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Istanbul
The cradle of convergence

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Cover: View of the Bosphorus from the terrace of the Istanbul Convention and Exhibition Centre.
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New directions
for future work of ITU Radiocommunication Sector

Istanbul, the city that has long been a source of inspiration for culture (poetry, music and art) over the centuries, has also inspired greatly the first Radiocommunication Assembly (RA-2000) of the millennium which it hosted from 1 to 5 May. Radiocommunication assemblies are normally convened every two to three years, and may be associated in place and time with a world radiocommunication conference (WRC).

The Assembly, which was opened by the Turkish Minister of Transport and Communications, Enis Öksüz, took place under the Chairmanship of Eberhard George (Germany), assisted by four Vice-Chairpersons: Mark Krivocheev (Russia), Masayoshi Murotani (Japan), C. Merchán Escalante (Mexico) and Idrissa Samake (Mali).

In his opening remarks, Robert W. Jones, Director of the ITU Radiocommunication Bureau (BR) paid tribute to the Turkish Administration for their outstanding commitment to organize the Radiocommunication Assembly and the World Radiocommunication Conference in Istanbul.

Mr Jones added that this event was unique not just because it was the first ITU Radiocommunication Assembly to be held outside Geneva, but also because of the number of challenging issues that required the understanding and cooperation on the part of all, due to the very limited time available. "Many of these issues result from important changes decided by the Plenipotentiary Conference (Minneapolis, 1998) which require a continuous effort to make the activities of the radiocommunication study groups and, indeed the entire Sector, more efficient", he said.

ITU Secretary-General, Yoshio Utsumi, urged the Assembly to implement decisions of the Minneapolis Conference aimed at reinforcing the role of the Union in the telecommunications field. "There is no need to say that the ITU membership should play an active role in strengthening the Union's position in an environment where it is being challenged. This is a constant preoccupation for all of us. A number of important initiatives, such as the establishment of the Reform Advisory Panel, have been taken to this end. In the field of radiocommunication, new proposals and suggestions are also needed to achieve this goal and we must give the Council (ITU's governing body) and the next plenipotentiary conference good ideas to carry out the necessary changes", Mr Utsumi declared.

Istanbul, the city that has long been a source of inspiration for culture (poetry, music and art)

Photo: A. de Ferron (ITU 002151)

Concluding his remarks, the Secretary-General called on the Assembly "not to forget that ITU is the only organization where spectrum regulators, spectrum users, administrations, equipment manufacturers and service providers and others have established a worldwide forum to talk to each other. Many important projects which depend upon the work of the Radiocommunication Sector have now achieved global application. This can be said of *IMT-2000* (International Mobile Telecommunications-2000) and will certainly be the case for many more projects, the success of which will send a signal to the external world of the ever-increasing role of the ITU."

Enis Öksüz *(ITU 002014)*

Main issues for RA-2000

For five days the Assembly discussed the results of the work of the study groups of the ITU Radiocommunication Sector (ITU–R) in the period 1997–2000, further improvements to the working methods of the study groups, approval of recommendations, work programme (adoption of questions and setting of priorities, both for regular work and WRC-related activities), the structure of the study groups, including the Radiocommunication Advisory Group (RAG), the Conference Preparatory Meeting (CPM), and the Special Committee on Regulatory/Procedural Matters (SC).

RA-2000 took some landmark decisions on Voice over Internet Protocol (VoIP), IMT-2000, fixed-wireless access, mobile for developing countries and on some controversial recommendations dealing with sharing issues.

Working methods

The working practices of the Sector are covered by a series of resolutions, some of which were reviewed by the Assembly. Of greatest significance was the adoption of a fast-track approach for the adoption of technical recommendations when they do not have regulatory or policy implications nor to issues relevant to the work of radiocommunication conferences (which are treaty-making). This measure was in response to a resolution of the Minneapolis Conference (Resolution 82).

Until now, approval of recommendations (the standards developed by study groups) has been the exclusive province of the Member States, either at an assembly or, increasingly, by consultation in the period between two assemblies. In order to give the industry greater decision-making authority and achieve a shorter time-to-market for recommendations to better serve the needs of the market-place, Resolution 82 proposed that recommendations *which do not have regulatory and policy content* might be approved directly by study groups without the subsequent and lengthy step of formal adoption by Member States. Study groups are groups of experts from both industry and Member States who participate on an equal footing.

The Assembly had the onerous task of establishing categories, identifying what is regulatory and policy and what was not. Most delegations were in favour of the move while some Member States were somewhat cautious in this regard, feeling that national sovereignty and the intergovernmental nature of the organization would be at stake. The case was made that if indeed during the course of work a recommendation appeared to have some regulatory or policy impact, the study group would always have the possibility of reverting to the standard approval process.

After a protracted debate, agreement on the fast-track procedure was finally reached. A suitable categorization of the questions to which this procedure will apply will be carried out by each study group as soon as possible.

Radiocommunication Study Groups

Study Group 1 (Spectrum management)
Spectrum planning, utilization, engineering, sharing and monitoring
Chairperson: R. Mayer (United States)
Vice-Chairpersons: T. Jeacock (United Kingdom), N. Kisrawi (Syria) and A. Pavliouk (Russia)

Study Group 3 (Radiowave propagation)
Propagation of radio waves in ionized and non-ionized media and the characteristics of radio noise, for the purpose of improving radiocommunication systems
Chairperson: D. G. Cole (Australia)
Vice-Chairpersons: B. Arbesser-Rastburg (European Space Agency — ESA) and D. V. Rogers (Canada)

Study Group 4 (Fixed-satellite service)
Systems and networks for the fixed-satellite service and inter-satellite links in the fixed-satellite service, including associated tracking, telemetry and telecommand functions
Chairperson: Y. Ito (Japan)
Vice-Chairpersons: J. M. P. Fortes (Brazil), A. G. Reed (United Kingdom), J. Seseña Navarro (Spain) and Ms V. Rawat (Canada)

Study Group 6 (Broadcasting services)
Radiocommunication broadcasting (terrestrial and satellite), including vision, sound, multimedia and data services principally intended for delivery to the general public
Chairperson: A. Magenta (Italy)
Vice-Chairpersons: S. Glotov (Ukraine), V. Stepanian (Islamic Republic of Iran), K. M. Paul (India), J. Kumada (Japan), H. Kussmann (Germany), L. Olson (United States), J. A. Flaherty (North American Broadcasters Association — NABA) and R. Najm (Arab States Broadcasting Union — ASBU)

Study Group 7 (Science services)
Systems for space operation, space research, earth exploration and meteorology, including the related use of links in the inter-satellite service; radioastronomy and radar astronomy as well as dissemination, reception and coordination of standard-frequency and time-signal services, including the application of satellite techniques on a worldwide basis
Chairperson: R. M. Taylor (United States)
Vice-Chairpersons: G. De Jong (Netherlands), V. Meens (France), M. B. Vasiliev (Russia) and R. Jacobsen (Australia)

Study Group 8 (Mobile, radiodetermination, amateur and related satellite services)
Systems and networks for the mobile, radiodetermination and amateur services, including related satellite services
Chairperson: C. Van Diepenbeek (Netherlands)
Vice-Chairpersons: T. Mizuike (Japan), R. L. Swanson (United States) and V. A. Strelets (Russia)

Study Group 9 (Fixed service)
Systems and networks of the fixed service operating via terrestrial stations
Chairperson: V. M. Minkin (Russia)
Vice-Chairpersons: A. Hashimoto (Japan), H. Mazar (Israel) and K. Medley (United States)

Special Committee on Regulatory/Procedural Matters (SC)
Chairperson: J.-P. Huynh (France)
Vice-Chairpersons: L. W. Barclay (United Kingdom) and P. García Barquero (Spain)

Conference Preparatory Meeting (CPM)
Chairperson: E. George (Germany)
Vice-Chairpersons: Ms V. Rawat (Canada) and M. Ghazal (Lebanon)

Special Committee on Regulatory/Procedural Matters (SC)
Chairperson: F. Rancy (France)
Vice-Chairpersons: F. Williams (United States) and S. Balakrishnan (India)

Radiocommunication Advisory Group (RAG)
Chairperson: B. Gracie (Canada)
Vice-Chairpersons: A. I. Kushtuev (Russia), I. Samake (Mali) and W. Luther (United States)

Approval of recommendations

In comparison with previous assemblies, there were fewer recommendations submitted for approval as a great majority were adopted through the consultation process when they had been agreed at study group level. The Assembly had nevertheless, some 90 draft new or revised recommendations on the table spanning a range of issues involving spectrum management, sharing criteria and system specification and in particular the landmark agreement on the IMT-2000 specifications for the air radio interfaces.

Rights of Associates

The Radiocommunication Sector will be the first to implement a decision of the Minneapolis Conference calling for the establishment of a new category of participants in ITU work. Known as Associates, this category was created to draw on the knowledge and expertise of entities when mutual interests exist. The creation of this new category also aims at encouraging greater participation in the work of ITU by smaller companies, institutions and organizations with highly focussed areas of activity.

Thanks to a decision of RA-2000, interested entities or organizations will now be able to join the Sector as Associates, and be entitled to take part in the work of a selected single study group and its subordinate groups (working parties, joint working parties, task groups and joint task groups). Associates will therefore be able to participate in meetings, submit contributions and provide comments before the adoption of recommendations. In addition, Associates will be able to take part in the process of preparing recommendations within a single study group. They will however not be entitled to vote, should the case arise.

In defining these rights, the Assembly has further invited the Council to determine a financial contribution for Associate membership to share in defraying the expenses of the Sector and the study group concerned.

Structure of radiocommunication study groups

Considering convergence between technologies in use for several types of radio services where the distinction between services and applications is increasingly blurring, RA-2000 decided to merge the sound broadcasting study group (formerly Study Group 10) and the television broadcasting study group (formerly Study Group 11) into a new one (Study Group 6), reducing the total number from eight to seven.

This much-talked about merger had been controversial in the past, but agreement was finally reached, having found a compromise on the scope of the new study group, in particular as regards matters on the "borderline" between ITU–R and the ITU Telecommunication Standardization Sector (ITU–T).

The new study group will be responsible for satellite and terrestrial broadcasting from end-to-end including vision, sound, multimedia and data services. In particular, it will study those aspects related to production and radiocommunication including the international exchange of programmes as well as the performance of the overall delivery chain to the general public.

Both the new structure and scopes of the study groups are shown on page 3. The work of these study groups involves developing technical, operational and procedural bases for efficient use of the radio spectrum and the geostationary-satellite orbit.

Further, the Assembly appointed or confirmed the chairpersons and vice-chairpersons for the Study Groups, the Conference Preparatory Meeting (CPM), the Special Committee on Regulatory/Procedural Matters (SC), the Radiocommunication Advisory Group (RAG) and the Coordination Committee for Vocabulary (CCV); it also confirmed the eight-year maximum term of office for chairpersons as it was felt that this duration provided stability and continuity in the work while offering opportunities for bringing to the Sector fresh talents and expertise. However, the term of office for the chairperson and vice-chairperson of the Radiocommunication Advisory Group was reduced to four years as different factors applied for RAG than for study groups.

Work programme of ITU–R study groups

The work programme approved for the next study period contains some 340 questions with their priority and urgency for completion of studies. It includes studies on matters related to agenda items of WRCs or requested by WRC resolutions. ■

Deputy Prime Minister of Turkey opens **World Radiocommunication Conference**

The World Radiocommunication Conference (WRC-2000) was opened on 8 May by the Deputy Prime Minister of Turkey, Devlet Bahçeli, at the brand-new Istanbul Convention and Exhibition Centre (ICEC). Some 1342 participants from 121 countries attended the opening ceremony. In Istanbul, there were as many delegates at the beginning of the conference as there were at the end of the first week of WRC-97. This large attendance reflects the ever-growing importance of the world of radiocommunications.

Istanbul itself, a city with such a fascinating history and situated at the crossroads between Europe and Asia, is an appropriate reminder of the progress that can be made in terms of the incredible advances in technology, many of which will depend on the outcome of WRC-2000.

High on the conference agenda are the need for additional spectrum to facilitate the expansion

Istanbul, a city with such a fascinating history and situated at the crossroads between Europe and Asia

Photo: A. de Ferron (ITU 002153)

of existing services as well as to foster development of brand-new technologies and applications and questions of regulatory procedures and the equitable use of the spectrum. As some parts of the spectrum become intensively used, the conference is required to ensure that all services can share safely without harmful interference.

Like previous conferences WRC-2000 has been set a punishing agenda: a significant number of difficult and often conflicting issues within which there are many potential problem areas. Its task has been made all the heavier by the very large volume of documentation — so large in fact that the often talked about paperless society may remain an illusion. Some delegates are already comparing this conference to the marathon World Administrative Radio Conference held in 1979 (WARC-79) because of its extremely full agenda with no less than 21 items to cover the various issues to be tackled. The difference is that WARC-79 lasted seven weeks!

Devlet Bahçeli *(ITU 002030)*

The entrance of the Istanbul Convention and Exhibition Centre

Photo: A. de Ferron (ITU 002152)

WRC-2000 should however be helped by the extensive preparations carried out individually and collectively. Proposals were prepared, and reworked through many iterations. Groupings such as the European Conference of Postal and Telecommunications Administrations (CEPT), the Inter-American Telecommunications Commission (CITEL), the Asia-Pacific Telecommunity (APT), the Africa Group, and the Arab States Group, have all worked hard to harmonize positions and proposals.

In his opening address, the Deputy Prime Minister of Turkey, stated that one of the recent milestones in the telecommunication sector of Turkey had been the establishment of a new independent regulatory authority which will play a vital role in regulating the telecommunication sector soon to be deregulated. "Turkey will introduce competition by the end of 2003 when the State monopoly will come to an end", Mr Bahçeli said.

The ITU Secretary-General, Yoshio Utsumi, paid special tribute to the Turkish Government and its partners for their generous and outstanding support in hosting WRC-2000, which is also the first major ITU conference in the new millennium. "At a time when two big natural disasters have presented enormous challenges to them, we can imagine how hard they must have worked to prepare for this conference. We are very proud of being able to hold this millennium event in a city that has, for many centuries, been a symbol of bridging continents, different cultures and people — just as telecommunications do today", the Secretary-General said.

He further referred to WRC-2000 as the first ITU conference to operate under the revised provisions of the Union's Constitution, Convention and Rules of Procedure adopted at the Minneapolis Plenipotentiary Conference in 1998. Of significance in this regard, is the participation, as observers, of Sector Members in their own right. Mr Utsumi added that the ITU was considering further reforms of this kind to ensure that the organization remains relevant in the face of the changing demands of today's environment.

In his opening address, the Minister of Transport and Communications, Enis Öksüz remarked that the number of players in the field of radiocommunications and their interests and requirements were growing every day, as were the demands on ITU and its constituent bodies. "Like all other countries, naturally we do not want to remain behind all these developments in the world. That is why we thought that ITU activities should be spread out all over the world. We are happy that we are able to serve humanity by hosting this conference in Turkey", the Minister said.

The large attendance reflects the ever-growing importance of the world of radiocommunications

Photo: A. de Ferron (ITU 002040)

Yoshio Utsumi paid special tribute to the Turkish Government and its partners for their generous and outstanding support in hosting WRC-2000

(ITU 002018)

Conference structure

Chairperson: F. M. Yurdal (Turkey)

Vice-Chairpersons:

Region A: Ms G. Schoettler (United States)
Region B: J. S. Strick (Germany)
Region C: L. Reyman (Russia)
Region D: I. Samake (Mali) and A. Berrada (Morocco)
Region E: H. Ishihara (Japan)

Statutory Committees

Committee 1 — Steering Committee
This committee is composed of the Chairperson and Vice-Chairpersons of the Conference and of the Chairpersons and Vice-Chairpersons of the Committees and Working Groups of the Plenary.

Committee 2 — Credentials Committee
Chairperson: M. T. Abu (Nigeria)
Vice-Chairperson: R. Chen (China)

Committee 3 — Budget Control Committee
Chairperson: B. Gracie (Canada)
Vice-Chairperson: M. Tabeshian (Islamic Republic of Iran)

Committee 6 — Editorial Committee
Chairperson: L. Bourgeat (France)
Vice-Chairpersons: M. Johnson (United Kingdom) and C. Menéndez Argüelles (Spain)

Principal Committees

Committee 4 — Regulatory and associated issues
Chairperson: H. Railton (Radio Regulations Board — RRB)
Vice-Chairpersons: N. Kisrawi (Syria) and L. Petzer (South Africa)

Working Group 4A
Chairperson: N. Kisrawi

Working Group 4B
Chairperson: Ms A. Allison (United States)

Committee 5 — Allocations and associated issues
Chairperson: C. Van Diepenbeek (Netherlands)
Vice-Chairpersons: H. K. Al-Shankiti (Saudi Arabia) and H. Fernández Macbeath (Cuba)

Working Group 5A
Chairperson: A. Jamieson (New Zealand)

Working Group 5B
Chairperson: T. Mizuike (Japan)

Working Group 5C
Chairperson: D. Jansky (United States)

Working Group 5D
Chairperson: J. Leary (Japan)

Working Group 1 of the Plenary
Chairperson: R. Zeitoun (Canada)
Vice-Chairpersons: S. Djematene (Algeria) and A. Frederich (Sweden)

Working Group 2 of the Plenary
Chairperson: E. George (Germany)
Vice-Chairperson: A. Zourmba (Cameroon)

Also attending the opening ceremony were Erkan Mumcu, Minister of Tourism, Osman Durmus, Minister of Health, Erol Gakir, Governor of Istanbul, Ali Müfit Gürtuna, Mayor of Istanbul, and Mustafa Sarigül, Mayor of Sisli.

At the first Plenary Meeting held immediately after the opening ceremony, the Conference elected as Chairperson of WRC-2000, Fatih Mehmet Yurdal, Chairman of the Board, Telecommunications Authority of Turkey.

In his statement, Mr Yurdal appealed to all participants to work efficiently and in harmony with each other because of their heavy responsibility: the decisions they take will have a major impact on the life of all the world's inhabitants in the 21st century.

The Director of ITU's Radiocommunication Bureau, Robert W. Jones, on his part, stated that the processing of satellite network filings was one significant issue on which immediate action was needed, as the situation had become totally unacceptable. "The Bureau has done much to continue streamlining its work but the filings now awaiting processing represent close to three years work, even if no further filings were to be made", Mr Jones said. "The kind of streamlining of work that we in the Bureau can undertake within the current Radio Regulations can lead to only marginal improvements. Regulatory changes are necessary to have a more significant and more immediate impact. I hope that you will agree with me that this situation has to be corrected if the ITU is to maintain its credibility in this fundamental role", he also said. He expressed the hope that this Conference would be able to tackle the complexity of the current regulatory framework and provide the means for the required improvement. "WRC-2000 is probably the last effective opportunity to do so", he cautioned.

Regulatory changes are necessary to have a more significant and more immediate impact, declared Robert Jones

(ITU 002034)

From left to right: R. W. Jones, O. Durmus, Y. Utsumi, E. Öksüz, R. Blois and E. Mumcu during the opening remarks of D. Bahçeli

Photo: A. de Ferron (ITU 002039)

The conclusions of WRC-2000 will be published in a future issue of *ITU News*. ■

ITU joins MoU on **e-commerce**

The International Telecommunication Union signed a Memorandum of Understanding on electronic business, joining three leading international standards-setting organizations already party to the MoU, namely the International Electrotechnical Commission (IEC), the International Organization for Standardization (ISO) and the United Nations Economic Commission for Europe (UN/ECE). In addition to the four signatories, CALS* International and NATO CALS participate in implementation of the MoU as registered international user groups.

"The purpose of the MoU is to minimize the risk of divergent and competitive approaches to standardization, avoid duplication of efforts and avoid confusion amongst users", said Houlin Zhao, Director of ITU's Telecommunication Standardization Bureau (TSB) when signing the agreement on 24 March 2000. "The MoU will also provide greater intersectoral coherence in the field of electronic business, an important step considering the uptake of e-commerce", he added.

Yves Berthelot, Executive Secretary to UN/ECE, stressed that the participation of ITU is essential to secure the interoperability required by the network economy. "When countries adopt international standards and harmonize their technical regulations worldwide, everybody stands to gain. Moreover, the development of technical instruments shared by all countries facilitates and strengthens their involvement in harmonious economic relations. This vital role of international standards as the technical

From left to right (seated): R. Herreman for Lou Kratz, Chairperson, NATO CALS Management Board; R. Esposito, Chairman, CALS International; Y. Berthelot, Executive Secretary, UN/ECE; H. Zhao,Director, Telecommunication Standardization Bureau; L. D. Eicher, Secretary-General, ISO; A. Amit, General Secretary, IEC

Photo: A. de Ferron (ITU 000027)

* Continuous Acquisition and Life-Cycle Support (CALS) is defined as a strategic management concept that uses the best available information technology, management methods and international standards to increase the effectiveness of organizations. It allows enterprises to be integrated on a worldwide basis thereby facilitating electronic commerce within and between organizations.

foundation for the global market is explicitly recognized by the World Trade Organization", he said.

The MoU establishes a coordination mechanism under a unique cooperative model to produce mutually supportive standards required in business transactions (data interchange and interoperability) as well as products design and manufacturing to meet the urgent needs of both the industry and the end-users. Electronic business covers the information definition and exchange requirements within and between enterprises, including customers. Given that it provides the vital framework for e-commerce, the MoU is intended to support this rapidly changing and fast growing business sector.

ISO Secretary-General, Lawrence D. Eicher, commented: "This MoU is an excellent practical example of greater partnership between the governmental and private sectors. It lays the foundation for a healthy future development of e-commerce to the benefit of all stakeholders."

Under the MoU, the four organizations undertake to review their standardization activities and develop a joint, coordinated programme for standards development and publication which will benefit the market-place.

The MoU is open to other international, regional, governmental, industry and consumer organizations whose core mission involves standards-setting.

For more information, please contact:

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New edition of **ITU–T Recommendation X.509**

Study Group 7* of ITU's Telecommunication Standardization Sector (ITU–T) approved a new edition of Recommendation X.509. This recommendation is a broadly accepted standard suitable for many environments, providing an economy of scale that allows e-commerce transactions and communications to be secured as rigorously as needed — from consumer transactions with limited risk, to mission critical business-to-business transactions.

Recommendation X.509 is viewed throughout the information technology (IT) industry as the definitive reference for designing applications related to public key infrastructures (PKI). The elements defined within Recommendation 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.

"The ITU is pleased that study has begun towards enriching Recommendation X.509 to better support the use of public key and attribute certificate frameworks in both

* This study group, where work on the new standard was carried out, is the Lead Study Group for open distribution processing (ODP), frame relay and communication systems security. It is also responsible for studies concerning data communications, data networks and open system communications.

resource constrained such as wireless communications and business-to-business environments including Web-based e-commerce as well as business-to-business services and protocols", said Houlin Zhao, Director of TSB.

Recommendation X.509, in specifying public key and attribute certificate frameworks, is also one of the premier elements of the X.500-series of directory recommendations.

The elements defined within Recommendation 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

Houlin Zhao *Photo: A. de Ferron (ITU 000028)*

This new edition, developed in close co-operation with ISO/IEC and ISOC/IETF (Internet Society/Internet Engineering Task Force), supersedes and replaces the 1997 edition. It contains specific enhancements to public key certificates to support the correct processing of certification paths that involve multiple certification authorities within multiple enterprises, as well as enhancements in the area of certificate revocation.

It also contains a significant enhancement to attribute certificates and definition of the framework for privilege management infrastructure (PMI). Attribute certificates will play a major role in addressing the complex security issues of access control and authorization globally. They are a standardized mechanism for defining user access privileges in a multi-vendor, multi-application environment. These issues are just now coming to the attention of IT planners, as organizations move their mission-critical business relationships to the Web.

"As the Recommendation X.509 was there anticipating the rapidly growing needs of electronic commerce, we expect that this new edition will be critical in meeting the need to protect enterprise resources. It will likely be a best seller among ITU–T recommendations", said Hoyt L. Kesterson II, chair of the working group that develops the X.500-series recommendations.

"The addition of a framework for PMI, and refinements to certification path processing will play a major role in establishing the foundation for business-to-business electronic commerce growth. This telecommunications standard has been universally adopted by the computing industry and we believe it is one of the ITU–T's single most important works", said Sharon Boeyen, the editor of Recommendation X.509.

For further information, please contact:

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ITU agrees on **key IP standard**

The ITU has approved an important new standard specifying the transport of Internet Protocol structured signals over public networks based on the asynchronous transfer mode (ATM) technology.

The new standard known as ITU–T Recommendation Y.1310 (Transport of IP over ATM in public networks) is the second major IP-related standard issued by the ITU–T Study Group 13*. In 1999, the study group completed Recommendation Y.1540, which defines performance parameters for quantifying IP network performance.

"This important new standard was achieved through the cooperation of all industry sectors and incorporates selected protocols developed by the ISOC/IETF [Internet Society/Internet Engineering Task Force]. It provides a common basis for interworking Internet and IP-based applications between different networks and different vendors in the public domain", said Brian Moore, Chairman of Study Group 13.

These standards are a major step forward for the ITU–T in moving telecommunication networks towards integration with the Internet, and other IP-based networks, to improve global opportunities for integrated voice, data, image and video communication. They form part of a Y-series of recommendations devoted to IP-related issues including architecture, access, transport, performance and signalling aspects.

Brian Moore *(ITU 000029)*

"This important new standard was achieved through the cooperation of all industry sectors and incorporates selected protocols developed by the ISOC/IETF. It provides a common basis for interworking Internet and IP-based applications between different networks and different vendors in the public domain", said Brian Moore

For further information, please contact:

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* This study group, where work on the new specification was carried out, is the Lead Study Group on IP-related standards activities responsible for standards development in the area of general network aspects.

From official sources

INSTRUMENTS AMENDING THE CONSTITUTION AND THE CONVENTION OF THE ITU (MINNEAPOLIS, 1998)

The Government of the **Republic of Korea** has accepted the above-mentioned Instruments amending the Constitution and Convention.

The Governments of the **Confederation of Switzerland** and the **Socialist Republic of Viet Nam** have ratified the above-mentioned Instruments amending the Constitution and Convention.

The instruments of acceptance and ratification were deposited with the General Secretariat of the Union on 31, 21 and 2 March 2000, respectively.

FINAL ACTS OF WRC-97

The Government of the **Confederation of Switzerland** has ratified the above-mentioned Acts.

NEW MEMBERS

Development Sector

Administración Nacional de Telecomunicaciones (ANTELCO) (Asunción), CKM HOLDING (Casablanca, Morocco), Egyptian Company for Networks (Egynet) (Cairo), Federation of Hellenic Information Technology Enterprises (Athens), InterCross AG (Zurich, Switzerland), as from 1 July 2000, *Mascom Wireless Botswana (Pty) Ltd. (Gaborone), Misrfone Telephone Co. (Cairo), Nokia UK Limited (Farnborough, United Kingdom), SYSTEL (Cairo), Technology for Communications International (TCI) (Sunnyvale, CA)* and *UPLINE SECURITIES S.A. (Casablanca, Morocco)* have been admitted to take part in the work of this Sector.

Radiocommunication Sector

ArrayComm, Inc. (San Jose, CA), Astrolink International LLC (Bethesda, MD), Boeing Aerospace UK Ltd. (London), EUMETSAT — European Organisation for the Exploitation of Meteorological Satellites (Darmstadt, Germany), GE Capital Satellites (Gibraltar) Limited (London), Hanaro Telecom, Inc. (Seoul), Nokia, Inc. (Irving, TX), Nokia UK Limited (Farnborough, United Kingdom), PanAmSat (Washington, D.C.), Siemens Information and Communication Networks SpA (Settimo Milanese, Italy), Sprint PCS (Overland Park, KS) and *Swedish Space Corporation (Solna, Sweden)* have been admitted to take part in the work of this Sector.

Standardization Sector

Administración Nacional de Telecomunicaciones (ANTELCO) (Asunción), Astrolink International LLC (Bethesda, MD), Haiti International Telecommunication S.A. (HAITEL S.A.) (Pétion-Ville, Haiti), Hanaro Telecom, Inc. (Seoul), Next Level Communications (Parsippany, NJ), Nokia UK Limited (Farnborough, United Kingdom), Sican GmbH (Hannover, Germany), Siemens Information and Communication Networks SpA (Settimo Milanese, Italy), SOLTEL GmbH (Munich, Germany) and *Velocity Communication, Inc. (Fremont, CA)* have been admitted to take part in the work of this Sector.

New denominations

Ameritech Corporation, Inc., which participates in the work of the Standardization Sector has merged with **SBC Communications, Inc**.

Japan Satellite Systems, Inc., which participates in the work of the Radiocommunication Sector has changed its name. The new denomination is: **JSAT Corporation**.

Marconi S.p.A., which participates in the work of the Radiocommunication and Standardization Sectors has changed its name. The new denomination is: **Marconi Communications S.p.A**.

NTT Mobile Communications Network, Inc., which participates in the work of the Radiocommunication and Standardization Sectors has changed its name. The new denomination is: **NTT DoCoMo, Inc**.

SBC Technology Resources, Inc., which participates in the work of the Radiocommunication Sector has changed its name. The new denomination is: **SBC Communications, Inc**.

The New ITU Association of Japan, Inc., which participates in the work of the Development, Radiocommunication and Standardization Sectors has changed its name. The new denomination is: **The ITU Association of Japan, Inc**.

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(CD-ROM single user)
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Telecommunication Standardization Sector

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ITU–T Recommendation G.711 Appendix I (09/99)
Pulse code modulation (PCM) of voice frequencies
Appendix I: A high quality low-complexity algorithm for packet loss concealment with G.711
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(12.3.00–8.4.00)
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(19.3.00–18.4.00)
Carrillo W. (Ecuador)
Consultant in basic technical routing plans
(26.3.00–22.4.00)
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Consultant in fundamental technical plans for synchronization
(30.4.00–29.5.00)

• Bosnia and Herzegovina (Sarajevo)
Cox R. (United Kingdom)
Senior expert in numbering plan
(28.3.00–1.4.00)

• Cape Verde (Praia)
Carrier C. (France)
Consultant in training
(24.4.00–8.5.00)
Saibou M. (Niger)
Consultant in training
(29.4.00–6.5.00)

• Costa Rica (Moravia)
Coto González C. (Costa Rica)
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(24.4.00–8.7.00)

• Dem. Rep. of the Congo (Kinshasa)
Batchalinge Saidi A. (Dem. Rep. of the Congo)
National expert in financial management
(20.3.00–28.4.00)
Mbalanda Kisoka P. (Dem. Rep. of the Congo)
National expert in telecommunication regulation
(20.3.00–28.4.00)
Mbobi Mokhoo A. (Dem. Rep. of the Congo)
National expert in the organization of telecommunications
(20.3.00–28.4.00)
Gnon B. (Côte d'Ivoire)
Senior expert in network interconnection
(28.3.00–14.4.00)

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Chillón Medina J. (Spain)
Consultant in processes leading to the global information society
(26.3.00–7.5.00)

• Ethiopia (Addis Ababa)
Yitamben Mankamte G. (Cameroon)
Senior expert in rural telecommunications planning with gender expertise
(19.4.00–27.4.00)

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Africa joins the Internet Age

Tim Kelly
Coordinator, Strategies and Policy Unit (SPU)
International Telecommunication Union

In March 2000, Eritrea joined the Internet. Drawing upon funds donated by USAID's Leland Initiative, the Eritrean public telecommunication operator, *TSE*, established an international gateway providing satellite connectivity for the country's 300 or so dial-up Internet subscribers. The significance of this event is that it means that now, all 54 countries and territories of Africa have direct access to the Internet (although Liberia has temporarily lost its connection). Previously, countries like Eritrea had been served by store and forward e-mail service only, or through expensive international dial-up connections.

54 countries and territories of Africa have direct access to the Internet

Photo: A. de Ferron (ITU 990116)

Eritrea's advent to the Internet may not have had any noticeable effect of the market valuations of the so-called "dot.com" companies that garner most of the hype generated by the Internet. Nor did the extra traffic generated from the 29 kbit/s of bandwidth which is currently available have much impact on the many gigabytes of traffic which is transported each second over the worldwide Internet. Nevertheless, Eritrea's entry means that the Internet is a little bit less of an exclusive club. Eritrean expatriates living outside the country have long been using the Web as a means of exchanging information about their country. Now they can also post links to websites of organizations within the country. Eritrea's own citizens also now have access to the billion or so Web pages that have been created worldwide over the last decade.

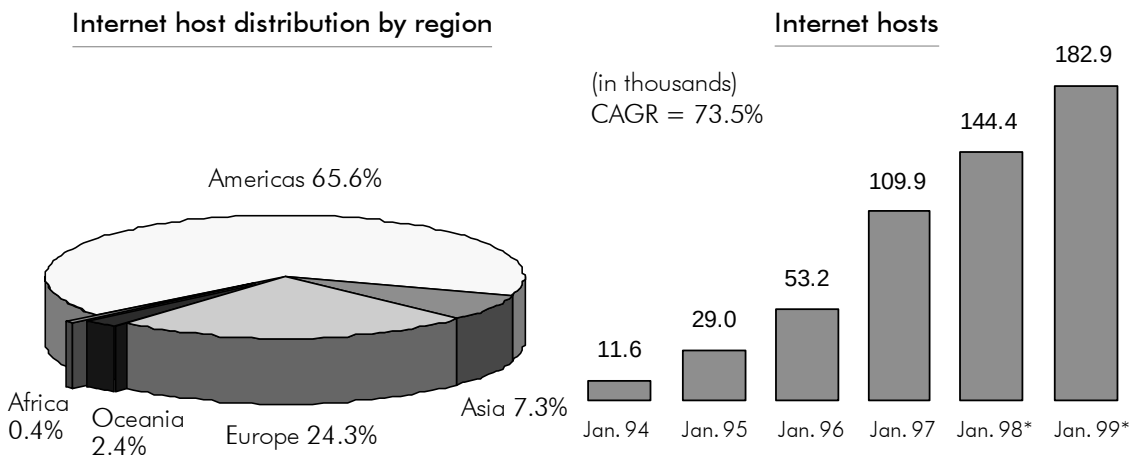
Nevertheless, the gap between Africa and the rest of the world with regard to Internet connectivity remains huge (see Figure1). Africa's 600 000 or so Internet users account for around 0.4 per cent of the world's total, whereas Africa's 760 million inhabitants constitute almost 13 per cent of the world's total. Furthermore, the rate of growth in Internet host computers in Africa, around 73 per cent per year in the latter half of the 1990s, while still impressive, is much slower than that achieved in Latin America or Asia-Pacific.

Even within Africa, disparities persist. Almost 90 per cent of African Internet users are in South Africa. South Africans enjoy by far the best connectivity on the continent, and have some of the lowest prices, with typical Internet prices as low as USD 10 per month for dial-up access.

But there are signs of growth in other countries. ITU starts a round of Internet diffusion studies, examining how the Internet has grown in different countries around the world, and what are the obstacles that might be hindering its con-

tinued growth. Uganda was one of the countries chosen in the first round of studies. One of the most liberal markets in Africa and one of the first countries in which the number of mobile subscribers has overtaken fixed-line users (see Figure 2), Uganda is poised to become a unique laboratory for the development of mobile Internet.

ISP, *Swift Global*. This should lead to a greater degree of price competition than exists at present. The average monthly charge for Internet access is around USD 50; even before telephone charges are taken into account. If this figure can be reduced to close to the world average (between 10 to 20 dollars), then the Ugandan



* From 1998 onwards, a modified methodology was used to allocate a proportion of hosts under generic top-level domains (e.g., com) to countries on the basis of .com registration data. Consequently, there is a break in the series between 1997 and 1998. There are around four Internet users for each host computer.

Source: ITU "Challenges to the Network 1999: Internet for Development", available at: http://www.itu.int/ti/publications/INET_99/index.htm. Internet Software Consortium at: http://www.isc.org.

Figure 1 — The Internet in Africa (distribution of host by region, January 1999, and number of Internet hosts in Africa, 1994–1999)

Already, the primary means of corporate access to the Internet is from microwave radio access and access from *GSM* data services is widespread. With both cellular operators poised to enter the market, and with the newly-privatized incumbent, UTL, planning to start a third mobile service, the likelihood is that mobile may become the primary form of Internet access within the next five years.

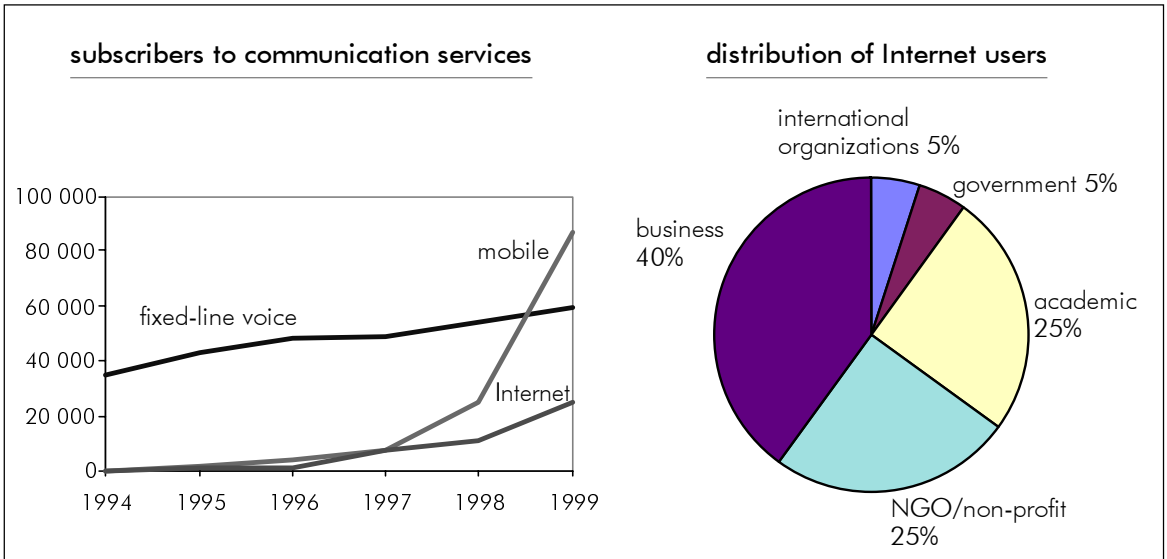
The Internet market in Uganda is already lively with two major Internet service providers (ISP), two minor ones, and four others licensed, but not yet providing service. In March 2000, Africa Online, the largest ISP on the continent outside South Africa, announced its entry into the Ugandan market by taking over the second-largest market could experience a similar boom to that which the mobile sector is currently enjoying.

Together, the four active ISPs had some 4100 accounts at the start of 2000, which probably equates to around 25 000 users (see Figure 2). There are hardly any individual users accessing the Internet from home in Uganda. Instead, the main user groups are the business sector, the universities and non-governmental organizations working in the country. The vast majority of these are in Kampala. There are no points of presence in other parts of the country, which means that users outside the capital must use expensive dial-up connections, which greatly increases the cost of Internet access. Indeed, in some of the more remote parts of the country, HF radio is

used for providing e-mail connectivity, albeit at very low speeds.

One of the reasons the Internet has grown relatively rapidly in Uganda is because the government has liberalized VSAT (very small aperture terminals) data market. VSATs are used by ISPs to peer with Internet exchange points in other countries, as there are no peering points in the country itself. The ability to use VSATs also means that the ISPs do not have to rely upon the high-priced international leased line services provided by UTL, which is itself poised to enter the ISP market. In other African countries, which have not yet liberalized access to international connectivity, the high prices charged by incumbents are a major constraint on market expansion.

The lessons from Uganda are one of the experiences that will be related at the African Telecoms and Internet Summit*, being held in Banjul (Gambia), from 5 to 9 June 2000. The meeting, which will be conducted in English and French, is being organized jointly by the ITU and the Commonwealth Telecommunication Organization. It will bring together policy-makers, regulators, Internet service providers and public telecommunication operators from across the continent to discuss how to expand access to the Internet in Africa. In addition, international organizations and funding agencies will also be participating to share information on the many different initiatives that are currently being undertaken across the continent. The goal is to ensure that, now that all of Africa is online, a greater number of Africans can participate in the "new economy" to which the Internet is giving birth and can use the Internet to narrow the digital divide which has, for too long, separated Africa from the rest of the world. Surely that is not too ambitious a goal for the start of a new millennium!



Note: The fixed-line voice and mobile subscribers are as reported by the operators. The Internet users are an ITU estimate based on number of accounts reported by ISPs.

Source: Left chart: ITU estimates. Right chart: Charles Musisi (Network Start-up Resource Center).

Figure 2 — Internet users in Uganda (number of subscribers to communication users and estimated Internet users, 1994–1999, and classification of Internet users, March 1999)

* For more information concerning the African Telecoms and Internet Summit, please visit the ITU websites at: http://www.itu.int/africainternet2000 and http://www.itu.int/ti/casestudies/.

❑ **Mobile data market in Western Europe ready for take-off.** According to the International Data Corporation (IDC), the mobile data market in Western Europe is finally ready for widespread deployment as the pieces of the puzzle begin to fall into place. As a number of key technologies, such as general packet radio services (GPRS), wireless application protocol (WAP), and unified messaging are being launched by European operators, the opportunity for high-speed mobile data services is set to explode in the medium term.

Over the next few years, packet data will take over circuit-switched data on the mobile network as the main data platform, and this will enable a number of new applications to be made available to users both in the business sectors and for consumers. WAP will initially be the main driver of mobile data as more operators launch and promote their services. Some operators have already taken the lead and are targeting the youth market with prepaid WAP phones. This method will see the fastest uptake of WAP technology. Business users will initially be interested in the high-speed data services that will begin to be launched in the third and fourth quarter of 2000 — although widespread usage is not forecast until at least 2001.

WAP has been criticized and labelled an interim technology, and this is the case. In the same way a Pentium 300 processor or Windows 95 are interim technologies. WAP will develop into something greater than it is now, but at the moment it is the only option available to deliver Web or interactive content to mobile phones, so it cannot be ignored or dismissed, argues IDC's report, *Mobile data in Western Europe: applications on the move — Analysis and forecast, 1999–2004*.

Mobile commerce services will remain a niche market for a few more years until secure and reliable transactions can be enabled. However, this market will potentially be huge, with IDC forecasting the value of mobile commerce transactions in Western Europe to top USD 37 billion in 2004. The report states that these services are one of the real killer applications for mobile data and that mobile commerce will continue the trend that we have seen with e-commerce, to move more transactions out of the real world into the virtual one. Although clearly limited by the screen and input mechanism, mobile commerce has the ability to bring the buyer and seller together at the time that the service is required — not when they are behind the PC or in the shop, the report says. — *IDC*.

❑ **InnoWave to supply broadband wireless systems to Telefónica Argentina.** InnoWave ECI Wireless Systems Ltd., a fully-owned subsidiary of ECI Telecom Ltd., has been chosen by *Telefónica Argentina* to supply new point-to-multipoint fixed wireless access *WaveGain* systems. Telefónica Argentina will deploy these systems to deliver broadband services to thousands of residential and business subscribers in North Argentina.

ECI Telecom was awarded the USD 37 million frame contract through its distributor in Argentina, *PLANEX S.A.*, following a competitive bidding process. — *ECI Telecom*.

❑ **EMS Technologies completes satellite broadband access tests.** EMS Technologies, Inc. has announced that it has completed the world's first DVB-RCS (digital video broadcast-return channel via satellite) closed loop broadband satellite access tests, paving the way for high-speed wireless Internet access via satellite.

DVB-RCS is an international open standard for multimedia satellite networks, which defines return channel via satellite using low-cost user terminals capable of return data rates in excess of 2 Mbit/s. The forward-link data transmission rate is up to 40 Mbit/s.

This new technology features broadband connectivity for user uplinks at speeds of up to 35 times the current 56.6 kbit/s of terrestrial modems, downlink speeds of up to 40 Mbit/s, and the ability to support multiple numbers of subscribers per satellite transponder.

EMS also formalized the schedule to supply a full DVB-RCS demonstration system by the end of June 2000 to (*Société européenne des satellites* — SES), the Luxembourg-based operator of ASTRA, Europe's satellite system for direct-to-home transmission of television, radio and multimedia. This is a precursor to the delivery of a fully operational system by the end of 2000. EMS will supply the critical hub technologies as well as

the end-user terminals under the agreement with SES. Neither SES nor EMS are releasing financial terms of the contract. — *EMS*.

❑ **SMEs to account for 70 per cent of growth in telecommunication revenues.** Over 70 per cent of the growth in European data services in the next five years will come from small- and medium-sized enterprises, according to a new report from telecommunications consultancy Analysys.

The report, *Next generation networks: delivering services for SMEs*, forecasts that growth in delivering data services to SMEs will far outstrip the growth in delivering similar services to large corporates. Analysys estimates that data revenues from SMEs will rise from their current USD 8 billion in 2000 to 19 billion by 2005, while the corporate market will remain relatively static, increasing from 18 to 22 billion over the same period.

This dramatic increase will come as operators and service providers take advantage of the opportunities provided by the new Internet Protocol (IP) technologies. These enable operators to deliver a range of services that previously have been available to corporate users but unaffordable by most SMEs.

The report identifies Internet service providers (ISP), application service providers (ASP), competitive local exchange carriers (CLEC) and data value-added resellers (VAR) as key new suppliers. They will be able to use new local access technologies such as digital subscriber line (DSL) and cable modems to break the access bottleneck and offer far more cost-effective high bandwidth than the current ISDN or leased line solutions currently on offer from traditional telecommunication operators. Analysys estimates that by 2005, DSL and cable modems will overtake the slow and expensive ISDN or dial-up technologies that currently account for almost 90 per cent of SME connections. — *Analysys*.

❑ **Barclays PLC signs Internet Protocol deal with BT.** Barclays PLC has announced that it has signed a five-year deal with BT worth some GBP 250 million for the provision and service of an Internet Protocol (IP) based network. An IP network will enable all Internet traffic to flow freely, and at speed, across all Barclays channels of delivery such as branches, cash machines and call centres.

This will mean that all 3000 of the bank's United Kingdom sites can deliver services and products via the Internet and is a significant step towards Barclays achieving its wider strategic goal of designing a single Internet-enabled platform for the entire retail bank.

Over the next 21 months, BT's Business-to-business Division, BT Syncordia Solutions, will migrate Barclays multiple networks to a single, company-wide IP structure.

At the heart of this network, BT will be integrating leading edge e-commerce technology. As a result, Barclays customers will be able to access banking products and services by mobile telephony through WAP, the Internet, cash machines and digital television. — *BT/Barclays*.

❑ **European microelectronics industry aims for new EUREKA projects.** High-ranking industrialists from leading European microelectronics companies met in Berlin in April 2000 to put forward plans for a new strategic microelectronics initiative. Discussing future opportunities for the information and communication technology industry in Europe with government officials at the EUREKA High Level Group meeting, company representatives proposed a combined effort to ensure European success in the global market. EUREKA is a European network for market-oriented R&D. The EUREKA initiative enables industry and research institutes from currently 26 member countries and the European Union to collaborate in a bottom-up approach in developing and exploiting innovative technologies.

Successful cooperation in the past within the EUREKA framework has enabled three of Europe's large microelectronics companies to move into the world's top ten in the sector. EUREKA's role is one of supporting the expansion of the public and private sector partnerships which foster the innovation necessary to meet Europe's scientific and technological challenges in the 21st century.

The series of successful EUREKA projects such as *JESSI*, its successor project *MEDEA* and others, may be followed up with another strategic effort that the European microelectronics industry has recently submitted to EUREKA. Called "MEDEA+, system innovation on silicon for the e-economy", this new coop-

erative R&D project aims to strengthen microelectronics in Europe by developing enabling technologies for the Information Society. The new project is estimated to cost around EURO 4 billion. — *EUREKA*.

❑ **Motorola comments on Iridium LLC motion.** Iridium LLC has notified the United States Bankruptcy Court that it has not been able to attract a qualified buyer by the deadline set by the court. Iridium LLC further announced that it will terminate its provision of commercial service and begin the process of liquidating its assets.

Reacting to this announcement, Motorola, Inc. said that it would maintain the Iridium satellite system for a limited period of time, while the de-orbiting plan is being finalized. During this period, Motorola will continue to work with subscribers in remote locations to obtain alternative communications. However, the continuation of limited Iridium service during this time will depend on whether the individual gateway companies, which are separate operating companies, remain open.

Motorola is extremely disappointed that Iridium LLC has not succeeded in its effort to emerge from voluntary bankruptcy. Motorola and other Iridium investors have worked very hard to support Iridium LLC's efforts to reorganize and continue operating the business. Unfortunately, that has not happened.

Iridium is an example of a proven, pioneering technology. Many of Motorola's finest people worked together worldwide to implement a global communications system that was, from a technology standpoint, an extraordinary achievement. Going forward, Motorola will continue to look for new opportunities that will provide a path to the future. But, as in the case of Iridium, Motorola will continue to absorb the risk through a conservative management of its balance sheet.

In order to support those customers who purchased Iridium service and equipment directly from Motorola, customer support call centres and a website that are available 24 hours a day, seven days a week have been established by Motorola. Included in the information for customers is a list of alternative satellite communications services. — *Motorola*.

BIHTEL 2000

Telecommunication networks

The Faculty of Electrical Engineering of the University of Sarajevo will organize the Third International Conference on Telecommunications (BIHTEL 2000), on the theme "Telecommunication networks".

BIHTEL 2000 will be held in Sarajevo from 23 to 25 October, under the high patronage of Alija Izetbegovic, the Chair of the Presidency of Bosnia and Herzegovina.

Conference themes

- Convergence of stationary and mobile networks
- Terrestrial and satellite systems of mobile radiocommunications
- IP telephony
- New telecommunication services (CATV, in-service and Internet).

Deadlines

- 15 July: submission of final papers
- 15 September: acceptance of papers
- 10 October: printing of the proceedings of the conference.

Venue of the conference and contacts

The conference will take place at the Holiday Inn Hotel, Sarajevo, Zmaja od Bosne, 4.

Participants in the conference wishing to be accommodated in the same hotel will be granted a special discount.

For booking, please contact the hotel directly: Tel.: +387 71 664 273. Fax: +387 71 663 862.

Registration and hotel reservation forms will be available on the organizer's website: etf.unsa.ba.

For all other information, please contact the organiser: "Faculty of Electrical Engineering, BIHTEL 2000, Skenderija 70, 71000 Sarajevo (Bosnia and Herzegovina). Tel./fax: +387 71 654 976. E-mail: bihtel@etf.uns.ba".

Contact persons at the Faculty: Dragoljub Milatovic, for conference papers and Fatih Imamovic for other issues.

❑ **Alcatel signs contract with Mannesmann Mobilfunk.** *Alcatel* and the German mobile operator *Mannesmann Mobilfunk* have signed a contract worth DEM 120 million for the delivery of Alcatel dual band *GSM* mobile phones. Initially, Alcatel will provide Mannesmann with several hundred thousands of *One Touch Club DB* mobile phones. The agreement, furthermore, foresees a strategic cooperation regarding the complete Alcatel mobile phone product range which will be commercially available from this summer.

With more than 30 million mobile users by the end of 2000, Germany is one of the most innovative and dynamic mobile communication markets in Europe. — *Alcatel*.

❑ **Europe*Star: The power of five.** Europe*Star Limited (a joint venture between *Alcatel Space* and Loral Space & Communications) made its debut on the satellite broadcasting scene during Mediacast 2000 at Earl's Court in London in mid-May. At a session entitled "The Power of Five", the company described the new possibilities in the world of satellite communications that will open up later this year, with the launch of its first satellite *Europe*Star-FM1*.

The Europe*Star system will combine features from both regional direct broadcast by satellite and intercontinental communication satellites to offer service innovation — broadcast-quality IP and digital service connectivity between regions as far apart as the United Kingdom and Malaysia. Through the use of advanced computer design and modelling techniques, very precisely shaped footprint contours have been placed around Europe, Southern Africa, the Middle East, Indian subcontinent, and South-East Asia.

Europe*Star-FM1, is a high-powered Ku-band geostationary satellite, equipped with 30 transponders, placed into orbit at 45° E. The Europe*Star system will have transponder-by-transponder connectivity, thereby covering and connecting each of the coverage areas while providing highly flexible services for a wide variety of IP and digital applications delivered to smaller dishes.

Europe*Star has chosen the European launch service provider, *Arianespace*, to launch its satellite on either an *Ariane-5* or an *Ariane-44 LP*. The launch will take place from the French Guiana Space Centre in Kourou in the third quarter of 2000. A second satellite, *Europe*Star-FM2*, will be co-located at 45° E, providing the system with 30 additional transponders. — *Europe*Star*.

❑ **BT, AT&T and Concert to invest in global network of Internet data centres.** These three companies have announced their plans to invest GBP 1.25 billion over three years to deliver seamless, global e-commerce services via a network of 44 Internet data centres in 16 countries.

The centres will be directly connected to a worldwide Internet Protocol (IP) backbone.

This global platform will include the 14 Internet data centres already "open for business" in New York (two centres), Middletown, San Diego (two centres), San Francisco and Phoenix (United States), and in Birmingham, Cardiff, Bletchley and St Albans (United Kingdom) as well as in Madrid (Spain), Milan (Italy) and Zurich (Switzerland).

Eleven additional Internet data centres will be opened in the United States, the United Kingdom, Canada, Germany, the Netherlands, France and Japan, by the end of 2000.

The remaining 19 Internet data centres will begin opening in 2001 in the United States, the United Kingdom, Mexico, Australia, Brazil, Hongkong, Belgium, Portugal, and Sweden and will be completed within two years.

Beyond their existing base, the three companies are targeting customers for Web hosting services in a global market forecasted to grow from nearly USD 4 billion in 2000 to more than 16 billion by 2004. More than half of this growth will occur outside the United States. — *BT*.

❑ **Mobile e-commerce "pushed" towards consumers, say analysts.** Potential mobile e-commerce players should plan to provide genuinely unique and compelling services, rather than trying to excite the market with over-hyped messages about "cool new technology". Otherwise they will find it hard to change the habits of an unimpressed buying public, says a new report, *Mobile e-commerce: market strategies*, by independent research and consulting company Ovum.

It is debatable whether ordinary consumers are actually demanding mobile e-commerce services right now. It is more a case of suppliers sensing an opportunity to make money, and pushing the idea at them. In fact there is not much, if any, money to be made in the short term, according to the report. Business users, rather than the mass market, will be the first serious adopters, but even they will not pay a premium for existing services which are easier and cheaper to access using the phone or a PC. So if suppliers are to survive and prosper in the long term, their early offerings will have to be very targeted, and very compelling. Consumers will not pay for services just because they are wireless, Ovum warns suppliers.

The current climate has all the frenzy, uncertainty and ill-preparedness of a gold rush, according to the report. To avoid investing in applications which sound impressive on paper but do not attract user take-up, the report has this advice to offer. "Potential mobile e-commerce players have to realize that at this point in time, good substitutes for their services already exist — it is only the delivery method that has changed". Old habits die hard!

Until the mobile networks are upgraded to allow higher bandwidth applications, Ovum advises potential mobile Internet merchants to concentrate on "killer applications" which play to the strengths of mobile: convenience, location and personalization.

The barrage of operator marketing and press articles hyping technologies such as WAP has left many believing that shopping via the mobile will be a reality within the year. It is far more complicated than that. The industry has not even agreed a framework for trusted and secure payments yet, let alone standardized its technology. It is just not going to happen until these big questions are answered.

In fact, the fledgling mobile e-commerce industry will need a complete transformation to deliver true mobile e-commerce: lots of content, a sound financial infrastructure with guarantees, compelling applications, and a first-rate mobile network.

There is no doubt that the market has enormous potential, argues the report. The number of mobile devices is widely expected to exceed the magic one billion mark by 2003, with a large proportion technically capable of mobile e-commerce. If the market fulfils its promises, Ovum predicts that the end-user spend on services will rise to more than USD 200 billion in 2005. — *Ovum*.

❑ **Telstra reaches agreement with EBU for Sydney 2000 Olympic Games transmission via INTELSAT.** The International Telecommunications Satellite Organization and Telstra Corporation Limited have announced that they have concluded a major agreement with the European Broadcasting Union for coverage of the upcoming Olympic Games. This agreement brings to 40 000 the number of programme hours that have been booked through Telstra on seven different INTELSAT satellites for broadcast to a global audience of some 4 billion people.

EBU has signed eight short-term leases with Telstra on the *Intelsat-804* satellite at 64° E and on the *Intelsat-704* satellite at 66° E for the broadcasting of the Olympic Games. The deal was announced at the National Association of Broadcasters Convention in Las Vegas (Nevada) in April 2000.

The EBU transmissions will include more than 25 full-time programme channels to over 30 broadcasters, and will be received at 42 locations. These broadcasters include the BBC of the United Kingdom, *TVE* of Spain, *ZDF* of Germany, and *RAI* of Italy. — *INTELSAT/Telstra*.

❑ **Thuraya signs service provider agreement with Bhutan.** Moving ahead with its goal to provide satellite telecommunication services to its targeted countries, *Thuraya Satellite Telecommunications Company* has signed a service provider agreement with Bhutan. The agreement comes as a boost to that country's Department of Telecommunications in its attempt to modernize its telecommunication services nationwide.

Under the agreement, the Department of Telecommunications of Bhutan will have all rights to distribute and market Thuraya's products in the country, including user terminals and SIM cards, as well as billing customer care services.

The Department of Telecommunications of Bhutan is the latest company to join Thuraya's service provider consortium which comprises *Emirates Tele-*

communications Corporation (ETISALAT), *Qatar Telecom, Pakistan Telecommunications Company Ltd*, *Sudan Telecom Company Limited*, Libya's *General Post and Telecommunications Company*, *Silki La Silki* of Saudi Arabia, *ALKAN* of Egypt, Kuwait's *Mobile Telecommunications Company* (MTC), Next Destination Limited of the United Kingdom, *ZAJEL* of Jordan and the *Syrian Telecommunications Establishment* (STE). — *Thuraya*.

❑ **COM One teams up with Alcatel to develop Bluetooth solutions.** *COM One* and *Alcatel* have announced their efforts to develop competitive connectivity solutions for the end-user market, using Alcatel's single *Bluetooth* chip.

Based on wireless connectivity, Bluetooth will be the smart and ultimate link between *GSM* phones, notebooks and other peripherals. After an initial takeoff for business users, Bluetooth technology is expected to enter the high volume consumer market by mid-2001. — *COM One/Alcatel*.

❑ **Alcatel and Fujitsu to form joint company in mobile communications.** *Alcatel* and *Fujitsu Limited* have announced their intention to join forces in the mobile communications field by establishing a joint venture to develop and manufacture next-generation mobile communications network systems. The new company will be majority-owned by Alcatel, which will hold 66 per cent of the shares, with Fujitsu holding the remainder.

The agreement will aim to leverage the technological strengths of both companies and maximize development efficiency and economies of scale to compete in the third generation (3G) mobile communications market.

The joint venture will concentrate on product definition and marketing, research and development and manufacturing policy for high-quality mobile communications and radio infrastructure, including GSM, its different evolutions including GPRS and EDGE, and 3G (also known as *IMT-2000*), which should be ready for deployment by the first half of 2001. — *Alcatel/Fujitsu*.

❑ **PanAmSat's global network expands to 21 satellites.** PanAmSat Corporation successfully launched into orbit its high-power *Galaxy-IVR* spacecraft, the company's third consecutive satellite deployed in four months. Galaxy-IVR, PanAmSat's twenty-first spacecraft worldwide, will offer high-power delivery of video, radio, Internet and telecommunication services throughout North America.

The satellite, which contains 24 C-band and 24 Ku-band transponders, was rocketed into space from the French Guiana Space Centre in Kourou, aboard an *Ariane-4* launch vehicle on 18 April 2000.

Galaxy-IVR, an *HS 601 HP* model spacecraft built by Hughes Space and Communications Co., will operate at 99° W, taking over from *Galaxy-XI*, which will now transition to its final orbital location at 91° W. Among the services on Galaxy-IVR will be the delivery of *AOL Plus via DirecPC*, the United States direct-to-consumer service offered by Hughes Network Systems. The satellite will also serve as the digital platform for the transmission of AT&T's *Headend in the Sky* (HITS) digital cable service, offering up to 140 channels of programming throughout the United States.

In addition, the newly launched satellite will be the new platform for PanAmSat's *Galaxy-3D* service, a bundled domestic digital delivery package offering television broadcasters, programmers and business network managers a one-stop shopping resource for end-to-end digital video, audio and data transmission services in more than a dozen North American cities. — *PanAmSat*.

❑ **EMS to provide spot-beam technology for ASTROLINK broadband satellite programme.** EMS Technologies, Inc. has won two separate contracts with TRW Inc. to supply radio frequency switching systems and electronic power conditioners for the satellite payloads of the ASTROLINK global broadband communications system.

TRW is building the digital, packet-switched payloads for ASTROLINK International LLC satellites poised to provide the world's first global broadband access, with service beginning in 2003.

ASTROLINK has raised more than USD 1.3 billion in equity from four venture partners: Liberty Media Group, Lockheed Martin Corporation, TRW, and *Telespazio S.p.A.*, a subsidiary

of *Telecom Italia SpA*. ASTROLINK began construction of its first-phase constellation of four geostationary satellites in 1999. — *EMS*.

❑ **BT buys partner's stake in Dutch venture Telfort.** BT has announced that it is raising investment in its Dutch communications venture, *Telfort*, to 100 per cent. The company has acquired a further 50 per cent of Telfort for GBP 1.16 billion from its partner, the national railway company *Nederlandse Spoorwegen*.

Telfort runs fixed and mobile services in the Netherlands to businesses and consumers. It launched its mobile service in October 1998, and now has more than 500 000 customers. By the early summer 2000, Telfort will be among the first of BT's European ventures to launch *Genie*, Europe's leading mobile portal and Internet service provider. — *BT*.

❑ **A key project of the European Telecommunications Standards Institute (ETSI) supports H.323/SIP interoperability.** At a recent meeting, ETSI's Project TIPHON (Telecommunications and Internet Protocol Harmonization Over Networks) adopted an architecture for telephony over Internet Protocol (IP) that is independent of specific call signalling protocols.

The architecture supports a range of telephony-related services and capabilities, including the ones currently provided over the switched circuit network across multiple administrative domains.

IP telephony systems will be based both on the H.323 series of standards from the International Telecommunication Union (ITU) and the Session Initiation Protocol (SIP) from the Internet Engineering Task Force (IETF).

This protocol independence is a major breakthrough in a telecommunications industry characterized by increasing complexity and heterogeneity. Project TIPHON brings a unique perspective to IP telephony standardization efforts: a focus on scalability, reliability and performance requirements for worldwide deployment by major national and international carriers.

Project TIPHON's H.323/SIP activities will include close cooperation with other industry groups like the International Multimedia Teleconferencing Consortium, as well as coordinated contributions to the ITU and IETF standardization processes. — *ETSI*.

❑ **Convergys and NARUS announce breakthrough in IP services billing.** Convergys and NARUS, Inc., a provider of Internet business infrastructure solutions, have announced the completion of benchmark testing that produced landmark results for IP usage collection and rating. The companies demonstrated a throughput rate of nearly 6000 IP usage-based billing events per second. The benchmark replicated traffic loads equivalent to those generated by 50 million subscribers on a carrier-class IP services network.

One of the barriers for IP service providers to roll out next-generation IP services has been the absence of proven scalability in key business functions such as billing and customer care systems. The completion of this testing proves that IP billing, using comprehensive customer usage information taken off the network in real time, is not only possible but scalable to the carrier-class needs of IP service providers that are addressing mass-market, usage-based Internet services. — *Convergys*.

❑ **EUTELSAT establishes a new programme for "always-on broadband, anywhere".** In order to position itself as a key provider of bandwidth for new broadband services, the European Telecommunications Satellite Organization, has established a new multimedia programme which will focus on building solutions for high bit rate connections in the business-to-business and business-to-consumer markets.

The new programme will bring together the multiple products and services that EUTELSAT has developed over the last thirty months and which are already available in the market, including Internet backbone connections, "cache" services, two-way Internet and consumer Internet products, as well as bandwidth-on-demand and mobile services. It will also provide a platform for a new generation of broadband solutions that are already under development at EUTELSAT and that will use both Ku- and Ka-band frequencies in order to lower the threshold of entry into the market and increase the range of solutions available for full satellite interactivity. — *EUTELSAT*.

❑ **Airships to supplement satellite and land systems.** Our skies may soon be dotted with airships designed to provide telecommunication services at local or regional level and conduct Earth observation, atmosphere study and astronomy missions. The European Space Agency (ESA), in association with *DaimlerChrysler Aerospace* (Germany), Lindstrand Balloons Ltd (United Kingdom) and the Technical University of Delft (Netherlands), recently completed the first evaluation of a design for high altitude long endurance (HALE) aerostats, which would cruise in the stratosphere at an altitude of about 20 km, i.e. in an area of space neither used by aircraft nor by satellites; they would have an operational life of between a few months and a few years.

HALEs would be huge helium-filled airships with an aerodynamic shape like a cigar, roughly 220 m long and 55 m wide. They could carry useful loads of about 1000 kg. Unlike Zeppelins, which they closely resemble seen from the outside, HALEs require no rigid internal structure. The envelope is made of high-tech flexible materials, impermeable to helium and ultraviolet-resistant, while the rigidity of the shell is assured by pressurization. Only a few rigid reinforcements would be needed for the engine and payload mounting brackets.

Earth observation is a sector where HALEs could play an important role and provide permanent or specific services such as environmental surveillance and disaster management. Once a problem is detected by a satellite system, a HALE could be sent to the affected area to transmit back precise and continuously updated information. These craft could be used to conduct rescue operations in floods or earthquakes, where the local telephone connections, including land-based mobiles, have been put out of action and local observation of the stricken areas is urgently required.

In the telecommunication sector, several types of application are conceivable. For example, HALE airships could be used to provide future multimedia mobile services (voice, Internet, radio and television) to heavily populated areas, without the need to install networks of antennas and relay stations on the ground. Remote reading of gas, water and electricity meters is another possible application. Traffic control authorities could henceforth obtain rapid access to observation data and local information.

This initiative parallels similar projects being carried out in Japan *(Sky-Net)* and the United States *(Sky Station International)*, which are also attracting European companies in the space sector as well as constructors of aerostats. — *ESA*.

❑ **Structural change in Russia**

The Ministry for Communications and Informatization of Russia is the successsor in law of the *State Committee for Telecommunications*.

❑ **Personnel changes**

in Austria

Mr Michael Schmid has been appointed Federal Minister for Transport, Innovation and Technology.

in Burundi

Mr Nestor Misigaro has been appointed Director-General, *Agence de régulaton et de contrôle des télécommunications* (ARCT).

in the Dominican Rep.

Messrs José Guillermo Sued and Francisco Frías Lara have been appointed Chairman and Executive Director, *Instituto Dominicano de las Telecomunicaciones* (INDOTEL), respectively.

in Ecuador

Mr José Pileggi Veliz has been appointed Chairman, *Consejo Nacional de Telecomunicaciones* (CONATEL).

in Guatemala

Mr José R. Orellana Mendizabal has been appointed Superintendent of Telecommunications, *Superintendencia de Telecomunicaciones*.

in India

Mr Shyamal Ghosh has been appointed Chairman, Telecommunications Commission, and Secretary, Department of Telecommunications, Ministry of Communications.

in Korea (Republic of)

Mr Byong-Yub Ahn has been appointed Minister of Information and Communication.

in Mauritius

Mr Rajesh Unnuth has been appointed Chairman, Mauritius Telecommunications Authority.

in Nepal

Mr Ram Chandra Paudel has been appointed Deputy Prime Minister and Minister of Information and Communications.

in New Zealand

Mr Paul Swain has been appointed Minister of Commerce,

Minister of Communications and Minister for Information Technology.

in Panama

Mr Alex Anel Arroyo has been appointed Director and Chairman, *Ente Regulador de los Servicios Públicos*.

in Papua New Guinea

Mr Thomas Waim has been appointed Director-General, *Papua New Guinea Telecommunication Authority* (PANGTEL).

in Peru

Mr Alberto Pandolfi Arbulú has been appointed Minister of Transports, Communications, Housing and Building. Mr Julio García Torres has been appointed Vice-Minister of Communications, Ministry of Transports, Communications, Housing and Building.

in the Philippines

Mr Augustin R. Bengzon has been appointed Under-Secretary, *Department of Transportation and Communications* (DOTC).

in Portugal

Mr Jorge Coelho has been appointed Minister of Social Equipment.

in Russia

Mr Leonid Reyman has been appointed Minister for Communications and Informatization. Mr Yury Grin has been appointed Director-General, Department for International Cooperation, Ministry for Communications and Informatization.

in Rwanda

Mr Jean de Dieu Ntiruhungwa has been appointed Minister of Works, Transports and Communications.

in San Marino

Mr Clelio Galassi has been appointed Minister of Finance, Budget, Posts and Telecommunications.

in Senegal

Mr Mamadou Diop has been appointed Minister of Culture and Communication.

in Syria

Mr Makram Obeid has been appointed Minister of Transport.

in Uruguay

Mr Fernando Pérez Tabo has been appointed National Director of Communications, *Dirección Nacional de Comunicaciones*.

in Venezuela

Mr Alberto Esqueda Torres has been appointed Minister of Infrastructure. — *ITU Notification Nos. 1388 and 1389*.

The calendar for all ITU conferences and meetings can be found on the Web at: http://www7.itu.int/events-public

2000

- **19–28 July (Geneva) Council 2000 (C-2000)**
- **27 September–6 October (Montreal, Canada) World Telecommunication Standardization Assembly (WTSA-2000)**
- **4–9 December (Hong Kong) ITU TELECOM ASIA 2000**

General Secretariat

- 19–28 July (Geneva) Council 2000 (C-2000)
- 6–10 November (Geneva) Working Group on ITU Reform (third meeting)
- 4–9 December (Hong Kong) ITU TELECOM ASIA 2000

Telecommunication Development Sector

- 17–21 June (Manama, Bahrain) Regional maritime radiocommunications workshop for the Arab States and the Red Sea countries (GMDSS)
- 19–20 June (Geneva) Rapporteur's Group meeting on Question 9/1
- 19–23 June (Ouagadougou) Regional meeting on HRD for French-, Spanish- and Portuguese-speaking countries of Africa
- 21–22 June (Bridgetown, Barbados) CBU/ITU/FES/UNESCO seminar on challenges to broadcasting in the Caribbean
- 22–23 June (Geneva) Rapporteur's Group meeting on Question 8/1
- 26–28 June (Lusaka) ITU/COMESA workshop on SDH/ATM technologies
- 26–29 June (Manaus, Brazil) World symposium in tele-education
- 26–30 June (Abidjan) Spectrum management for French-speaking countries of Africa
- 26–30 June (Bamako) Business planning for French-speaking countries of Africa
- 3–6 July (Cairo) ITU–D Study Groups regional meeting for Arab countries
- 4–12 July (Warsaw) Workshop: Strategic management
- 5–7 July (Kingston, Jamaica) Seminar on tariffs, accounting rates and WTO issues — Caribbean region
- 5–7 July (Kingston) ITU/OECS workshop on liberalization/competition
- 10–12 July (Tegucigalpa) Seminar on tariffs, accounting rates and WTO issues in Central America
- 10–14 July (Issyk-Kul, Kyrgyzstan) Subregional seminar on Basic Automated Spectrum Management System (BASMS) for the CIS countries

ITU Conferences *(continued)*

• 12–14 July (Geneva)
Meeting of Focus Group 7

• 17–18 July (Geneva)
Rapporteur's Group meeting on Question 10/2

• 17–21 July (Dakar)
Management workshop for top-level managers

• 31 July–4 August (Kuala Lumpur)
ABU/ITU seminar and workshop on Digital Sound Broadcasting (Managing the transition, policy issues)

• 7–12 August (Yaoundé)
Seminar on spectrum management and the use of BASMS in Central Africa

• 4–6 September (Managua)
Central American workshop on telecommunication policies (Blue Book)

• 11–15 September (Geneva)
Third meeting of Study Group 1

• 12–15 September (Budapest)
Regional seminar for Europe on the regulation of telecommunication markets (optional solutions in privatization)

• 18–22 September (Geneva)
Third meeting of Study Group 2

• 26–29 September (Bishkek, Kyrgyzstan)
Subregional seminar on international telecommunication law for the CIS

• 3–5 October (Vientiane)
Seventh subregional telecommunication meeting for Cambodia, Lao P.D.R. and Viet Nam

• 4–6 October (Kyiv)
Interregional seminar on the transition from SECAM to digital broadcasting

• 9–10 October (Geneva)
Third meeting of the Task Force on Gender Issues

• 11 October (Geneva)
Fourth meeting of TDAG subgroup dealing with private sector issues

• 12–13 October (Geneva)
Fourth meeting of the Telecommunication Development Advisory Group (TDAG)

• 15–16 October (Egypt)
Arab telecommunication development meeting

• 16–19 October (Arusha, Tanzania)
HRD regional meeting — English-speaking countries of Africa

• 17–19 October (Egypt)
Preparatory meeting for the Arab States for WTDC-02

• 25–27 October (Tunis)
Regional seminar on trade of telecommunication services

• 5–9 November (Dubai, United Arab Emirates)
Regional seminar on electronic commerce

• 20–22 November (Geneva)
Development symposium for regulators

• 20–22 November (Rabat)
Private-sector cooperation meeting related to equipment manufacturers in the Arab Region (telecommunications and information technology)

• 28–30 November (Yerevan, Armenia)
Seminar on pricing for frequency usage

Radiocommunication Sector

• 28 June–11 July (Geneva)
Working Party 3K (Point-to-area propagation)

• 28 June–11 July (Geneva)
Working Party 3M (Point-to-point and Earth-space propagation)

• 29 June–11 July (Geneva)
Working Party 3J (Propagation fundamentals)

• 4–10 July (Geneva)
Working Party 3L (Ionospheric propagation)

• 12–13 July (Geneva)
Study Group 3 (Radiowave propagation)

• 27–28 July (Vancouver, Canada)
Working Party 7E (Inter-service sharing and compatibility)

• 31 July–4 August (Vancouver)
Working Party 7B (Space radio systems)

• 31 July–4 August (Vancouver)
Working Party 7C (Earth exploration satellite systems and meteorological elements)

• 31 July–4 August (Vancouver)
Working Party 7D (Radio astronomy)

• 21–25 August (San Diego, CA)
Working Party 8F (IMT-2000 and systems beyond IMT-2000)

• 11–15 September (Geneva)
Radio Regulations Board (RRB)

• 13–19 September (Geneva)
Working Party 6Q (Quality assessment)

• 13–19 September (Geneva)
Working Party 6R (Recording for broadcasting)

• 13–21 September (Geneva)
Working Party 6B (Digital coding)

• 13–22 September (Geneva)
Working Party 6A (Broadcasting systems, production, baseband signals)

• 13–22 September (Geneva)
Working Party 6E (Terrestrial emission)

• 13–22 September (Geneva)
Working Party 6M (Interactivity and multimedia)

• 13–22 September (Geneva)
Working Party 6S (Satellite broadcasting)

• 18–25 September (Geneva)
Working Party 9A (Performance and availability, interference objectives and analysis, effects of propagation, and terminology)

• 18–26 September (Geneva)
Working Party 9B (Radiofrequency channel arrangements, radio system characteristics, interconnection, maintenance and various applications)

• 18–26 September (Geneva)
Working Party 9D (Sharing with other services (except for the fixed-satellite service)

• 20–22 September (Geneva)
Working Party 4SNG (Satellite news gathering (SNG), outside broadcast via satellite)

• 20–26 September (Geneva)
Working Party 4B (Systems, performance, availability and maintenance)

ITU Conferences *(continued)*

• 25–26 September (Geneva)
Working Party 9C (HF systems)

• 25–27 September (Geneva)
Study Group 6 (Broadcasting service)

• 25 September–4 October (Geneva)
Working Party 4A (Efficient orbit/spectrum utilization)

• 27 September (Geneva)
Study Group 9 (Fixed service)

• 27 September–4 October (Geneva)
Working Party 4-9S (Frequency sharing between the fixed-satellite service and the fixed service)

• 5 October (Geneva)
Joint Study Groups 4 and 9 meeting

• 6 October (Geneva)
Study Group 4 (Fixed-satellite service)

• 9–13 October (Geneva)
Working Party 7A (Time signals and frequency standard emissions)

• 9–18 October (Geneva)
Working Party 8A (Land mobile service excluding IMT-2000, amateur and amateur-satellite services)

• 16–17 October (Geneva)
Study Group 7 (Science services)

• 17–27 October (Geneva)
Working Party 8D (All mobile satellite services and radiodetermination satellite service)

• 18–27 October (Geneva)
Working Party 8B (Maritime mobile service including Global Maritime Distress and Safety System (GMDSS); aeronautical mobile service and radiodetermination service)

• 23–27 October (Geneva)
Working Party 8F (IMT-2000 and systems beyond IMT-2000)

• 23–31 October (Geneva)
Working Party 1A (Spectrum engineering techniques)

• 23–31 October (Geneva)
Working Party 1B (Spectrum management methodologies)

• 23–31 October (Geneva)
Working Party 1C (Monitoring spectrum)

• 23–31 October (Geneva)
Task Group 1/5 (Unwanted emissions and the modification of Recommendation ITU–R SM.328-8 concerning out-of-band emissions)

• 24–25 October (Geneva)
Task Group 6/6 (Recommendation for a digital broadcasting standard below 30 MHz)

• 26 October (Geneva)
Study Group 6 (Broadcasting service)

• 30–31 October (Geneva)
Study Group 8 (Mobile radiodetermination amateur and related satellite services)

• 1–2 November (Geneva)
Study Group 1 (Spectrum management)

• 6–10 November (Geneva)
Radiocommunication Seminar

• 20–24 November (Geneva)
Radio Regulations Board (RRB)

Telecommunication Standardization Sector

• 27 September–6 October (Montreal, Canada)
World Telecommunication Standardization Assembly (WTSA-2000)

Conferences external to the ITU

2000

• 27–30 June (Wroclaw, Poland)
15th International Wroclaw Symposium on Electromagnetic Compatibility
E-mail: emc@il.wroc.pl
http://www.emc.wroc.pl

• 11–12 July (London)
IP based VPNs
Tel.: +44 171 453 5495
Fax: +44 171 636 1976
E-mail: cust.serv@ibcuk.co.uk
http://www.ibctelecoms.com/ipworld

• 10–13 July (Guildford, United Kingdom)
Eighth International Conference on HF radio systems and techniques
Tel.: +44 171 344 5471
Fax: +44 171 240 8830
E-mail: hf2000@iee.org.uk
http://www.iee.org.uk/Conf/

• 10–13 July (Guildford, United Kingdom)
Eighth International Conference on HF radio systems and techniques
Tel.: +44 171 344 5471
Fax: +44 171 240 8830
E-mail: hf2000@iee.org.uk
http://www.iee.org.uk/Conf/

• 23–25 October (Sarajevo)
BIHTEL 2000 – Telecommunication networks
Tel./fax: +387 71 654 972
E-mail: bihtel@etf.unsa.ba

2001

• 20–22 February (Zurich, Switzerland)
EMC Zurich '01 – The 14th International Zurich Symposium and Technical Exhibition on Electromagnetic Compatibility
Tel.: +411 632 2790
Fax: +411 632 1209
E-mail: gmeyer@nari.ee.ethz.ch
http://www.nari.ee.ethz.ch/emc/

• 1–4 March (Beirut)
ARABCOM 2001 – The 4th Annual Arab International Telecom Development Congress and Exhibition for the Middle East and Arab States
Tel.: +961 5 450 212
Fax: +961 5 455 477
E-mail: ktayar@arabcom.com
http://www.arabcom.com