



ITU NEWS

SPECIAL EDITION - AUGUST/SEPTEMBER 2000

WORLD TELECOMMUNICATION STANDARDIZATION ASSEMBLY



AMNT WTSA

2000

Montreal • Quebec • CANADA

27 September-6 October 2000

GLOBAL STANDARDIZATION IN AN ERA OF HIGH-SPEED NETWORKS



Cover: Global standardization in an era of high-speed networks.
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ITU News: ISSN 1020-4148
<http://www.itu.int/itunews/>
10 issues per year

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Drawing a new roadmap for global standardization

Houlin Zhao
Director, Telecommunication
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Photo: A. de Ferron (ITU 000034)

This is a particularly busy summer for the International Telecommunication Union. From 27 September to 6 October 2000, ITU will organize the World Telecommunication Standardization Assembly in Montreal (Canada). Let me take this opportunity to thank the Government and people of Canada for their kind invitation to host this global event. As I write these lines, ITU Members are busy putting final touches to their preparations for WTSA-2000.

It is time now to review the work of ITU's Telecommunication Standardization Sector (ITU-T)

Our mission to produce high-quality global standards for telecommunications in a timely manner is more crucial now than ever

most important standards or recommendations, as ITU prefers to call these agreements to underline their voluntary character. In total, some 795 new or revised recommendations were

in the last four years and define future strategic directions. The last review was in 1996 during the World Telecommunication Standardization Conference (WTSC-96), the predecessor of WTSA. The 14 ITU-T Study Groups and the Telecommunication Standardization Advisory Group (TSAG) will be proud to report their achievements in this review. In particular, they will present reports on their activities, highlighting the

produced between year-end 1996 and July 2000.

WTSA-2000 will, among other things, discuss and adopt:

A comprehensive programme of work addressing key industry standardization areas.

An appropriate study group structure to address the new programme.

Innovative ways of forging a real partnership between Member States and Sector Members in the development and approval of technical recommendations.

Processes to ensure timely response to changing industry needs in the interval between WTSAs.

Behind every successful technology or service is a standard. ITU-T's mission to produce high-quality global standards for telecommunications in a timely manner is more crucial now than ever. With the convergence of technology, applications and services, new breeds

of standards are needed to promote the interoperability of equipment from once disparate realms of telecommunications, information technology, broadcasting, consumer electronics and content provision. In addition, traditional distinctions between wireline and wireless applications are disappearing. The ITU TELECOM 99 Exhibition and Forum put much of this convergence into clear perspective. More and more, global standards will contribute to network efficiency in as much as they will promote a multi-vendor environment.

ITU-T has long-enjoyed worldwide recognition and competence in telecommunication standardization, but is now operating in a very competitive environment and has to continually revamp its working methods to grapple with new market forces. Not only are our Members facing major changes in the way they meet their customers' needs but also, these changes are happening in ever shorter time intervals with reduced development timescales for services and products. For example, network operators and manufacturers

have to keep reconsidering their services, network structures and products because of the explosive growth of the Internet and other IP-based networks.

In a nutshell, business directions are changing across the converging industries. We are also witnessing the growing number of consortia and forums which have become very active in telecommunication standardization. All of this means that ITU-T must be able to change its focus and work direction to produce the necessary standards in much shorter intervals.

Our good track record shows that we can. As some of our readers will recall, the real reform process to improve global standardization started at the IXth CCITT* Plenary Assembly in Melbourne (Australia) back in 1988. The Standardization Sector has since fine-tuned its working methods several times, each time adopting a quicker process for the production of recommendations. For example, before 1988, the development period for a recommendation was four years.

This period has been reduced progressively to two years between 1989 and 1993, one and a half years between 1993 and 1996, and nine months from 1997 to date. We want to reduce that timeframe even further (six months or less) through new approval procedures that will be submitted to WTSA-2000.

Indeed, reforming and reshaping any sector of activity are not singular events that are carried out as a one-time task. Rather, they are continuous priorities. So while we have continued the deep-rooted reforms we started in Melbourne and have made tremendous progress, we are not resting on our laurels. The road to reform must continue with the new strategies and priorities guided by the Union's Strategic Plan for the period 1999–2003.

ITU's Telecommunication Standardization Sector is now operating in a very competitive environment and has to continually revamp its working methods to grapple with new market forces

* CCITT stands for International Telegraph and Telephone Consultative Committee and is the predecessor of ITU-T.

Pressure for on-going reform will remain as long as today's, and even more so tomorrow's market forces fuelled by privatization, liberalization, and competition continue to unleash their dynamics and race forward unabated. I have undertaken several initiatives in order to better understand and meet our Members' requirements.

One of the initiatives, taken in line with the advice from the Strategic Plan that "the solution to strengthening ITU lies in treating Sector Members more as partners in appropriate work

of the Union", was an Informal Consultations meeting which I convened for senior representatives of our industry membership. A number of senior staff at Vice-President level or equivalent from operators and manufacturers attended the event which was held in Martigny (Switzerland) in February this year with the aim to further facilitate our mutual understanding and cooperation.

Results of the Martigny meeting are as encouraging as they are crucial. The participants



Participants in the Martigny meeting consider ITU as "the only truly global organization exclusively devoted to the development, implementation, and use of telecommunication services through cooperation between government players and partnership between developed and developing countries"

(ITU 000035)

consider ITU as “the only truly global organization exclusively devoted to the development, implementation, and use of telecommunication services through cooperation between government players and partnership between developed and developing countries”. They recognize the important intergovernmental role of the ITU, particularly with respect to regulatory and telecommunication policy matters and partnership with other governmental bodies such as the World Trade Organization (WTO). They believe that ITU-T should continue to play an eminent role in standardization for the global telecommunications industry.

However, they expressed the view that continued reform of ITU and ITU-T is necessary to ensure this role for the future. These reforms must ensure that the standardization work is market-oriented and market-sensitive, and that it provides the right environment for industry to participate.

For them, it is critical that Sector Members, who are contributors to technical standards development and the main users of standards, should have the primary voice on all decisions affecting technical standardization, including approval.

Recognizing that it is the Member States that have been vested with the power to effect these changes, the participants urged Member States to support their proposals (regarding changes needed in the operation of ITU-T) and their speedy implementation, in the spirit of transforming ITU-T into the instrument that the global market-place demands it to be.

A document entitled Consensus views of participants, along with the proposed actions agreed by the Martigny meeting were presented to the last TSAG meeting in June 2000 for review and action, and will be submitted to WTSA-2000 for further consideration.

The Plenipotentiary Conference (Minneapolis, 1998) adopted a number of policies to help ITU adapt to the changing environment. Of important significance for ITU-T is Resolution 82 which

invites each Sector of the ITU to develop its own procedures, if appropriate, for approving questions and recommendations using an alternative approval process.

In this regard, TSAG has developed alternative approval procedures which it will submit to WTSA-2000. Furthermore, ITU-T will welcome a new category of participants in the work of the study groups, known as the Associate Member category, following a decision of the Minneapolis Conference.

All in all, some of the proposals to WTSA-2000 encourage the study of urgent, market-driven issues within short periods of time. Others

express the hope that the Assembly will seek new and innovative ideas beyond the traditional approaches of developing and approving recommendations in order to introduce faster processes. We are even contemplating the use of Web-consultation for ap-

Reforms must ensure that standardization work is market-oriented and market-sensitive, and that it provides the right environment for industry to participate

proving technical standards.

Delegations to the Assembly will be exchanging views on these and other issues in order to develop a common understanding and a shared vision of the tasks ahead for all to participate profitably in the information revolution. Decisions taken at WTSA-2000 will establish the roadmap for the future of global telecommunication standardization in such critically important and dynamic areas as Internet Protocol (IP)-based networks, International Mobile Telecommunications 2000 (IMT-2000) networks and global multimedia services and systems.

The fact that the June TSAG meeting attracted more than 200 participants shows the high interest in the Assembly. The unprecedented preparations by regional telecommunication organizations in their development of common proposals also augur well for WTSA-2000. Let us all seize the opportunity offered by WTSA-2000 to strengthen and maintain ITU's pre-eminent position in global telecommunication standardization and to propel ITU-T further forward. Let us use WTSA-2000 to create a good environment for our Members.

A Canadian welcome to WTSA-2000

Issue No. 10/99 of ITU News announced that Canada would host the International Telecommunication Union's quadrennial World Telecommunication Standardization Assembly from 27 September to 6 October 2000 in Montreal, Quebec.

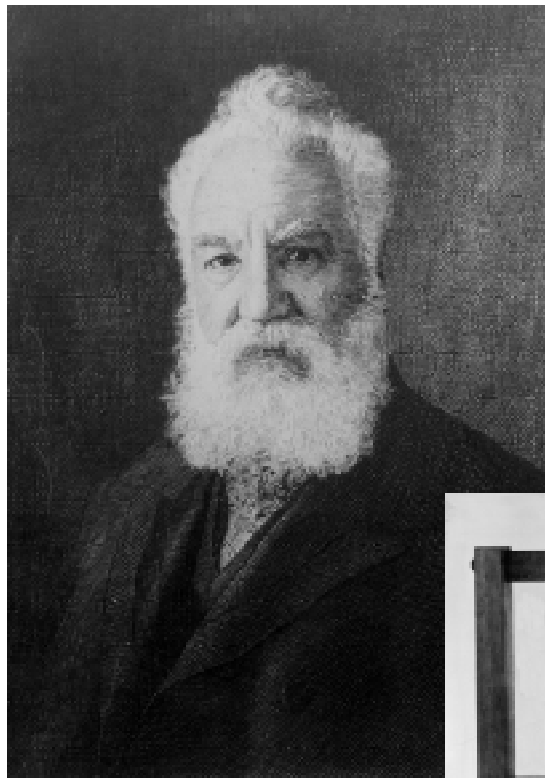
Industry Canada has been working with three leading telecommunication businesses in Canada (Nortel Networks, Bell Canada and Teleglobe), to ensure that WTSA-2000 is a memorable event. The Host Committee of WTSA-2000 Founding Partners (see page 8) has planned several events, most notably a reception to provide an informal meeting opportunity for Assembly delegates and Canadian experts in the telecommunications and communications technology fields.

Other companies have recently joined the Host Committee team, including the Government of Quebec, BC Telus, Rogers AT&T, 360 Networks, Lucent, Ericsson, SR Telecom, AT&T, Intelsat, Clearnet and Crosskeys.

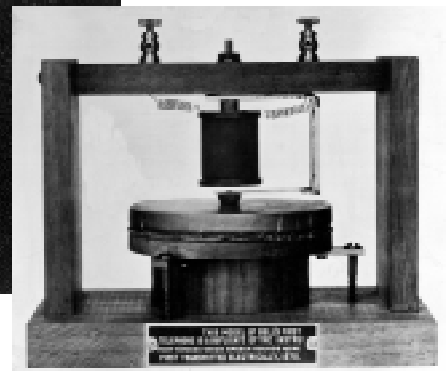
As the first ITU Member State in the Americas to host the World Telecommunication Standardization Assembly, we want to take this opportunity to share our telecommunication and communication technology expertise with other Member States and Sector Members attending the Assembly.

Canadians are recognized pioneers in the telecommunications sector. In 1876, Alexander Graham Bell patented the telephone, and Reginald Fessenden successfully transmitted the first, two-way wireless voice message by radio in 1900. Canada has remained on the cutting

edge of this vibrant industry. We are currently the only country running an all-optic research and development Internet network, CA*net 3, which is faster than any other next generation research network in the world. Canada is also using the latest satellite technology in the Arctic to enable callers in Nunavut to com-



(ITU 77383 and 77303)

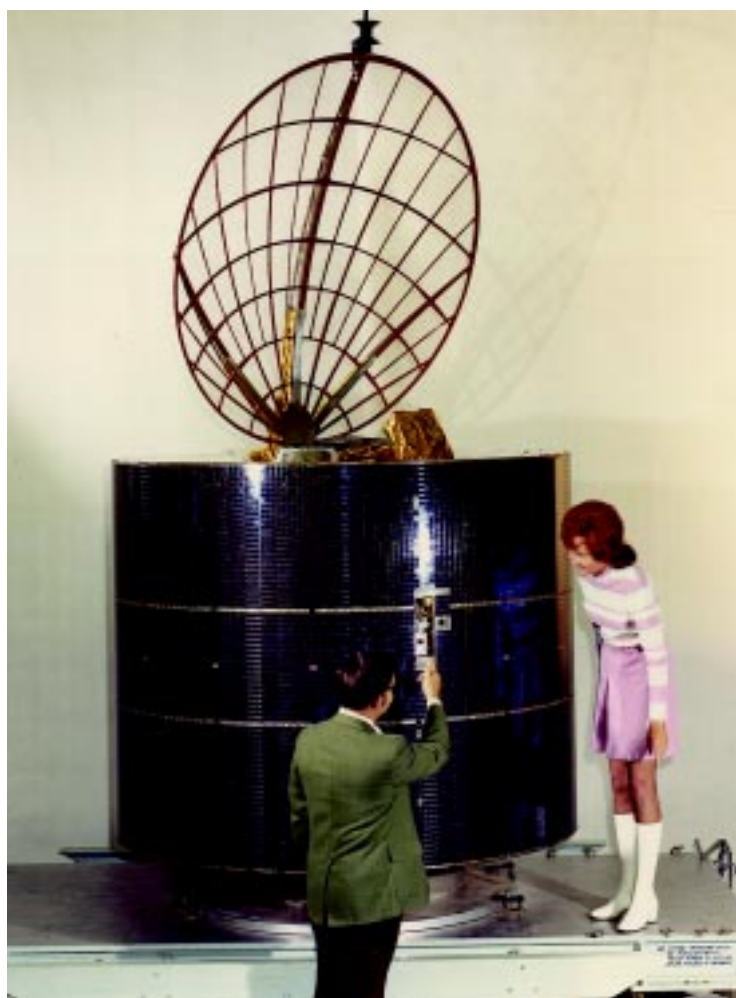


Model of Alexander Graham Bell's original telephone, dismissed by Western Union in a memo of 1877 as "inherently of no value", with "too many shortcomings to be considered seriously as a means of communication". Contrary to this prediction, the world telecommunication network is now the largest man-made artefact

Source: American Telephone and Telegraph Company, New York

municate via a chain of low-Earth orbit satellites.

Canada's telecommunications system has evolved in a geographically diverse country stretching from the Atlantic to the Pacific, and northward to the Arctic. We have invested heavily in fibre optics and high-speed transmission technology to build a telecommunications infrastructure that is seamlessly interconnected from coast-to-coast, and with every other part of the globe, providing leading edge capabilities.



In 1972, Telesat Canada launched the Anik-A1 satellite, becoming the first country in the world to have a satellite in geostationary orbit for domestic, non-military communications

Photo: Telesat Canada (ITU 000036)

Following the launch of our first satellite in 1962, a scientist by the name of John Chapman argued that Canada should use the knowledge gained through satellite technology to improve

communications. So, in 1972, Telesat Canada launched the Anik-A1 satellite, becoming the first country in the world to have a satellite in geostationary orbit for domestic, non-military communications. Today, the fifth generation Anik satellites are the largest, most powerful domestic communication satellites in the world.

Canadian companies continue to build on their technological excellence in many areas of telecommunications, including switching systems, broadband and multimedia products and services, fibre-optic cabling, rural communications, submarine cable systems, satellite networking, computer telephony integration, and mobile and cellular phones.

Canada views its telecommunications sector as an enabler of business activity and human interaction — a key ingredient in the country's employment, prosperity and global competitiveness. Both government and telecommunication companies work hand-in-hand to ensure our telecommunications infrastructure is always on the leading edge of this dynamic and futuristic global industry. For example, as part of its Connecting Canadians agenda, we fostered competitive and innovative telecommunications and communications technology industries for advanced infrastructure. As a result, Canada is one of the first countries in the world to have connected all of its schools and libraries to the Internet.

The global network connectivity via Internet is only one part of the connection equation. Standards for interoperable networks are also essential, and they are quickly becoming a pillar of the new global trading system. Decisions made at WTSA-2000 will set the pace for the evolution of key technologies that build Internet protocol-based networks, communications infrastructure of telecommunications and wireless technologies in the years to come. Canada's telecommunications industry has played a key role in the development of global telecommunication standards since 1932, and we currently have 15 businesses and three organizations that are ITU Sector Members.

Industry Canada's portfolio includes the Standards Council of Canada to implement our national standards system. The key elements of this strategy include our participation in the development of international standards, and a desire

to forge partnerships and strategic alliances among current and potential participants in standardization activities. Our participation in the ITU demonstrates this commitment.

Standards provide a basis for fair competition. By fostering global network interconnectivity and facilitating global service interoperability, ITU voluntary standards, in the form of recommendations, serve to protect users from experiencing incompatibility problems between systems. The centrality of communications to our nation's social, economic and political development and the world-class calibre of our telecommunication manufacturing and service industries are re-

flected in our interest and involvement in the ITU. We believe in the critical role the ITU plays in the development of global standards as information and communication technologies evolve at an unprecedented rate.



Canada has invested heavily in fibre optics and high-speed transmission technology to build a telecommunications infrastructure that is seamlessly interconnected from coast-to-coast

Photo: Telecom Canada (ITU 910038)

Relative to its size in the international economy, Canada is an effective player in the standards arena. We want to influence the formation and evolution of global standards that are important to Canada to meet the needs of an evolving regulatory and policy environment.

By positioning standardization processes as a necessary complement to regulatory processes, we encourage the use of standards in the development of Canadian policy. In 1998, the World Trade Organization (WTO) adopted the "Canadian model" of regulation, when the historic agreement intended to liberalize the international trade of basic telecommunication services came into effect. Specifically, the signatory countries agreed to change the structure of their regulatory authorities to establish a body to regulate independent telecommunication services, separate from all suppliers of basic telecommunication services.



Photo: Bell Laboratories/USA (ITU 800135)

Since the signing of this agreement, delegations from all over the world have consulted the Canadian Radio-Television and Telecommunications Commission (CRTC) on our regulatory model in broadcasting and telecommunications.

In 1998, the CRTC received the international Carl Bertelsmann Prize for its standing in the new global information infrastructure. The Bertelsmann award recognized the advantage of being a single regulatory agency overseeing both broadcasting and telecommunication matters. This has allowed us to develop a sophisticated understanding of convergence and how tradi-

tional barriers between telecommunications and broadcasting, and between their respective markets, are breaking down. Our unique structure also helps us to make decisions efficiently, to build consensus and to find the best solutions.

Canadians have built a strong and dynamic economy based on our expertise in areas such as telecommunications and communications technology. We are pleased to host WTSA-2000 and to welcome ITU Members to our country. Look for our welcome booth at Montreal's Dorval International Airport upon your arrival, and for more information about our planned events, please visit our website at <http://www.wtsa2000.org>.

WTSA-2000 Founding Partner profiles

Industry Canada's mission is to foster a growing competitive, knowledge-based Canadian economy. The department works with Canadians throughout the economy and in all parts of the country to improve conditions for investment, enhance the country's innovation performance, increase Canada's share of trade and build a fair, efficient and competitive market-place. Programme areas include developing industry and technology capability, fostering scientific research, telecommunications policy, promoting investment and trade, promoting tourism and small business development, and setting rules and services that support the effective operation of the market-place.

Nortel Networks is a global supplier in telephony, data, wireless and wireline solutions for the Internet. Today, the company is creating a high-performance Internet that is more reliable and faster than ever before. It is redefining the economics and quality of networking and the Internet through unified networks that promise a new era of collaboration, communications and commerce. Nortel Networks has offices and facilities in Canada, Europe, Asia-Pacific, Caribbean and Latin America, the Middle East, Africa, and the United States.

Bell Canada is Canada's largest supplier of telecommunication services. With one of the world's most robust and reliable public switched networks, the company provides advanced voice, data and image communications to more than eight million business and residence customers across the country. Bell Canada is a subsidiary of BCE Inc. (80 per cent) and SBC Communications Inc. (20 per cent). In March 1999, the company announced a strategic partnership with Ameritech Corporation (which merged with SBC Communications on 8 October 1999) to expand its business potential.

Teleglobe is a global provider of broadband services with an extensive global Internet network. The company delivers advanced broadband applications to customers in more than 100 countries. Moving swiftly during the 1990s to expand its presence in liberalizing markets around the world, Teleglobe currently holds operating authorities in 27 countries, including 15 in Europe, and has an extensive in-country sales presence with 53 offices in 42 countries.

ITU races ahead with industry to develop telecom standards

It may not be the type of competition which makes the headlines of a newspaper's sports page or even the business section. However, a race has been going on over the past decade which will not only have significant implications for international telecommunications but for society as well. That race is the attempt by the industry to keep pace with the revolutionary developments in the telecommunication sector (most notably the Internet) by establishing global standards which will allow the rapid technical advances to be enjoyed throughout the world. The International Telecommunication Union has played a key role in facilitating agreements on the standards which serve as the framework for the telecommunications revolution.

But like greyhounds pursuing a mechanical rabbit in a dog race, ITU is under constant pressure to chase up on the latest technical breakthrough and produce standards that receive international acceptance. With the global value of telecommunication goods and services surpassing USD 1 trillion this year, the stakes for telecommunication businesses in ensuring that their goods can function worldwide are more important than ever. But even

more important is the growing recognition that information and knowledge are becoming key factors in societal growth and development and that the Internet has a key role in facilitating information exchange.

Without global standards for seamless telecommunications, technical barriers would hinder the capability to compete on a global marketplace. Because global standards mean formidable economies of scale and lower development and hardware costs, they also mean lower prices to end-users. The world as a single open



Behind every successful technology is a standard. Without global standards, technical barriers would hinder the capability to compete on a global market-place

Photo: © 2000 PhotoDisc, Inc. (ITU 00038)

market-place is therefore good news for the industry and for the consumers.

In line with the rapid changes in the industry, ITU has accelerated its standardization process. "It is going much faster", noted Fabio Bigi, Deputy Director of ITU's Telecommunication Standardization Bureau. "From the time a proposal is received by one of the ITU-T study groups to the time we have determined a text and have approved it, the whole thing can be completed in eight months or less."

One example of the new accelerated process was ITU's successful adoption last March of the Y.1310 standard, which sets out the specifications for the transport of Internet Protocol structured signals over public networks using asynchronous transfer mode (ATM) technology. From start to finish, the approval process took less than eight months. Another example is ITU's H.245 standard which serves as a control protocol for visual telephony applications in ATM networks and in LANs (local area networks). The H.245 is revised twice each year to add functionalities needed by the industry.

Not only is the ITU under pressure to speed up its standardization work, the amount of work it is being asked to carry out is also increasing substantially. As an example of this, the ITU formally adopted 795 new or revised standards since the last Assembly (then called the World Telecommunication Standardization Conference) of which 362 were adopted in the course of 1999 alone. This means well over one new or updated standard for every working day covering industry global needs.

The vision of a new global information infrastructure (GII) connecting all the world's people and providing them with access to an enormous range of information anywhere at affordable prices, is finally becoming a reality, thanks in part, to ITU's efforts. Apart from providing instant access to a huge range of information held all over the world, the GII promises to open up a whole world of new services for the world's consumers. Electronic commerce, teleshopping, interactive television, multimedia to the desktop, telemedi-

cine, electronic data interchange and distance learning are just a few of the applications already on the drawing boards of the world's infocommunication companies.

Several standards developed within the ITU framework over the past few years will facilitate the emerging global information society and foster global acceptance of technological developments that will fundamentally change the telecommunications industry as we know it today. One of the most important developments has been the new "Y-series" standards cover-

"ATM systems are being installed to provide high capacity network capabilities and will be used by many operators as the backbone for conveying IP traffic over public networks"

ing Internet protocol (IP) aspects of telecommunication networks such as architecture, access, transport, performance and signalling. Drawn up in ITU-T Study Group 13, the standards will help integrate circuit-switched telecommunication networks with IP-based networks, essentially making access to a host of

new applications and services. The first breakthrough came in 1999, when this study group completed the Y.1540 standard establishing performance parameters for quantifying IP network performance. This will be followed by the Y.1541 standard, which will establish quality of service classes and performance objectives that should be achieved by IP network providers in assuring acceptable end-to-end performance for IP communications.

The Y.1310 standard for ATM technology adopted earlier this year "is especially important as it is at the heart of the convergence between the IP and telecommunication worlds", noted Brian Moore, Chairman of Study Group 13. "IP over ATM is one of a number of standards that are being developed to convey IP 'packets' over various systems and networks. ATM systems are being installed to provide high capacity network capabilities with very good network and performance management features and will be used by many operators as the 'backbone' for conveying IP traffic over public networks. The same approach may be applied also to private networks and end system networks", he added.

Another important development has been the adoption of standards for the advanced technolo-



DSL standards make it possible to introduce systems that provide affordable access to the Internet, teleworking, distance learning and multimedia services

Photo: © 2000 PhotoDisc, Inc. (ITU 000039)

gies which will form the building blocks of tomorrow's high-speed networks. Chief among these is ITU's new G-series of digital subscriber line (DSL) standards which promise to significantly increase Internet access speeds over traditional copper telephone lines, thereby eliminating the need for costly home or office rewiring.

The key standard in the series is the G.992.2 "G-Lite" asymmetrical digital subscriber line (ADSL) standard which is now allowing Internet users to download data at speeds of up to 1.5 Mbit/s over existing telephone lines. Instead of having to install costly "splitters" in order to separate voice and data traffic over the telephone line, the G-Lite standard permits both voice and data traffic to be sent simultaneously. The end result for users are transmission speeds which approach those now available through cable modem systems.

In welcoming ITU's initial agreement on the standard in October 1998, an industry association called the Universal ADSL Working Group described the G-Lite standard as a "milestone for telecommunication service providers, network equipment providers and the PC industry". The association, whose members included Intel, Microsoft and telephone carriers from France, Germany, Singapore, the United Kingdom and the United States, added that Internet users could soon see DSL data transmission up to 30 times faster than that of the current highest-speed analogue modems.

Work is currently in place on new additions to the DSL series. The proposed high bit-rate digital subscriber line (HDSL) standard will allow high-speed data and high capacity voice applications to be transmitted over existing copper telephone lines by overcoming the need for line-power amplifiers every kilometre. Down the road is the development of standards for very high-rate digital subscriber line (VDSL) technology, which promises transmission rates in the order of 50 Mbit/s over shorter loop lengths.

The DSL series standards "allow the introduction of systems to provide affordable access to the Internet, teleworking, distance learning, and multimedia services at speeds many times faster than is possible via today's 'dial-up' modems", noted Andrew Nunn, Chairman of ITU-T Study Group 15 which is working on the standards. "The single standard transmission method for ADSL provides both residential and business customers with the freedom to choose equipment from many different manufacturers."

Beyond improvements in Internet speed have come the standards which will offer improvements in Internet services. Among these are the H-series of standards for multimedia applications. The ITU-T's H.323 family of standards is already recognized as the global standard for multimedia communications over the Internet and are among the most successful in terms of end-product sales. In November 1998, experts within ITU-T's Study Group 16 began work on a new standard that will expand upon H.323 by allowing low-cost Internet gateway devices to interface in a standard way with signalling systems found in conventional telephone networks. The end result is expected to be new types of telecommunication services in which voice, fax, video and data can be packaged together and offered through conventional telephone lines. The standard, which will effectively bridge circuit-switched and IP-based networks, received final approval in June 2000.

In addition to improvements over conventional telephone networks have come advances in accessing Internet services over cable networks. In April 1998, ITU-T's Study Group 9 approved

the landmark J.112 standard for interactive cable television services. The standard fixes modulation protocols for high-speed, bi-directional data transmissions, allowing the transfer of IP traffic between cable system hubs and cable customers over all-coaxial or hybrid fibre/coaxial networks. The end result is improved interactive services with transmission data rates up to 30 Mbit/s.

The J.112 standard has been followed up by the drafting of the new J.117 standard setting



The new X.509 enables electronic transactions to be conducted with the same confidence as in a traditional paper-based system

Photo: © 2000 PhotoDisc, Inc. (ITU 000040)

out interface specifications for home digital networks. This standard provides the means for linking cable feeds with videocassette recorders and digital television sets, and will eventually be upgraded for linkages with personal computers and other networked home devices.

The J-series standards are considered particularly important for developing countries, where public access to television services is relatively high compared to fixed-line telephone services. By opting to make broadband services such as voice, video and Internet available through cable networks, developing countries are no longer obliged to invest huge amounts of time and money in upgrading fixed-line networks in order to access the benefits of the digital age.

In the field of electronic commerce, ITU has done important work through its ITU-T Study Group 7 in establishing the technical standards necessary to ensure network security and consumer confidence.

Commercial transactions over the Internet are expanding at a rapid pace — according to the United States Commerce Department, on-line shopping in the United States alone totalled USD 5.3 billion during the fourth quarter of 1999. This figure is expected to leap to more than 1.4 trillion annually by 2003 and could reach 3 trillion worldwide. An important share of this trade will be the so-called “B2B” or business-to-business transactions, as firms increasingly use the Internet to seek out the best price for inputs or pool together their buying power to negotiate deals.

In April of this year, Study Group 7 adopted a new version of its X.509 standard which is used in designing public key infrastructures (PKI) applications for e-commerce transactions. “The elements defined within X.509 are widely utilized — from securing the connection between a browser and a server on the Web to providing digital signatures that enable electronic transactions to be conducted with the same confidence as in a traditional paper-based system”, noted Herb Bertine, Chairman of Study Group 7.

The new X.509 aims to improve the environment for B2B transactions by setting out a framework for privilege management infrastructure as well as improved standards for attribute certificates, which define user access privileges. According to Sharon Boeyen, the editor of X.509, these advances “will extend the role of X.509 as a critical foundation standard for B2B electronic commerce growth, by enabling access control and authorization services in a secure, standardized, multi-vendor environment”.

Study Group 7 also completed important work last April with the approval of new frame relay standards. The X.36 and X.76 standards will increase data transmission rates up to 622 Mbit/s, allowing network operators to offer new frame relay services such as on-demand-connection, multicast communications and data compression. The study

group will continue its work in this field by focusing on key aspects on interworking between frame relay systems and ATM and the Internet.

Not only have network operators and business users benefitted from recent ITU standards work in the Internet sector, but the individual cyber-surfer has gained as well. An example is the development of the V-series of standards for computer modems. In October 1998, ITU formally adopted the V.90 standard for the new generation of 56 kbit/s modems. Since then, these modems have been selling like hot cakes; an estimated 75 million modems based on the V.90 standard are expected to be shipped this year, accounting for USD 4.3 billion in sales.

Following up on this development, public and private sector representatives agreed last June on the technical specifications for the new V.92 standard. The new standard will improve upon the V.90 standard by speeding up the outbound data rate to networks by 40 per cent to a maximum of 48 kbit/s, essentially achieving the two-fold improvement which the V.90 standard made for incoming data speeds. "The dramatic progress made with the V.90 standard is now being applied in the other direction", noted Mr Bigi.

Work on the V.92 standard began at a May 1999 meeting of Study Group 16 in Santiago (Chile). The standard is expected to get formal approval at the study group's meeting in November 2000, at which time it will come into immediate effect. Other more recent developments on the modem front have been the completion of the V.44 and V.59 standards, which will be formally approved at the World Telecommunication Standardization Assembly.

The V.44 "is a new data compression algorithm which builds on the exceptional success of V.42 bis that has been incorporated in almost every modem manufactured in recent years", explained Bill Pechey, Director of UK-based Computency Limited, who was closely involved in the standard's development. This standard not only increases data speeds by 30 per cent, but has been designed to be easily adapted to new applications and is expected to find use especially in packet-switching networks such as the Internet where savings in transmission costs may be expected", he noted. Bruce Adams, CEO and General Manager for US-based Signals + Software



Much of ITU's future standardization work is expected to focus on the wireless world, where global roaming and wireless Internet have become the buzzwords

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and head of an ITU-T group responsible for drafting the V.59 standard, said this latter development "is significant in that it provides both customers and service providers — be they Internet service providers, corporate, or other private networks — a common set of tools to diagnose problems with modem connections".

"ISPs have tremendous difficulty understanding the problems their customers have with dial-up connections, be it sluggish performance, disconnects, or incorrect protocols", Mr Adams noted. "V.59 allows users to query their equipment, even after a call, to find out various technical details about a call. Trained support people can use this information to tell a number of things about calls, such as what modulation standard connected, and why."

Much of ITU's future standardization work is expected to focus on the wireless world, where global roaming and wireless Internet have become the buzzwords for the cellular industry. The market for the latest "third generation" of mobile telephone equipment is estimated to grow to USD 9.2 billion by 2005, with infrastructure investment peaking at around 5 billion by 2003.

ITU has already approved important standards in its Q.1700 series covering the interfaces which will form the basis of tomorrow's 3G mobile networks and specifications for network interconnection and global roaming. A top priority for the technical experts will be establishing standards for the enhanced management and security for 3G systems.

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Beyond WTSA-2000

Relevance, speed and adaptability

Gary Fishman
Chairman, TSAG

For this special edition of the ITU News on WTSA-2000, I would like to stimulate some thinking about the time beyond WTSA-2000, what the membership of the Standardization Sector tells us it needs and how the Assembly's actions will enable us to reach that future successfully.

Although the Telecommunication Standardization Advisory Group (TSAG) has prepared proposals on more than 50 resolutions and recommendations for WTSA's consideration, including proposals for the future structure of ITU-T study groups and allocation of nearly 200 study questions, when I think of the time beyond WTSA-2000, the issues affecting the performance of ITU-T can best be summarized by just three themes: relevance, speed and adaptability.

For ITU-T to be effective in the future, WTSA-2000 will be asked to enhance its capabilities in each of these three areas.

Relevance

Are we working on the right things? One thing is clear when we look beyond the time of WTSA-2000 and that is that we must constantly reassess what we are working on. This WTSA will be asked to approve mechanisms that enable creation of new groups during the interval between Assemblies to complement current procedures that allow study groups to initiate work on new study questions. WTSA-2000 will be asked to approve a revised resolution enabling the membership, through TSAG, to create study groups without waiting for the next WTSA. It will also be asked to

approve a "fast set-up" option for study groups to create focus groups as quickly as forums and con-

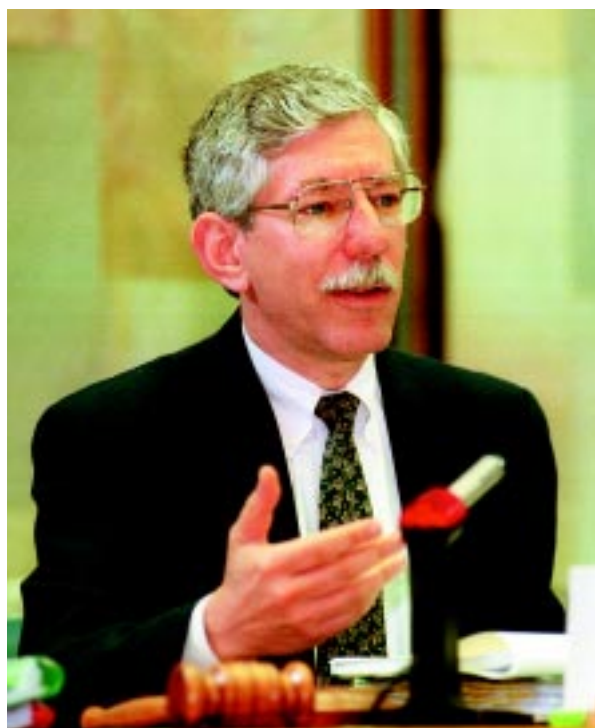
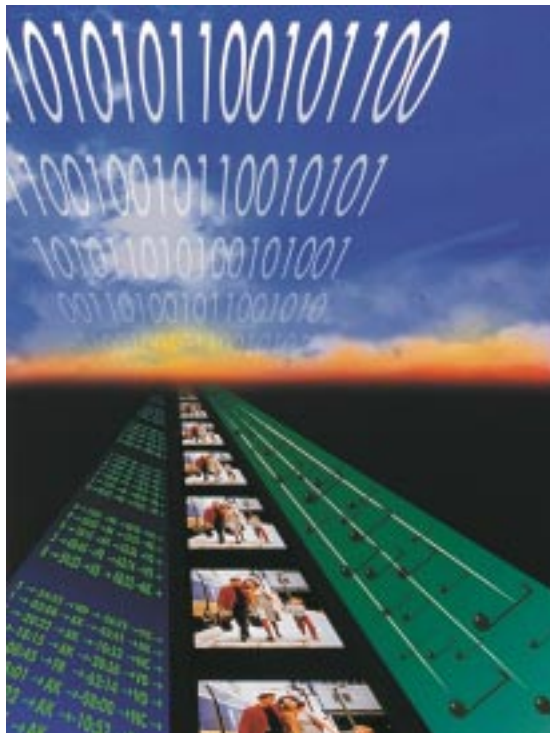


Photo: A. de Ferron (ITU 000037)

sortia are formed outside ITU. Hopefully, these new tools will help keep work in ITU-T, instead of seeing competing forums established to do the work outside this Sector.

Speed

Are we able to develop and approve Recommendations at the right time? Are we able



Networks and services increasingly represent the lifeblood of national economies

(Photo: ITU 970038)

to work fast enough? Over the past periods, ITU-T working methods have been refined so that approval procedures that used to take more than two years are now completed in about ten months. But that is not fast enough for the telecommunications industry when the capacity of optical transmission systems doubles in the time it takes to hold two study group meetings at a traditional interval of nine months. We must be faster. Therefore, this WTSA will be asked to approve new procedures that were embodied in the ITU Constitution and Convention by the 1998 Plenipotentiary Conference. Under the new Alternative Approval Process (AAP), speed will be increased and the openness and transparency of ITU-T working methods will be enhanced through the use of electronic communication. At the same time, the AAP responds to the concerns of many that the number of physical meetings has become overly burdensome. The procedures in use today that have been reduced to nine or ten months will be further reduced to two or three months.

Adaptability

Are we able to change when change is required? The structure and functioning of ITU-T has evolved over many years and it generally

worked well. However, the pace of technology and the speed required for the production of high-quality international recommendations demand much more of ITU-T than it can deliver if it is inflexibly tied to fixed structures and processes.

As ITU-T Study Group Chairmen stated to the June 2000 meeting of TSAG, "work of the study groups and TSAG should be on a continuous basis, disassociated from the interval between WTSAs". The World Telecommunication Standardization Conference in 1996 (WTSC-96), the predecessor of WTSA-2000, recognized the need for continuous review and change and delegated limited authority to TSAG to take action in a few specified areas, such as maintaining up to date working methods and responsibility for recommendations relating to the operations of the Sector.

WTSA-2000 will be asked to approve an update to that resolution so that ITU-T's ability to adapt quickly to changing requirements will be enhanced. If approved, the membership will be able to adapt work structures, working methods and cooperation mechanisms when needed, and not be restricted to a fixed interval between assemblies.

Providing a list of resolutions and recommendations and saying how important each one will be to the future of ITU-T might have been a more traditional

approach to previewing the work of the Sector's Assembly. However, how many of us would remember all 50, why each was important or what happened to each one after the Assembly was over? Rather, when considering TSAG's proposals to WTSA, we should focus on the years beyond WTSA-2000 when the membership has to come together to do its work and we should keep in mind how WTSA-2000 decisions will contribute to the three key aspects of ITU-T's effectiveness: relevance, speed and adaptability.

The pace of technology and the speed required for the production of high-quality international recommendations demand much more of ITU-T than it can deliver if it is inflexibly tied to fixed structures and processes

Common proposals for global solutions

Inter-American Telecommunication Commission

Overview

The Inter-American Telecommunication Commission (CITEL) provides a forum for the 34 Member States of the Americas to discuss telecom-



Félix Castro Rojas, Alternate Chairman, CITEL PCC.1

Photo: A. de Ferron (ITU 000042)

munications development and coordination in the region.

Preparations for the World Telecommunication Standardization Assembly (WTSA-2000) have been conducted under the auspices of CITEL's Permanent Consultative Committee 1 (CITEL PCC.1), the technical advisory body that deals with the coordination and harmonization of telecommunication standards in the region.

CITEL PCC.1's forward-looking vision for the Americas in the coming years encompasses many of the new topics high on the agendas of premier telecommunication standards bodies and forums worldwide. These include Internet protocol (IP)-based networks and service standards, global information infrastructure (GII) standards and policies, accounting rate issues and electronic commerce (e-commerce) standards and policies.



William A. McCrum, Vice-Chairman, Ad Hoc Group on WTSA-2000 Preparations

In 1999 the Alternate Chairman of CITEL PCC.1, Félix Castro Rojas (Colombia), established a working group to coordinate the development of common proposals to be tabled at WTSA-2000. To this end, he appointed Leonel López Celaya from the Government of Mexico

to chair the group, with William A. McCrum (Canada) as Vice-Chairman.

The working group fulfilled its mandate and came up with common proposals that were approved at CITEL PCC.1 meetings held in Buenos Aires in November 1999 and in Isla Margarita (Venezuela) in June 2000. A CITEL common proposal is one that is supported by at least five Member States. A sufficient number of Member States have approved these common proposals for them to become accepted CITEL positions.

Background to common proposals

Within the Americas region, there is a wide diversity in the levels of deployment of telecommunications infrastructure and penetration of telecommunication services. The teledensity in some countries is still at single digit levels while in others it is almost complete. There is, therefore, an intense interest in the possibilities of harnessing new technologies to address this disparity, and in so doing accelerate the overall development of the economies of the region.

Standards, and especially international standards, are seen as one of the key elements that promote compatibility, and interoperability. They are seen as an important part of a strategy for deployment of a telecommunications infrastructure in the region.

Furthermore, the political leadership of the Member States of the Americas fully recognizes the potential of technologies such as the Internet and wireless technologies to accelerate, dramatically, the rate of infrastructure build-out and facilitate a wide range of service delivery by electronic means.

Connectivity and telecommunications are subjects that are on the agendas of practically every meeting of senior officials at the regional level, and are expected to be central topics at the next Summit of the Americas to be held in Quebec City in April 2001. Applications such as telemedicine, tele-education and e-commerce are already being used widely in many countries of the region.

CITEL Member States are keenly interested in WTSA-2000 because of the opportunity it provides to raise telecommunications-related issues of concern and relevance to the region, and which ITU-T has to consider. CITEL's view is that maintaining and strengthening the pre-eminence of ITU-T in global standardization is of great importance. Key actions for achieving this include:

- an increased Sector Member participation in the work of ITU-T and, in appropriate cases, the use of a more rapid approval process for recommendations;



The Stock Exchange in Mexico City

Photo: © 2000 PhotoDisc, Inc. (ITU 000043)

- development of recommendations that reflect market- and trade-related considerations;
- playing a leading role in the promotion of cooperation among international and regional standardization organizations, forums, and consortia concerned with telecommunications;

- addressing important issues related to changes due to competition, tariff principles and accounting practices;

- development of recommendations for new technologies and applications such as IP-based networks, as well as global multimedia and mobility systems.

Common proposals

Recognizing that global standardization of public switched telecommunication networks (PSTN) is one of the core strengths of ITU, and having concluded that issues including interoperability and convergence of IP-based networks with existing infrastructures represent a key priority for the region, CITEL proposes that the Montreal Assembly devote considerable attention to agreeing on the appropriate structure and working methods that will enable ITU-T membership to carry this work forward. It is also recognized in the region that while ITU-T Recommendations are widely deployed, a rapid increase in IP-based network standardization and liaison activities in ITU-T can be expected. CITEL further puts forward seven proposals which it recommends the Assembly to consider. These are:

- The need for an appropriate study group structure not only to address IP-based networks standardization, but also to facilitate collaboration with the Internet Engineering Task Force (IETF), its working groups and other relevant standardization bodies.

- The need for a standardization role to address the evolution of the physical transport network in order to facilitate extensive deployment of an optical infrastructure in view of the rapid increase in demand for high-speed data services.

- The formulation and promotion of a clear role for ITU-T in third generation mobile communications in the context of the Internet and mobile data communications, recognizing that IMT-2000 is a high-priority activity of ITU-T and

that standardization activities outside ITU-T require coordination and collaboration for global standards development.

Enhancing the authority of the Telecommunication Standardization Advisory Group (TSAG) to enable rapid response to changes in work priorities and the needs of the market-place in a timely manner. In particular, the authorization given to TSAG in Resolution 22 of WTSC-96 to act between WTSCs (now WTSA) should include the ability to create new study groups, give advice on study group meeting schedules, and provide representation at the ITU Council and its standing committees.

Reviewing and considering the advisability of free Web distribution of certain, or all, recommendations as a means of promoting widespread awareness of the work of ITU-T.

The recommendation to establish a new study group for "IMT-2000 and beyond" under the auspices of ITU-T.

The recommendation that all standardization activities within ITU be consolidated under the auspices of ITU-T in order to facilitate increased efficiency in carrying out the standardization work.

Conclusion

WTSA-2000 provides an opportunity for representatives of national and regional standardization bodies and organizations such as CITEL to contribute to the debates and put forward perspectives and proposals that can lead towards global solutions to issues which are before ITU-T. In the case of CITEL, this is particularly opportune as the Assembly will be held within the region of the Americas this year.

As WTSA-2000 approaches, the region is putting final touches to its common proposals within the CITEL PCC.1. Meanwhile, CITEL representatives will be discussing their views with other regional bodies such as the Asia-Pacific Telecommunity. These discussions will help build consensus and focus on matters which are of vital importance to the global standards requirements for telecommunications, address specific priorities of the Americas, and assist ITU-T in planning its structure, operating methods and work.

Expectations for change

Nortel Networks Corporation

The World Telecommunication Standardization Assembly will be a key milestone for ITU's Telecommunication Standardization Sector (ITU-T) in addressing the challenges it faces in grappling with a telecommunications standardization environment that has changed dramatically in recent years. It is Nortel Networks' view, as a Founding Partner in hosting WTSA-2000 in Canada, that this Assembly will be a turning point in the positioning of ITU-T as a leader in global telecommunications standardization.

The crucial need for ITU-T to demonstrate its willingness and ability to respond to the changing environment is underscored by the explosion in the number of competing forums, consortia and partnership projects, the increasing rate of change in technology, and evolving Sector Member roles, needs and expectations. The outcome of the WTSA must enable changes that will attract new private sector players to participate actively in the work of ITU-T, and must change the perception that ITU-T cannot address the most relevant technical matters with the responsiveness and speed required by industry. The results must also facilitate cooperation and collaborative work between ITU-T, in its position as a global leader in telecommunications

standardization and harmonization, with other standards-development bodies worldwide.

A key step forward would be WTSA support for the Telecommunication Standardization Advisory Group (TSAG) to have the authority in the interval between WTSA's to act on new priority work directions, including the creation and termination of study groups. This would enable ITU-T to respond quickly to the rapidly evolving telecommunications environment.

WTSA-2000 will define and approve a work structure which will set the stage for ITU-T activities for the remainder of 2000 and beyond. This structure should not only focus ITU-T's energies in areas such as optical transport networks (OTN), Internet protocol (IP) networks interworking, and telecommunication management network (TMN), but also continue to lay the groundwork for harmonization of IMT-2000 standards, as well as for the wireless/IP infrastructure of the future.

The key to enabling the evolution of the telecommunications environment towards networks optimized for the transport of IP traffic is timely standards for high-speed (multi-Megabit/s) network access and ultra-high capacity (Terabit/s) metropolitan and long-haul transport. ITU-T is undoubtedly the leading global standards-development body in these areas, having



Bruce Pettitt, Adviser
International Standards



John Visser, Senior Manager
International Wireless Standards

developed, in the last four years, a large number of key recommendations for high-speed access over both copper loops (digital subscriber line) and optical fibre, for the synchronous digital hierarchy and for the OTN. WTSA-2000 will be asked to endorse Study Group 15 (Transport networks, systems and equipment) as the focus for all OTN-related work in the years ahead.

In the wireless area, given the scale of the subscriber base, and the very high market interest in wireless Internet access, a much-needed and significant output of WTSA-2000 would be the establishment of a group to address IMT-2000 and beyond. With half of the global subscriber base being mobile, and a large proportion of these subscribers using Internet services, greater emphasis on infrastructure standards to support the needs of mobile subscribers should be given high priority in ITU-T. Ensuring a strong and visible focal point in ITU-T for IMT-2000 and beyond standardization will greatly facilitate global harmonization of existing and future technical standards applicable to wireless and IP-based networks, and pave the way for support of the inevitable convergence of wireless and IP-based technologies.

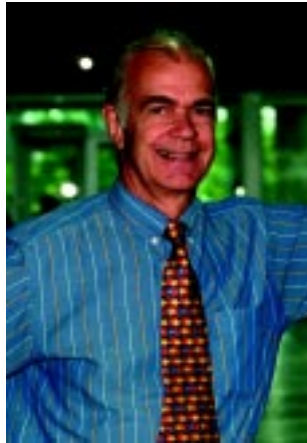
WTSA-2000 will also be asked to endorse the continuing role of Study Group 4 (TMN and network maintenance) as the focus for TMN standardization in ITU-T. A network infrastructure based on existing as well as emerging wireless, optical and IP-based technologies must be supported by an effective management infrastructure, which provides for the integration of existing and emerging management technologies. The continuing role of Study Group 4 in this respect is key to the future success of ITU-T in addressing the integrated management requirements of converg-

ing circuit switched and packet/IP-based networks.

Many ITU-T Sector Members will also be seeking confirmation from WTSA that their role in ITU-T, and their relationship with the Member States should, in future, reflect the leadership which the private sector now plays in the telecommunications environment, as a result of deregulation and privatization. Nortel Networks firmly supports the continuing role and unique position of ITU-T in global standards development and harmonization. This role is only sustainable in the context of an effective partnership between Sector Members and Member States, in the spirit reflected in Resolution 82 of the Plenipotentiary Conference (Minneapolis, 1998), which deals with the approval of questions and recommendations.

In a broader context of change, ITU has embarked on a process of reform of the organization as a whole. The Working Group on ITU Reform is addressing aspects which include the roles of the Member States and Sector Members. Nortel Networks views this as an important but parallel process to the changes that need to be agreed at WTSA-2000. In this respect, WTSA-2000 should grasp this golden opportunity to play a proactive role in the reform process by providing its views on the essential and desirable attributes of a revamped standardization organization within ITU, whatever the outcome.

In Montreal, WTSA-2000 will be laying a solid foundation for international telecommunication standardization in the new millennium — highlighting the optical networking, wireless, and IP-related aspects, and paving the way for their convergence in providing a broad range of new and enhanced services. It will be ensuring a strong future for the global telecommunication standardization role of ITU.



Peter Wery, Associate Director, International Standards, Chairman ITU-T Study Group 15



Godfrey Williams Associate Director International Standards

A perspective from the Asia-Pacific region

Asia-Pacific Telecommunity

The World Telecommunication Standardization Assembly promises to be an historic event for the future of telecommunications standardization. Industry-led standardization efforts continue to reflect market requirements and standardization is now a shared domain between administrations and Sector Members.

How does ITU-T as a Sector of a treaty-based organization respond?

The Asia-Pacific Telecommunity (APT) provides for regional coordination of standardization efforts in the Asia-Pacific Rim, a region that encompasses over half of the world's population. APT currently has 31 members, 4 associate members, 42 affiliate members and 45 participating companies, indicating wide representation from administrations and industry alike. APT has programmes for regional harmonization of standardization and provides a regional input to major global events, including the World Radio-



Bob Horton, Chairman of the APT Standardization Programme and Vice-Chairman for the APT Preparatory Group for WTSA-2000

Photo: A. de Ferron (ITU 000044)

communication Conference and WTSA. APT has also initiated its own Standardization Programme, known as ASTAP, to better involve industry from the region in the standardization process, both in a regional perspective as well as providing input into the ITU global process.

In preparation for WTSA-2000, APT has held a series of meetings over the months leading up to the Assembly. Positions of interest common to the region have been formed and appropriate proposals submitted to the Telecommunication

Standardization Advisory Group (TSAG) meeting in June 2000 on the issues highlighted below.

Working methods

APT proposes the introduction of maximum terms of office for the ITU Telecommunication Standardization Sector (ITU-T) Study Group Chairmen and Vice-Chairmen. This might result in benefits to the study group by introducing new ideas on a periodic basis, and could also provide an opportunity for study group chairmen and vice-chairmen to be appointed from different ITU-T Members.

APT supports the Alternative Approval Process (AAP) for the approval of recommendations of a technical nature, as a way for ITU-T to speed up the standards approval process, which it sees as vital to meet the rapidly changing needs of the telecommunications market. Issues associated with electronic document handling and Intellectual Property Rights (IPR) were also considered as significant to APT members.

ITU-T study group restructuring

With the explosive growth in the Internet and other IP-based networks with information technology, the use of IP-based networks, and appropriate applications such as e-commerce, have become critical factors in the development of telecommunication networks. Another important trend in telecommunications is the emergence of mobile networks and a significant increase of customers subscribing to them. In recognition of these major developments APT supports the introduction of a single study group to consider IMT-2000 and

beyond, and TSAG's proposal that Study Group 13 should maintain the lead role for IP-based networks.



Another important trend in telecommunications is the emergence of mobile networks and a significant increase of customers subscribing to them. Cambodia, with a population of more than ten million, is among the few countries in the world where the number of mobile subscribers has overtaken that of fixed telephone lines

Photo: Lars Alstrom (ITU 980164)

Associates

While APT supports the establishment of a category of participation called Associates, it nonetheless notes that in order to gain the full benefit of this category it may be necessary to

consider establishing project-oriented study groups in certain specific areas, rather than limit the Associates to a single study group.

General standardization matters

APT proposes that in order to retain a leading role in standardization, ITU-T would need to be market-oriented, accelerate the speed of the pro-

management, functioning and structure of ITU. These proposals include ways in which ITU-T might best fulfil its objectives by better identifying its goals and areas of expertise, developing a set of indicators against which its performance can be measured, increasing the role and responsibilities of TSAG between WTSAs, and investigating the need for ITU-T to promote itself more effectively to industry.

Regulatory aspects

APT notes the split between regulatory and technical work, with much of it falling into the technical category; which tends to be driven by Sector Members. APT raises a number of regulatory concerns, including lawful interception, number portability and emergency call requirements.

In order to harmonize inputs to the maximum extent practicable, APT has held these preparatory meetings in an open environment, where ITU-T officials and other regional bodies have participated by sharing their views on issues.



The Asia-Pacific region offers much scope for the fruits of telecommunications standardization to enrich the lives of its people

Photo: © 2000 PhotoDisc, Inc. (ITU 000045)

cess of standardization, be flexible and increase industry involvement. APT also emphasizes the need for ITU-T to focus on its areas of expertise and establish relations with other standards bodies in order to avoid an overlap of work activities and to add value to the work of these bodies.

Reform

APT has put forward a number of proposals for consideration in support of Resolution 74 of the Plenipotentiary Conference (Minneapolis, 1998) on the review and improvement of the

The Asia-Pacific region offers much scope for the fruits of telecommunications standardization to enrich the lives of its people. APT preparatory work has reaffirmed the need for significant change in ITU-T.

Areas of interest to our region include:

Working methods, where a modern electronic approach to our own regional work has proven most beneficial, allowing for increased participation in the work of the Sector for those who are unable to attend meetings in person due to geographic or financial impediments.

Identification of the major topics in an ever converging telecommunications environment, including IP-based networks and mobile systems, both current and future, as these are important not only within the Asia-Pacific region but also across the globe.

Catering for the convergence of multiple technologies including interworking with existing systems, to ensure the most up-to-date and effective systems for the region.

Appropriate restructuring to cater for this changing environment, to ensure that ITU-T can best organize standardization and coordination work.

Greater flexibility in the working of ITU-T. This should involve adapting to new requirements and suppressing work where requirements have been met, to be able to better meet the needs of the telecommunications industry, including those identified by this region.

More timely development of appropriate recommendations without compromising quality of work, to meet the needs of the rapidly changing telecommunications environment.

More involvement in the decision-making process for our industry Members, in line with a decision of the Minneapolis Conference, and in

recognition that standardization is becoming increasingly industry-driven. More involvement from our Members will increase the likelihood that the standards developed will benefit and therefore be taken up by the region.

As well, the Asia-Pacific Telecommunity is closely monitoring reform activities in ITU, and will submit appropriate proposals to the World Telecommunication Standardization Assembly to ensure that its regional opinions are heard.

The world of telecommunications is changing rapidly. ITU's Standardization Sector is set to grasp the opportunity of WTSA-2000 to respond accordingly. APT is confident that WTSA-2000 will produce the desired results, in order to ensure maintenance of the relevance of ITU-T. Our Members eagerly await anticipated outcomes.



The world is shrinking into a global village, as the Sydney 2000 Olympic Games will bear testimony through a global audience of some 4 billion people, thanks to the convergence of multiple technologies

Photo: Department of Communications and Arts/Australia (Photo: ITU 980019)

The future of global standardization

Views of European telcos

Dietmar Schulz

Executive Board Chairman
European Public Telecommunications Network Operators' Association

Since its foundation in 1865 the ITU has played a leading role in the development of worldwide telecommunication services. In particular, the organization's standardization activities have enabled the interworking of national systems which allows communication between more than 850 million customers. This major achievement has found recognition across the world in both developed and developing countries.

However, over the past ten years, technological, economic and regulatory developments have combined to produce a revolution in the telecommunications industry. This revolution has in turn placed a large question mark over ITU's future role with respect to standardization, and created an urgent need for radical reforms.

The transformation within the last decade has been total. Firstly, in an ever-growing number of countries, the provision of telecommunication services is no longer a government-run monopoly. Secondly, as a result of market liberalization and technology convergence, many new players are now involved in information society

development who have no previous links with the telecommunications sector. Thirdly, the strategy of all major market players is increasingly international. Effective interconnection between mainly national markets is now far from being the only requirement at the global level.

Private businesses in competitive markets face constant and intense pressure to maintain their competitive edge. In a context of rapid technological change, they must reduce time-to-market for new products and services as far as possible. And this means that the production of the common specifications needed to underpin this process must be non-bureaucratic, market-led and fast. Unfortunately, ITU's standardization activities often fail to meet these criteria.

As a result, recent years have seen the establishment of a growing number of alternative frameworks and forums designed to respond to the demand for quick production of relevant specifications and standards. There are now more than eighty such structures in existence, and evidence for their success is easy to find. Most significantly, the Internet is based on



global standards which have been developed mainly outside ITU.

Since the expert manpower which companies can allocate to standardization work is limited, they will participate only in those bodies which produce positive and timely results. The activities of the new forums therefore represent a major competitive challenge to ITU's future role in the standardization field.

As the principal trade association for European telecommunication operators, the European Public Telecommunications Network Operators Association (ETNO) has reflected carefully on this new situation. The 45 companies represented by the Association appreciate that, in addition to its weaknesses, ITU has many strengths. Foremost among these are the global recognition enjoyed by the organization, its acknowledged technical competence, and its unique ability to take account of the specific needs of developing countries. For all these reasons, ETNO believes it would be unfortunate if the ITU's role as a standardization body is allowed to decline further. With a view to avoiding such a decline, the Association is advocating the introduction of a variety of major reforms.

In ETNO's view, it is necessary to transform ITU's Telecommunication Standardization Sector (ITU-T) into a more commercially-oriented organization with objectives, management and financing to match. A potential model is provided by those regional standardization bodies which have wide global membership including the full spectrum of actors involved in information society development. ITU-T needs to be able to listen to its membership and adapt itself to a changing environment in a similar way.

In order to achieve this, some reforms of ITU as a whole are needed. As a first step, each of ITU's three Sectors should be given its own budget, and the right to manage these resources



Businesses in competitive markets face constant and intense pressure to maintain their competitive edge

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independently. Contributions made for an individual Sector should stay within that Sector. Equally, revenues generated by the activities of a Sector should remain within that Sector. Costs for the General Secretariat and other related overhead costs should be purchased by the Sectors at cost on an "as used and required" basis, and not simply allocated to the Sectors as at present.

Secondly, the Directors of the three Sectors should be appointed by the appropriate Assem-

blies. A detailed job description for each Director should be established and the Directors appointed on the basis of the best candidate for the job.

Thirdly, more authority should be devolved to the individual Sector Advisory Groups so that they can be responsible for managing the ongoing activities of the Sector, within the strategic plan of that Sector.

As far as ITU-T in particular is concerned, decision-making procedures must be reformed in order to give equal weight to all Members. Given that standardization activities are carried out primarily by non-government Members for the benefit of non-government Members, it is wholly inappropriate that final authority on many matters should rest with government representatives.

The implicit four-year cycle of the study period for ITU-T should be abandoned. The processes already exist to enable questions to be adopted or abandoned as circumstances require. The study groups should therefore work instead on a continuous cycle managed by the Telecommunication Standardization Advisory Group (TSAG).

The World Telecommunication Standardization Assembly (WTSA) should be held every two years, but for a maximum of five days. Progress reports from the study groups would only be

noted by the WTSA. The WTSA would be responsible for a two-year rolling strategic plan, the budget/financial management and the appointment of the Director.

Regarding ITU-T products and services, ETNO believes the organization should concentrate on those activities where it has specific skills and acknowledged capability: for example, the areas of interconnectivity, interoperability, quality of service, optical networking, carrier-class networks and performance. It should not look to duplicate industrial forum activities.

Partnerships with industrial forums and regional standardization bodies should nevertheless be investigated. There is certainly scope to share information and expertise, and to elabo-

The opportunity for reform must be seized now if the Sector's future achievements are to match those of the past



One critical issue with all current forms of electronic signature systems is establishing a physical connection between the sender and the signature

Photo: © 2000 PhotoDisc, Inc. (ITU 000047)

rate some specifications on a cooperative basis. ITU-T should develop procedures to take the output of such bodies as input for its own work. In this way, ITU-T could add value for its Members by consolidating the outputs of these forums into stable global norms.

Consideration should also be given to the establishment of a new series of ITU-T products in the domain of technical standards. "Provisional standards" would be developed in the normal way, but would be approved in the study group by all the participants on the basis of consensus. If the relevant study group was to consider it necessary for the provisional standard to become a full standard, approval could be obtained by the normal process.

These are ETNO's main ideas on the changes that are needed to guarantee ITU-T's future success. The changes must be implemented quickly since, against a background of growing competition from rival bodies, the window of opportunity is short. The opportunity for reform must be seized now if the Sector's future achievements are to match those of the past.

Raising the standard



ITU headquarters

Photo: A. de Ferron (ITU 000048)

Founded in Paris in 1865, the original *raison d'être* of the International Telegraph Union was to harmonize pan-European telegraph systems to facilitate faster, more accurate transmission of messages across national borders

The standards-making activities of the International Telecommunication Union are so well-known that, for many in the industry, the Union's Telecommunication Standardization Sector, better known under the acronym ITU-T is the ITU. It comes as some surprise, then, to note that the Telecommunication Standardization Bureau (TSB), the executive arm of the ITU-T, only accounts for around 50 of the Union's 800-odd staff. The TSB can run its shop on what amounts to a skeleton staff for the simple reason that most of the nuts and bolts of standardization work is undertaken by the Sector's 14 study groups composed of voluntary representatives from the public and private sector who meet several times a year to develop the equipment and transmission standards which eventually become ITU-T recommendations.

The ITU's role as a creator of internationally-recognized standards for the telecommunications industry goes as far back as the organization itself. Founded in Paris in 1865, the original *raison d'être* of the International Telegraph Union was to harmonize pan-European telegraph systems to facilitate faster, more accurate transmission of messages across national borders. As the "T" in ITU eventually came to stand for "Telecommunication" rather than "Telegraph", so the Union's core standardization activities were centralized under the International Telephone and

This article has been adapted from "The twenty-first century ITU", published in the TELECOM 99 Daily, on 10 October 1999.

Telegraph Consultative Committee (CCITT), in 1956, and eventually, the T-Sector formed in 1993.

New playing fields

If standardization is still regarded by the industry as ITU's main function, it is also the area most under threat from changes in the global telecommunications environment. The convergence of information technology and telecommunications,

along with the rapid expansion of the world's telecommunications sector has seen the emergence of a myriad of new standardization groups — the Frame Relay Forum, ATM Forum, and GSM Association, just to name a

“Criticism of ITU's efforts is often based on commercial lobbying rather than on any actual delays in the standardization process”

few — set up to serve regional interests or to focus on specific areas of technology. At the same time, the rapid evolution of new technologies means standards-making organizations are under intense pressure to deliver their products to the world's commercial equipment manufacturers at lightning speeds.

Recognition of the need for a more responsive approach and faster delivery of ITU-T study groups' end product has led to some real improvements in the Bureau's performance over the last few years. Now ITU-T is working hard to build on those gains and consolidate its position as the world's leading source of global telecommunication standards.

A giant awakes

The ITU is often seen as a lumbering anachronism, an organization too rooted in the past and too slow-moving to be relevant to the needs of tomorrow's fast-changing industry. While this image may have been true in the past, enormous progress has been made.

ITU-T's commitment to reducing the development time for standards has resulted in a reduction of 80 per cent in the time-to-market of recommendations over the last ten years, with the average development cycle now down to just nine months. Even in the impatient world of the telecommunication equipment vendor, this makes the ITU process undeniably competitive.

Not only has the timeframe to produce a standard shortened but the scope and breadth of the recommendations has increased significantly with improved productivity to meet the needs of end users. So, despite the persistent image of lethargy which surrounds ITU's standardization process, equipment makers and carriers at the cutting edge have a different view.

Wyn Lucas (United Kingdom), a veteran ITU participant with around fifteen years' experience in the Union's study groups and policy development initiatives, emphasizes the importance of stability and global acceptance in standards-making. “Sometimes other standards bodies move faster than ITU — but they can also be much slower too. What the industry needs is solid, stable standards. A standard which is reviewed every few months or changed at the whim of the standards body is of no help at all.”

Roy Mills, Director, Standards with Canada's Nortel Networks, adds that it is a mistake to regard speed as the only consideration. “It is important to recognize that broad-based industry acceptance, stability and implementability are also criteria by which to measure a standards-development process. Speed is not always the key parameter.”

Praise for ITU-T's streamlined standards development and approval practices aside, there are still those who feel the Sector is out of its depth in an industry rapidly evolving away from conventional notions of telecommunications towards a brave new Internet protocol (IP)-based world of ubiquitous, invisibly networked devices.

“The ITU does a splendid job given the scope of the real task — global interoperability across a broad range of telecommunication services”, says Keith Murray of Jtec, an innovative Australian manufacturer of multiplexers and other transmission products. A telecommunications engineer by training, Mr Murray says he suspects criticism of ITU's efforts is often based on commercial lobbying rather than on any actual delays in the standardization process. “Any serious R&D effort will take a year at least and the standards are reviewed every year-and-a-half”, he remarks.

Even staunch critics admit that ITU has a sustained competitive advantage where stable, uniform global standards are needed. A nine-month turnover is very fast, maybe too fast commented

Fred Baker, Chairman of the Internet Engineering Task Force (IETF) during the latter's 45th Plenary Meeting held in Oslo in July 1999. Looking around, many standards-setting organizations are experiencing longer lead-time in adopting standards now that their membership is increasing.

Lean, mean and market-driven

Many believe ITU-T could play a valuable role as global harmonizer of the work performed in specialized standardization bodies. It is a view shared by Messrs Murray, Lucas and Mills, all of whom point to the ITU's unique selling point — its global membership. "ETSI, ANSI and all the other forums have their place. They provide valuable input from the perspective of different historical infrastructures. But ITU is the place where global harmonization should happen", says Mr Murray.

Mr Mills adds that: "Standards developed by other organizations may be highly relevant in particular national or regional markets, but it is ITU's standards that are globally applicable and cover a very broad range of technologies. These are important factors in today's market-place, where free trade is facilitating globalization and where convergence demands the integration of many different technologies."

Mr Lucas makes the point that ITU is the only body considered truly impartial by all players. "One could imagine the various regional standards groups from Europe, the United States and Asia banding together as a kind of global standardizer, but there would be a serious problem of trust. One of the reasons ITU standards are so widely accepted is that the organization is seen as one which develops standards without prejudice, and without kow-towing to undue pressure from the commercial sector."

The cold hard facts seem to confirm industry confidence in ITU-T (see Table 1): 162 operators, 207 scientific and industrial organizations as well as other national entities and 38 regional or international organizations now actively participate in the work of the Sector, with 137 new Members since the last World Telecommunication Standardization Conference in 1996, the predecessor of WTSA-2000. New Members reflect the increasingly widening sphere of com-



ITU standards are important factors in today's market-place, where free trade is facilitating globalization and where convergence demands the integration of many different technologies

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munications-related activities, encompassing not only traditional telecommunication operators and equipment manufacturers but also service providers, software developers, and Internet service providers.

These figures clearly show that the industry not only values the ITU's unique contribution, but sees the organization as vital to the development of the telecommunication networks of this new millennium.

The balance of power

Despite the high level of support from the industry, a nagging issue that remains unresolved concerns the level of influence accorded to ITU's private sector Members, which make up a good two-thirds of the Union's total membership and contribute around 13 per cent of its budget.

The role of the private sector Members is therefore called to be redefined to better balance the rights with the obligations. There is a growing number of Members who believe that the decision-making functions of the ITU should reflect the modern, competitive telecommunications

Table 1
A growing ITU-T membership

	1997	1998	1999	2000
Recognized operating agencies	129	149	160	162
Scientific and industrial organizations	160	183	192	204
Other national entities	3	3	2	3
Regional and international organizations	36	38	38	38
Total	328	373	392	407

Note: Last updated on 3 August 2000.

environment in which the private sector plays the lead role while the regulatory agencies act as an arbitrator for the wider public interest. Once the decision-making balance in ITU between the public and private sectors has been revised, the financing balance should also be changed accordingly. At the same time, there is a need to ensure that ITU-T's standardization process is never seen as the captive of powerful private sector interests. It is a difficult balance!



Upgrading today's infrastructure with next-generation all-optical transmission systems is one of the key challenges facing operators

Photo: © 2000 PhotoDisc, Inc. (ITU 000050)

Headlong into the future

Looking ahead, the progress made in developing standards for new technologies, which are poised to form building blocks for tomorrow's high-speed networks, augurs well for the Sector. Its standards for ATM, ADSL, SDH, optical switching and wave division multiplexing (WDM) quickly spring to mind. In the case of IP-based systems, work is well under way in nearly all of the fourteen ITU-T Study Groups, with Study Group 13 leading the way. As for tomorrow's third generation (3G) mobile networks, standards defining enhanced management and security for IMT-2000 systems are slated as a major priority. Already, ITU-T has developed and approved important recommendations in the Q.1700 series, covering the interfaces that will form the basis for 3G mobile networks. For ITU-T Members like Jtec, the Union's commitment to technical excellence combined with impartiality and global approach will be the key to its future success. "An absence of partisan politics and the technical commonsense to separate genuine contributions from contributions prompted by a commercial desire to drive a monopoly position are vital. At the same time, ITU needs to go some way towards becoming a little more vendor friendly", says Mr Murray.

The last word goes to Mr Mills who states: "We believe the ITU has a very bright future as the pre-eminent global standards body. It has already demonstrated its ability to evolve in the face of rapidly changing industry needs. Equally importantly, there is recognition of the need for on-going reform, and a commitment at the most senior level to achieving that goal."