma2000® was received, balloted and approved as part of the J-STD-038 Revision B. At the November 2002 meeting of TR-46, it was agreed that TR-46.3 had completed its work program, and the subcommittee was disbanded.

With the successful completion of their respective work programs by the subcommittees of TR-46, it was agreed by the membership of TR-46 that the Engineering Committee itself should be disbanded. This recommendation to disband TR-46 by year end 2002 was made to the TIA Technical Committee and accepted in September 2002.

The closure of TR-46 marks a milestone in TIA standardization. TR-46 was formed in May 1993 to develop the necessary standards to enable the deployment of PCS at the 1900

MHz band. TR-46 was responsible for the development of the necessary protocols for both ANSI-41- and GSM based-networks and the services to be supported by both network types. TR-46 also worked closely



with T1P1 in the development of the PCS radio interfaces in the Joint Technical Committee on Wireless Access. TR-46 continued working with T1P1 and TR-45 on standards and technical reports to assist the wireless industry in the evolution of wireless technologies and the sunsetting of certain Joint Standards developed in 1995 and the incorporation of other Joint Standards into current documents developed by both TR-45 and T1P1.

SUBCOMMITTEES

TR-46.1 Wireless Multimedia and Messaging Services
Chair: Kourosh Parsa
Golden Bridge Technology

TR-46.2 Network Interfaces
Chair: Vacant

TR-46.3 Network Interoperability
Chair: Ronald Ryan
Nortel Networks

The FO-4 Committee on Fiber Optics is responsible for the development and maintenance of fiber optic component and system technology standards. These standards are intended to be employed by users and suppliers of fiber optic communications technology to promote compatible and interoperable systems used to support a wide variety of voice, data, video and telemetry applications for trade and commerce. To this end, FO-4 works closely with other national and international standards development organizations in promoting harmonization and ease of use for worldwide fiber optic technology deployment. FO-4 focuses primarily on fiber optics standards for:

- *Testing methodologies for passive and active components, subsystems and systems*
- *Metrology and calibration*
- *Interface standards*
- *Component and system specifications*
- *Performance and reliability*
- *System design guides*
- *Terminology and symbology*

The newly created FO-4 Committee is the result of a restructuring and consolidation of former Committee FO-6, Fiber Optic Components, and Committee FO-2, Optical Communications Systems. For the past two years, joint meetings of Committees FO-2 and FO-6 have been held, and ongoing discussions for over a year on how to improve and streamline the committee's schedule and work processes led to the reorganization. At the June 2002 meeting, the Joint Engineering Committee unanimously approved merging the two engineering

committees, consolidating some subcommittees and further consolidating some of its working groups. This merger of the two committees was approved at their June 2002 meeting. New scopes were prepared for each subcommittee and working group, and the formation of FO-4 was approved by the TIA Technical Committee in September 2002.

Committee FO-4 has nine subcommittees and 11 working groups, which develop fiber optic component and system standards to meet the needs of users, suppliers and other standards organizations throughout North America and the world. The committee meets formally twice a year and maintains more than 200 published American National Standards related to the testing and specification of fiber optic components and systems.

2002 Overview

At the two meetings held in 2002, in addition to the regular participants from all subcommittees and working groups, attendees also participated from the International Electrotechnical Commission (IEC) Technical Advisory Groups (TAGs) to IEC Technical Committee (TC) 86, Fibre Optics. Also, the Alliance for Telecommunications Industry Solutions (ATIS) T1X1, Digital Hierarchy



SUBCOMMITTEES

- FO-4.1** Single-Mode Systems
Chair: Allen Cherin
OFS
- FO-4.2** Digital Multimode Systems
Chair: Gair Brown
Naval Surface Warfare Center
- FO-4.3** Interconnecting Devices
Chair: Tom Ball
OFS
- FO-4.4** Reliability and Characteristics of Active Optical Components
Chair: Pin Su
Chorum Technologies
- FO-4.5** Optically Amplified Devices, Sub-systems and Systems
Chair: James Matthews III
Corning, Inc.
- FO-4.6** Optical Fibers
Chair: Greg Smith
Corning, Inc.
- FO-4.7** Optical Cables
Chair: Mike Kinard
OFS
- FO-4.8** Passive Fiber Optic Devices
Chair: Rob Johnson
Corning, Inc.
- FO-4.9** Fiber Optic Metrology
Chair: Dennis Horwitz
Tempo, a Textron Company

and Synchronization, co-located one of its meetings with the FO committees, which allowed a network operator's perspective to be brought into the standards development activity for fiber optics equipment.

The committee took an active interest in the ongoing activities of both domestic and international standards organizations and continued to establish formal liaisons with organizations having mutual interests. In North America, these included ATIS

Committee T1, the Institute of Electrical and Electronics Engineers (IEEE), the Insulated Cable Engineers Association (ICEA), the National Electronics Manufacturing Initiative (NEMI) and the Institute of Interconnecting and Packaging Electronic Circuits (IPC).

Internationally, the committee developed several technical contributions in support of Study Group 15 "Optical and Other Transport Networks" in the International Telecommunication Union — Telecommunication Standardization Sector (ITU-T). The committee also participated in the relevant TAGs of the IEC and the Joint Technical Committee 1 (JTC1) 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 JTC1/SC25, Interconnection of Information Technology Equipment

Chair elections for each of the even-number subcommittees were held in January 2002 in line with the requirements of the revised TIA Engineering Manual, and chair elections for odd-number subcommittees were planned for January 2003.

Steve Swanson

Chair, FO-4
Manager, Standards
Engineering
Corning, Inc.



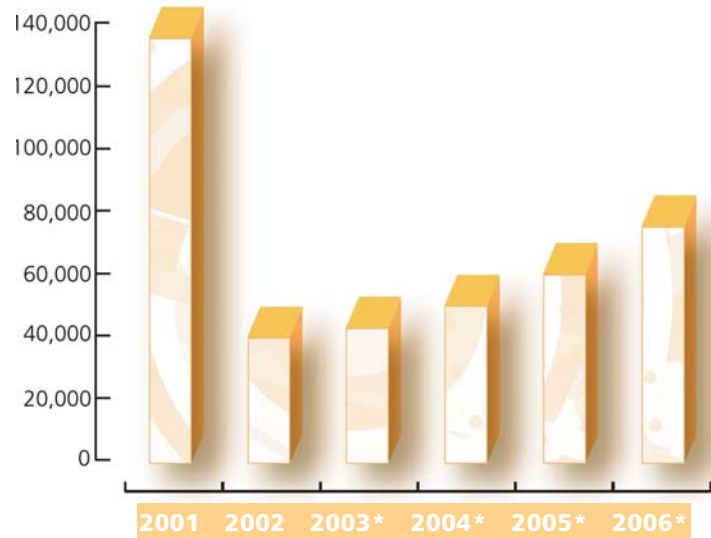
The committee has electronic email reflectors for all its groups and File Transfer Protocol (FTP) sites available for posting the contributions of the committee, subcommittees and working groups and has met the goal set in June 2001 of discontinuing any distribution of materials via hard copy by June 2003.

Key Developments in 2002

The committee published 24 standards in 2002 including:

- TIA-455-198, FOTP-198 — *Measurement of Polarization Dependence of Insertion Loss of Single-Mode Fiberoptic Components by a Mueller Matrix Method*
- TIA-455-199, FOTP-199 — *In-Line Polarization Crosstalk Measurement Method for Polarization-Maintaining Optical Fibers, Components, and Systems*
- TIA-455-228, FOTP 228 — *Relative Group Delay and Chromatic Dispersion Measurement of Single-Mode Components and Devices by the Phase Shift Method*
- TIA-455-229, FOTP 229 — *Optical Power Handling and Damage Threshold Characterization*
- TIA 492AAAC — *Detail Specification for 850-nm Laser-Optimized, 50-um core diameter/125-um cladding diameter class Ia graded-index multimode optical fibers*

Carrier Spending on Fiber (\$ Millions)



Source: TIA's 2003 Telecommunications Market Review and Forecast
* Projected

- ANSI/TIA-604-5-B, FOCIS 5 — *Fiber Optic Connector Intermateability Standard — Type MPO*
- ANSI/TIA-604-13, FOCIS 13 — *Fiber Optic Connector Intermateability Standard — Type SFOC 1.25*

In addition, the subcommittee continues to back-adopt IEC published test methods where possible. In 2002, the TIA standards that were back adopted from IEC included:

- TIA-455-221, FOTP 221 — *IEC 61291-2 — Optical Fibre Amplifiers — Part 2: Digital Applications — Performance Specification Template*
- TIA-455-222, FOTP 222 — *IEC 61290-3 — Optical Fibre Amplifiers — Part 3: Test Methods for Noise Figure Parameters*
- TIA-455-223, FOTP 223 — *IEC 61290-5-1 — Optical Fibre Amplifiers — Part 5-1: Test Method for Reflectance Parameters — Optical Spectrum Analyzer*

- TIA-455-224, FOTP 224 — IEC
61744: Calibration of Fiber Optic Chromatic Dispersion Test Sets
- TIA-455-225, FOTP 225 — IEC
61745: End Face Image Analysis Procedure for the Calibration of Optical Fibre Geometry Test Sets
- TIA-445-226, FOTP 226 — IEC
61746: Calibration of Optical Time-Domain Reflectometers (OTDRs)
- TIA/EIA-455-27, FOTP-227 — IEC
61300-3-24 Fibre Optic Interconnecting Devices and Passive Components — Basic Test and Measurement Procedures — Part 3-24: Examinations and Measurements — Keying Accuracy of Optical Connectors for Polarization Maintaining Fibre
- Studying the effect of epoxy voids on connector performance
- Evaluating connector failure modes
- Studying polarization modal dispersion meters: measurement and application issues
- New test method for measurement of frequency response of digital receivers
- Studying connector endface inspection instrumentation: measurement and application issues
- MMA Method - Mueller Matrix Method (will include an annex on the mathematical equivalence)
- Detail Specification for 850 nm laser optimized multimode optical fiber

Several new projects have been initiated including:

- Work on Micro Electromechanical Systems (MEMS) reliability

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