Public Hearing and Request for Comments on the International Aspects of the National Information Infrastructure

Comments from Arthur K. Reilly, Chairman Committee T1-Telecommunications

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1.0 Introduction

I am Arthur K. Reilly, Chairman of Committee T1-Telecommunications. Committee T1-Telecommunications is sponsored by the Alliance for Telecommunications Industry Solutions (ATIS)[1] and accredited by the American National Standards Institute (ANSI)[2].

Committee T1 - Telecommunications is 1) the U.S. public telecommunications network standards developer, 2) the primary source of U.S. technical contributions to international standards bodies on related subjects, and 3) an initiator and innovator in national, regional and global telecommunications standards coordination and collaboration efforts.

Committee T1-Telecommunications was formed on February 2, 1984 to develop standards and technical reports related to interfaces for U.S. telecommunications networks and to develop positions on related subjects under consideration in international standards bodies. Four membership interest groups are represented - Users/General Interest, Manufacturers, Interexchange Carriers, and Exchange Carriers. Committee T1 is a private-sector initiated standards process that is open to all interested parties, is required to maintain a balanced membership, and produces voluntary standards and technical reports on consensus support by the membership. The openness is extended to all interested parties independent of formal membership and, as such, participants from around the world have come to contribute to, comment on, and observe the T1 process of standards development. Committee T1 has served as a model for standardization efforts in other nations and regions of the world.

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[1] The Exchange Carriers' Standards Association (ECSA), a non-profit organization established in 1983, broadened its membership eligibility in October 1993 to include in addition to exchange carriers, all telecommunications service providers with a plant investment in transport and/or switching equipment. This adds interexchange carriers, cellular providers, CATV companies as well as other alternate access service providers to the membership of the newly-named Alliance for Telecommunications Industry Solutions (ATIS).

[2] The American National Standards Institute (ANSI) is a not-for-profit organization. Today the ANSI Federation is made up of 1,300 companies, 250 professional, technical, trade, labor, and consumer organizations, and some 30 government agencies. Since 1918, the U.S. voluntary standards system has been administered successfully by the private sector, via ANSI, with the cooperation of federal, state, and local governments. ANSI accredits Committee T1-Telecommunications to prepare and publish American National Standards.

Committee T1 currently has approximately 125 member companies and agencies, as well as participants from other (non-member) organizations who contribute their expertise. To carry out its work program of 140 approved projects, Committee T1 has established six, primarily functionality-oriented, technical subcommittees, with subtending working groups, and subworking groups. Each of these technical subcommittees meets four times a year along with its subtending groups. In addition, on occasion to meet special needs, groups hold interim meetings. Currently, approximately 1200 engineers and scientists participate within the complete T1 structure.

As to my own involvement with Committee T1, I have held elected positions since it was established in 1984. In 1992, I was elected by the Committee T1 membership to serve as their Chairman and was re-elected to that position in 1994. Prior to holding this position, I served from 1988 until 1992 as Committee T1 Vice Chairman, and Chairman of its International and External Liaisons Standing Committee. From T1's inception in 1984 until 1988, I was Chairman of T1's Performance Technical Subcommittee. In addition to my Committee T1 work, I am Director, Network Performance Requirements and Application, at Bell Communications Research (Bellcore).

I appreciate the opportunity to be with you here today. In my remarks, I shall address:

> 1) Committee T1's standardization efforts to meet user needs, 2) Committee T1's initiatives in national, regional and global harmonization,
> 3) Committee T1's relationship with the U.S. government, and
> 4) Conclusions and Recommendations regarding a partnership between private-sector standards bodies and government, and 5) Conclusions and Recommendations regarding an increased awareness by users and industry of the importance of the private-sector standards process.

2.0   Committee T1 Standardization Activities

Open, voluntary, consensus-based standards will be critical to achieving efficient access to, and transport of, information within the National Information Infrastructure (NII) [1] and the Global Information Infrastructure (GII). Such standards can provide the minimum requirements necessary for interoperability while promoting innovation (new services and capabilities) and reducing costs (multiple vendors, multiple service providers). Open, voluntary, consensus-based standards have broad industry acceptance, are robust and forward-looking, and are widely implemented.

Extensive use of telecommunications, computer, information, and entertainment services in the future will depend upon the evolution, extension and enhancement of the U.S. national and the global telecommunications "network of networks" to transport information. The promise of the convergence (or merger) of the communications, computer, entertainment, and information industries necessitates interface standards that provide the flexibility for innovation within each industry along with interconnection/interworking between industries [2, 3].

Since its formation, Committee T1 has had as one of its priorities the provisioning of technical specifications needed to keep the existing set of U.S. telephone technologies and services working. However, a more forwarding looking priority has been to ensure that the U.S. "network of networks" could grow, and continue to introduce new telecommunications technologies and services. The focus could not be just one technology or capability but had to be broad enough to encompass the need for interworking between technologies and capabilities in an integrated network of networks. Over the years, Committee T1's

objectives and results have become global [4, 5] in scope and broad in technical coverage, including standards and technical reports relating to the following:

* Network Interfaces (analog [4kHz] and digital [56 kb/s to 10 Gb/s])
* Services, Architecture and Signaling
* Digital Hierarchy and Synchronization
* Performance
* Systems Engineering, Standards Planning, and Program Management
* Environmental Considerations
* Signal Processing
* Internetwork Operations, Administration, Maintenance, and Provisioning

Specifically, Committee T1's work program and its resources have focused, and continue to focus, on the key telecommunications network technologies and service capabilities that will provide the roadbed for the "Information Superhighway." These include the following:

* Digital Access Technologies - Narrowband ISDN, Broadband ISDN/Asynchronous Transfer Mode (ATM), Asymmetrical Digital Subscriber Lines (ADSL), Frame Relay and associated network and signaling capabilities,
* Multimedia Capabilities
* Synchronous Optical NETwork (SONET),
* Personal Communications - wireless access and network capabilities to provide personal mobility
* Intelligent Network
* Common Channel Signaling (Signaling System #7 (SS7))
* Network Survivability
* Network Management

A broad range of Committee T1 Standards and Technical Reports, and international ITU Recommendations driven by U.S. contributions originated in T1 exist in all these areas. Furthermore, the importance of interoperability is recognized. Not only does current Committee T1 work focus on reducing options in the individual base standards, it also addresses global interworking among the multiplicity of past and present standardized technologies and capabilities.

If standards development is to be effective, and if the standards are to be implemented, standards development cannot be viewed as an isolated process. Standards bodies must communicate with all interested parties in the process. National and international Users Groups with whom Committee T1 has close liaison include the North American ISDN Users Forum, the ATM Forum, the Frame Relay Forum, the Multimedia Communications Forum, the Personal Communications Industry Association (formerly Telocator), the Internet Engineering Task Force, the Network Management Forum, the Network Reliability Council (and the Network Reliability Steering Committee), and the Industry Numbering Committee (INC). These liaisons are consistent with Committee T1's Vision Statement which goes beyond developing standards documents and addresses quality, implementation, and standards harmonization. Committee T1 has a quality improvement process [6] to facilitate development of timely, high-quality standards to meet the needs of users and industry in the dynamic, global telecommunications environment

Each of the above groups is focusing on a specific topic and promoting the use of that technology (or issue) through the use of standards [7, 8, 9, 10, 11, 12, 13, 14]. Committee T1 is responsible for standards that integrate all of the above plus other emerging technologies and service capabilities. To benefit the industry, Committee T1 works with

these individual groups to identify their standardization needs and to develop a program to respond to these needs.

In addition, Committee T1 has close ties to many other standards development organizations in the U.S. and around the world.

3.0 Committee T1's Initiatives in Global Harmonization

To understand the Committee T1's strong commitment to global telecommunications standardization, the relationship between Committee T1 and international telecommunications standards must be appreciated. Figure 1 illustrates the nature and flow of Committee T1 outputs. It reflects that in parallel with serving as the forum that produces ANSI telecommunications network standards, the Committee T1 technical subcommittees draft candidate U.S. technical contributions destined for the ITU. These contributions attempt to ensure compatibility between the U.S. standard and work progressing in the ITU. They are submitted to the U.S. Department of State's National Committee for approval and acceptance prior to submission to the ITU. The ITU is a treaty organization, and as such, the Department of State (i.e. Communications and Information Policy Bureau) administers U.S. participation and contributions.

The Committee T1 openness and consensus process ensures an extremely high degree of acceptance of T1 contributions as U.S. positions to the ITU. On an annual basis, between 500 and 1000 T1 contributions are approved as U. S. positions to the ITU.

The T1 vision, scope and level of contribution to the ITU mean that if progress is stalled on a topic at the ITU, progress within T1 can also be negatively impacted since harmonization is clearly a goal. Conversely, mechanisms that can expedite ITU progress can improve the timeliness of Committee T1 ANSI standards.

With this in mind, Committee T1 hosted the first "Standards Summit", the Interregional Telecommunications Standards Conference (ITSC) in February 1990 in Fredericksburg, Virginia. The leaders from the other "regional" telecommunications bodies that existed at that time (the European Telecommunications Standards Institute (ETSI) and the Telecommunication Technology Committee (TTC) of Japan) were invited along with the Directors of the ITU. The significant agreements at that meeting included a "Fredericksburg Plan". The "Fredericksburg Plan" was an agreement to a) work together on a continuing basis to foster the development of international standards in the ITU, b) to exchange information at early stages in the standards process, and c) to recognize the value of and to implement electronic means for document exchange.

The agreements developed in Fredericksburg were built upon in subsequent ITSC meetings in Nice (1991) and in Tokyo (1992) with increased collaboration on mutually agreed to areas of high, continuing common interest, and agreement on principles such as openness and "adoption of work". These efforts have fostered the establishment of liaison rapporteurs among the groups which now also include the newly-formed Telecommunications Standards Advisory Council of Canada (TSACC), the Australian Telecommunications Standardization Committee (ATSC) and the Telecommunication Technology Association (TTA) in Korea.

The ITSC process also led to the formation of the Global Standards Making Management (GSMM) group to handle the detailed management of the policies of the ITSC, technical workshops, and technical leaders meetings. At ITSC3 in Tokyo, a new, streamlined organizational structure was adopted that replaced the ITSC/GSMM approach. The first meeting with the new structure, now called the "Global Standards Collaboration" (GSC)

group, took place in March 1994 in Melbourne, Australia. Discussions related to technical work progress, sharing experiences on intellectual property rights, relationships with industry forums, and electronic document handling were among the topics that led to action items. Overall, this meeting saw a continuance of commitment from the participants to the ITU standardization process.

This process has sent a clear signal that the participating standards organizations intend to work together towards globally harmonized standards. Furthermore, because of the mechanisms that have been developed, significant progress has occurred at the ITU on an expedited basis on such topics as the Intelligent Network. In addition, ITSC and GSC have contributed to the establishment of an interconnected network of Electronic Document Handling capabilities among its participants.

3.1 Committee T1 Initiatives in Regional Harmonization

As privatization of the telecommunications industry has spread throughout the Americas, interest has increased in the private-sector standards process. Within the Organization of American States (OAS), the Conference on International Telecommunication' s (CITEL) Permanent Technical Committee 1 (PTC1) formed an Ad Hoc Group with Committee T1 to share Committee T1's experience with others within the region and to specifically address standards topics identified by the PTC1. This Ad Hoc PTC1/T1 Group, established in late 1991, began work on "White Papers" dealing with ISDN, Wireless Communications, and Signaling System 7. The intention was to provide a means for disseminating information within the Americas on the nature and status of standards on these topics in Committee T1 and at the ITU. This initial work has evolved with CITEL. CITEL has been raised in stature to a Commission from a Conference. This provides it with a permanent office and budget to progress its work. In addition, the Ad Hoc Group has been replaced by a Working Group on Standards Coordination within a new Permanent Consultative Committee 1. The new arrangement will encourage participation by other private-sector standards bodies and will further focus the harmonization efforts in a permanent structure with increased resources. The new group has added Intelligent Network to the technical topics that it will address. The initial meeting of the new Working Group on Standards Coordination since the CITEL restructuring will occur in August 1994 in Ottawa, Canada. Among the many elements of this meeting will be a Committee T1 sponsored one-day tutorial on Signaling System #7 to share information not only on the standards but also on operational experiences by U.S. service providers. This important, signaling protocol that has been in operation for a number of years in the U.S. and Canada with improvements identified through operational experience, is beginning to be deployed in other parts of the Americas.

Committee T1 established the Americas Telecommunications Standards Symposium (ATSS) by hosting the first such meeting in Orlando, Florida in April 1992. Participants included invited leaders from standards development and standards related organizations within the U.S. along with representatives from CITEL. Some of the key results from ATSS1 were the "Standards Life Cycle", increased attention on Electronic Document Handling, intensified liaisons among the participants, and support for CITEL harmonization efforts. ATSS2, held in Rio de Janeiro, Brazil, in October 1993, focused on progress since ATSS1 towards its goals and identification of new issues emerging within the Americas. Of particular note at ATSS2 was the active participation of the ETSI Technical Assembly Chairman during this symposium. The ATSS2 communique, entitled the "Rio Resolution" strongly supported work toward international standards, and CITEL efforts to harmonize standards within the Americas.

Committee T1 has been, and remains a key player in standards-related North American Free Trade Agreement activities, as will be seen later.

3.2 Electronic Document Handling (EDH) - Bridge to Harmonization

Committee T1 believes that electronic data handling (EDH) is critical to the future success of standardization. EDH can facilitate both standards development and standards dissemination. Committee T1 has a T1 Bulletin Board System (T1BBS) that provides unrestricted dialup access over the public telephone network as well as access via Internet Telnet. In addition, File Transfer Protocol (FTP) and a self-subscribing e-mail mailing list (Majordomo) facilitate the availability of T1BBS information and the dissemination of topic group electronic contributions/messages to anyone interested. Multiple processors and backup systems ensure near continuous access to users for e-mail, and file uploading and downloading. Internet "Gopher" capabilities for T1BBS are currently under study.

The T1BBS system is accessed by people and organizations around the world, with GSC, ATSS, and CITEL PCC1 all giving special attention to EDH as a facilitator of harmonization efforts. For example, all the contributions to the 1994 GSC meeting were sent via the EDH capabilities of the participants.

4.0 Committee T1 Relationship to Government

Committee T1 is a private-sector standards organization. This contrasts with telecommunications network standards processes in some other parts of the world where all or part of the standards work program is funded and directed by government.

In many nations, the global trend toward privatization has gained significant momentum. The U.S. standards process serves as a success model that other nations are emulating. The telecommunications industry, while characterized in the U.S. by regulation and an international treaty among nations, has been served well by a telecommunications network standards process that involves a partnership between Committee T1 and the U.S. government. Following are descriptions of the relationship between Committee T1 and government. These relationships, as a function of the government role, provide for flexibility and industry dynamics to meet user needs consistent with the "statutory" U.S. government roles.

4.1 U.S. Standards Body Member

A number of federal agencies and departments are valued, proactive members of Committee T1 and its Technical Subcommittees. These government organizations represent users and implementers of standards in the general, private-sector economy. Their standards participation is characterized by all the same obligations and privileges as those experienced by every other member.

4.2 Administrator of U.S. International Standards Participation in the International Telecommunication Union

As described earlier, international telecommunications network standards are developed in the International Telecommunication Union (ITU) [15], a specialized agency of the United Nations and established as a treaty organization. By virtue of this treaty status, the U.S. Department of State administers the U.S. membership. However, the State Department depends heavily on the technical expertise of the U.S. private sector in

establishing the U.S. delegation. Furthermore, Committee T1 has served as the primary developer of technical contributions approved by the State Department process and destined for the ITU.

In addition to the 500 to 1000 U.S. technical contributions that are submitted to State Department process, Committee T1 representatives also play active roles in the U.S. National Committee and the U.S. delegation to the ITU Telecommunication Standardization Advisory Group (TSAG).

4.3 U.S. Regulator

While the U.S. telecommunications industry is regulated, the U.S. telecommunications network standards process in Committee T1 is not directly regulated. The individual Committee T1 standards participants contribute to the standards process as they feel appropriate. The T1 standards process focuses on the technical aspects of contributions (the area of competence of the technical experts). The open, balanced, voluntary, consensus-based process serves to lead to a technical solution that meets consumer and industry needs without direct regulation in the standards process.

Committee T1 has provided inputs to groups such as the FCC in response to specific requests as well as at T1's initiation. Because of the special role of regulators and the impact of their decisions on the industry, special care is taken by Committee T1 in such situations. Committee T1 is a technical organization and provides technical solution(s) and does not advocate policy.

Committee T1's partnership with government in this area is evident on several, current example topics. One area specifically identified as important to the NII is Network Reliability. Committee T1 standards and related work were identified as "Best Practices" and Recommendations in the FCC's Network Reliability Council's (NRC) June 1993 "A Report to the Nation." Currently, Committee T1 is working closely with the Network Reliability Steering Committee. A "Technical Report on Analysis of FCC-Reportable Service Outage Data" which began with the August 1993 identification of the need for such an effort is expected to be completed through publication by August 1994.

Personal Communications is another such area receiving a great deal of attention today. The Committee T1 PCS framework Technical Reports and Network Architecture/Services Description standards have been developed to provide the industry with the necessary information related to direction/vision for planning and implementation. Additional technical reports and standards providing additional details and capabilities are complete, or in progress to meet the next stages of industry needs.

Technical specifications of candidate PCS air interfaces are being developed in collaboration with the Telecommunications Industry Association (TIA). Initial air interface standards are expected to be approved beginning in 4Q94, which is also the current FCC schedule for beginning the 2 GHz PCS spectrum auction process. Additional signaling standards beyond the base PCS capability will follow. Periodic reports have been provided to the FCC staff on PCS standards progress, issues and work program schedule.

4.4 Advocate for Global Trade

Global and regional trade discussions and agreements [16, 17, 18] have highlighted the important role of standards to international commerce. This, combined with the trend to privatization within telecommunications networks, has led U.S. government agencies (State Department, Commerce Department, Office of the U.S. Trade Representative, and the FCC)

to request assistance from representatives of Committee T1 to share private sector standards processes and experiences with others from around the world.

Committee T1's efforts within the Americas related to the OAS' CITEL and the ATSS were described earlier. In addition, Committee T1 and the Telecommunications Industry Association (TIA)[3] are among the U.S. charter members of the Canada/Mexico/U.S. private-sector initiated Consultative Committee Telecommunications (CCT). TIA provides the U.S. Secretariat for this group that was established to work toward compliance with the "Standards-Related Measures" provisions of the North American Free Trade Agreement (NAFTA). A T1 representative is the U.S. facilitator in the CCT Working Group on Telecommunications Networks, and an advisor to the U.S. delegates (government-only) to the Telecommunications Standards Subcommittee formally established under NAFTA.

5.0 Conclusions/Recommendations

Committee T1 believes that voluntary, consensus-based telecommunications network standards developed in a private-sector process with the principles of openness, fairness, balance, and due process have served the U.S. well, and should be endorsed and promoted. This process can provide timely, high-quality, collaborative standards domestically, and strong U.S. technical leadership and contributions internationally. Such a process can quickly identify and respond to changes needed to improve the process and to address user/industry needs.

The convergence of the dynamic telecommunications, computer, information, and entertainment industries will continue to require a standards process that stimulates competition and innovation. This has been achievable through a voluntary, industry standard development process that provides the minimum technical requirements that can be coupled with a forward-looking and consensus view on the future directions for a technology or capability. All of these characteristics are essential to meet user needs in a dynamic, innovative, flexible, technically complex, multi-vendor, multi-service provider, multi-industry environment.

The Committee T1 - U.S. Government partnership has been, and continues to be, strong and serves as an example. Continued technical participation by various government agencies is essential in Committee T1 to ensure that their special user needs are considered in the standards development process in general. Furthermore, it is vital that their skills in such areas as timing and synchronization (NIST), performance assessment, e.g. ATM, video

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[3] The Telecommunications Industry Association (TIA) is an ANSI-accredited standards development organization issuing standards in the telecommunications field. TIA was created from the merger in 1988 of the Information and Telecommunications Technologies Group of the Electronic Industry Association (EIA) and the United States Telecommunications Suppliers Association. Since TIA's telecommunications standards-writing activities originally started with EIA, TIA now has over 50 years of experience in these standards efforts. Whereas Committee T1 focuses on network standards and interface standards, TIA focuses on equipment and systems standards that work with those Committee T1 standards. TIA groups its standards-writing activities to support its four main Divisions: Fiber Optics, User Premises Equipment, Mobile and Personal Communications, and Network Equipment. In these four Divisions of TIA, approximately 70 Engineering Committees and Subcommittees are staffed by industry subject matter experts and create these TIA voluntary industry standards.

(NTIA/ITS) [19], and network reliability (DISA and NCS) are available to the standards process.

The relationships between Committee T1 and the U.S. government as regulator and as trade advocate has been a partnership that has permitted each to carry out its individual responsibilities while complementing each other. The success of this arrangement can be attributed to the broad vision that Committee T1 has had of its role, and government's willingness to recognize the technical strength within the private-sector, e.g. Committee T1, and the example and experiences that the private-sector can share with other nations.

Such broad visions by standards bodies and recognition of standards bodies contributions by government, described in this paper, must be continued for this partnership to continue to benefit users and industry. It is recommended that both should work to increase user and industry awareness of the standards bodies and their process, and the essential contributions that they make to individual users, companies, government agencies, industries, the nation, and the global society. Without clear and consistent recognition of the importance of these efforts, the resources necessary for base standards development (a public good) may not be available.

6.0 Summary

These comments have described Committee T1, its efforts to meet user needs for timely, high-quality telecommunications network standards domestically and internationally, and its relationship with government agencies. The successes and progress that have been achieved are due to the contributions of the approximately 1200 individual participants, the innovative technical leaders at all levels of T1's Technical Subcommittees, and the T1 Secretariat (ATIS). T1's strength has been, and continues to be, world-class technical expertise, exemplary dedication and hard work and commitment to the Committee T1 principles outlined in these comments.

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COMMITTEE T1 WORK FLOW

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