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ITU NEWS

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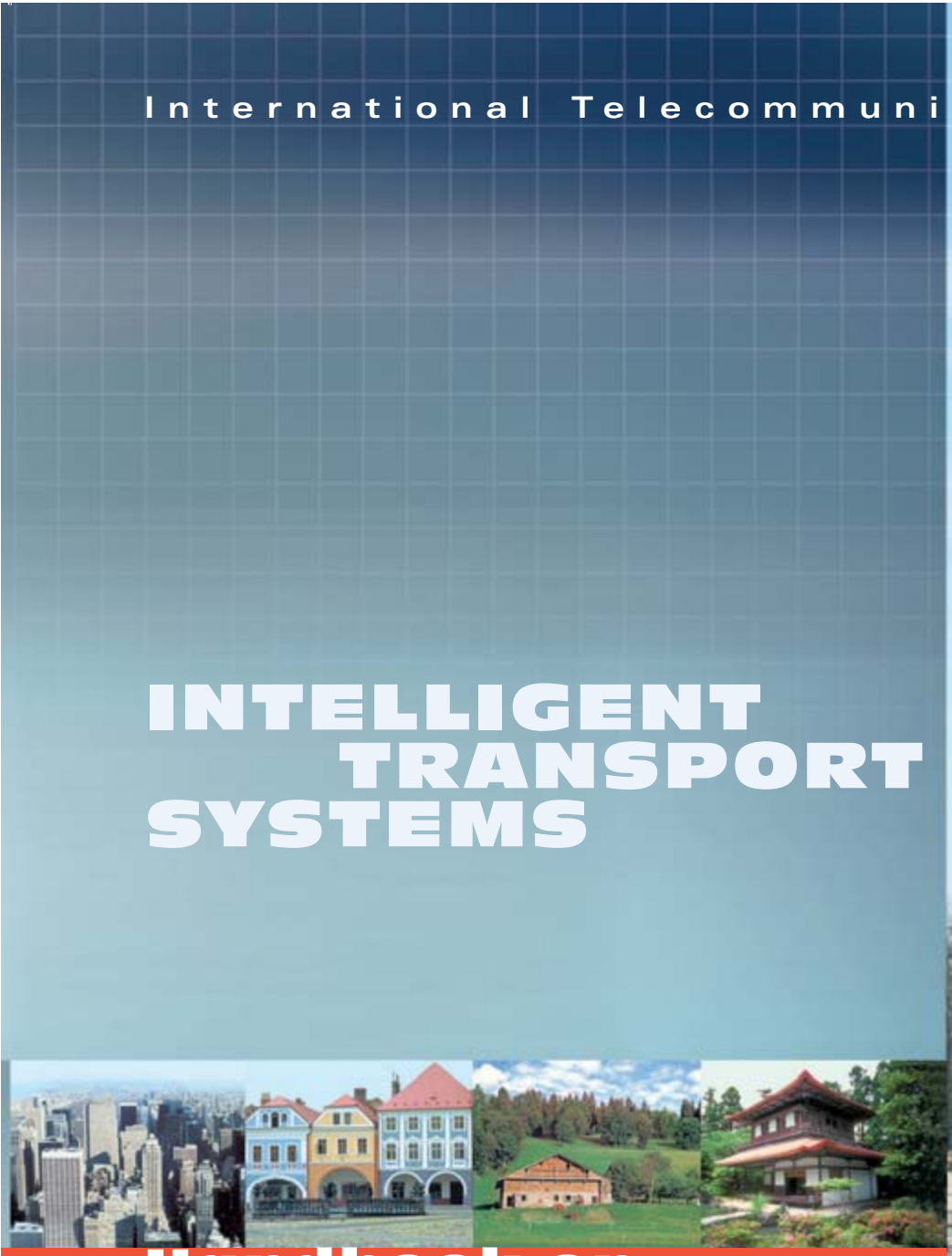
The networked car

Meeting Silicon Valley

Frequencies for mobiles

International Telecommunication Union

International Telecommunication Union



INTELLIGENT TRANSPORT SYSTEMS

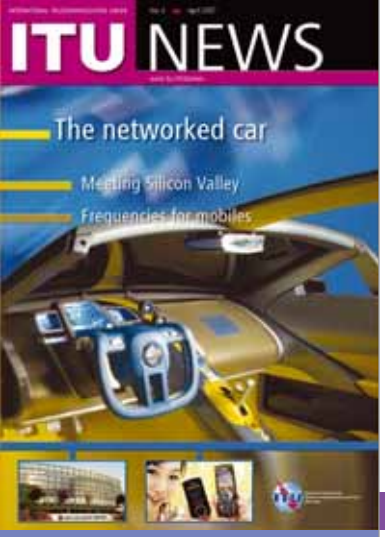
Handbook on Land Mobile

(including Wireless Access)

Volume 4

(Edition 2006)

Radiocommunication Bureau



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ITU at a glance

The world's standards bodies agree a common policy on patents

ITU, the International Electrotechnical Commission (IEC), and the International Organization for Standardization (ISO) announced on 19 March that they have adopted a harmonized approach to patented technology. Under the banner of the World Standards Cooperation (WSC) project, the three organizations have aligned their policies so as to encourage businesses to contribute to the process of defining standards, without putting their intellectual property rights at risk.

Significant investments are made in research and development, especially in the field of information and communication technologies (ICT). A reliable policy on patents provides crucial protection for businesses, while opening up intellectual property resources for broad implementation across the industry. The policy adopted by ITU, IEC and ISO allows for companies' innovative technologies to be included in standards as long as such intellectual property is made available under reasonable and non-discriminatory terms and conditions.

"ITU's standards-setting work is closely linked with innovation and new research," said Malcolm Johnson, Director of ITU's Telecommunication Standardization Bureau. "Today, it is difficult to develop technical standards without implicating patents. On the other hand, we have to take into account the interests of end-users. Therefore a balance must be found. We believe that this policy will encourage industry to share its intellectual property with implementers of standards on a reasonable basis, knowing that their interests will be protected," Mr Johnson said.

Secretary-General of ISO Alan Bryden had the same view. "The fine-tuning of this policy to achieve exactly the right balance — ownership versus sharing of intellectual property — is no small achievement," he said. "In this way we enable international standards to be used successfully to disseminate innovation, with a clear set of guidelines regarding the disclosure of, and commitment to license the use of, patented technologies. It is an excellent example of the cooperation between the three WSC partners."

Aharon Amit, IEC General Secretary, stated that the international standards developed by ISO, ITU and IEC provide a practical solution to many of the challenges faced by business in today's increasingly global markets. "Industry has been seeking a common approach to patents from the world's leading standards developers," he said, adding

"I am pleased that the increased collaboration between the World Standards Cooperation partners has led to the development of this common policy which will ultimately benefit end-users and industry."

New ITU group to focus on identity management

Computer hacking, identity theft and other forms of cybercrime cause not only personal anguish, but also financial losses amounting to billions of US dollars. On 12 March, ITU announced an initiative that will help to address this problem: an ITU Focus Group on Identity Management.

The Focus Group has taken the first steps towards creating a globally harmonized approach to online identity management systems, which reduce the need for multiple user names and passwords for accessing websites, while maintaining the privacy of personal information.

The group brings together standards forums, computer hardware and software producers, telecommunication firms and academics from around the world, to share their knowledge and coordinate their work. The aim is to create an open mechanism that allows various identity-management solutions to communicate, even as each one evolves. Thus, interoperability among solutions will be ensured. It is expected that the benefits of this universal approach will include increased trust among users of online services, as well as seamless roaming worldwide and reduction of spam.

Chairman of the Focus Group Abbie Barbir is a member of Nortel's Strategic Standards group, where he serves as senior adviser in the areas of Internet services and security. He said that the Focus Group's main aim is to achieve the common goals of those concerned with telecommunication and with identity management. "Nobody can go it alone in this space; an identity management system must have global acceptance," Mr Barbir said, and "there is now a common understanding that we can achieve this goal."

The Focus Group will examine the differences between the identity management frameworks now being developed by industry forums and consortiums. An interoperable framework will then be proposed to relevant standards bodies, including details of the requirements for the additional functionality within next-generation networks (NGN).


Nick Benjaminsz


Getty Images

The car as a four-wheeled computer

Malcolm Johnson

Director, ITU Telecommunication Standardization Bureau

ITU, in conjunction with the International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC), held a very successful workshop on 7–9 March on *The Fully Networked Car*. As I noted in my opening speech at the event, I am a car enthusiast as well as a technophile. So I am very happy to contribute to this issue of *ITU News* on the topic.

After some false starts, the market for telematics — roughly speaking ICT in vehicles — finally looks set to take off. This is evidenced by the substantial increase in numbers visiting *The Fully Networked Car* event this year, which attracted over 200 participants. This shows how seriously the industry is taking standardization in this domain.

Many key players now believe that without standards, the market for telematics will not prosper. The advantage of holding the workshop, especially during the Geneva Motor Show, is that it allowed everyone in the value chain to take part. We had representatives and speakers from manufacturers of cars, in-car devices, phones, and computer chips, as well as standards bodies and service providers.

Today, the car is a four-wheeled computer. A garage mechanic is just as likely to make use of a laptop as a spanner. But the car and ICT industries come from different backgrounds and have different business models. The meeting of the two industries is a revelation for both and an opportunity for them to learn from each other.

The historical differences between the two industries, and their huge variety of products and applications, make standardization an imperative. I am pleased to report that the workshop agreed, and that mechanisms are already in place to make sure that this convergence runs as smoothly as possible, taking into account all the players and avoiding duplication of work in various standards bodies.

Standards work in ITU is focused on a number of areas, including specifications to improve sound quality, wireless headsets, hands-free terminals, spectrum, and speech recognition. Also, we will be looking at how telematics will fit into next-generation networks (NGN).

Taking full advantage of ICT for vehicles and road transport systems, the "fully networked car'' is expected to offer such benefits as improved safety, reduced traffic congestion and pollution, and a smoother driving experience. I fully believe that with cooperation on standardization at an international level, this vision will become reality in the coming years. And ITU, together with World Standards Cooperation partners ISO and IEC, will play a key role in this.

The fully networked car

The number of cars continues to rise around the globe. In 2006 alone, some 46 million passenger vehicles were produced worldwide, according to OICA *(Organisation Internationale des Constructeurs d'Automobiles)*, which comprises national associations of manufacturers. These cars need to share roads and resources efficiently. The environment needs to be protected, traffic flows controlled and people kept safe. And increasingly, drivers expect to keep in touch with the outside world when travelling.

Part of the answer to these issues will come from advances in information and communication technologies (ICT). To examine how cars and ICT are converging, a workshop was held in March by World Standards Cooperation — which brings together ITU, the International Electrotechnical Commission (IEC) and the International Organization for Standardization (ISO).

Workshop at the motor show

The Fully Networked Car workshop was held on 7–9 March at a world-renowned venue: the Geneva International Motor Show. As well as attracting some 200 participants, the workshop featured speakers from major names in ICT and the car industry, including BMW, Ford, France Telecom, Freescale Semiconductor, Hitachi, Intel, Motorola, Nissan, On-Star, Orange, PSA Peugeot Citroen, Q-Free, T-Systems, Telecom Italia, Telecordia, Toyota, and Vodafone. The event was organized with the support of Cisco, Head Acoustics, SVOX and Ygomi.

The workshop's aim was to examine the technical and engineering challenges for the networked vehicle, and what business models could best link the automotive and ICT sectors. A central theme was how to ensure that appropriate standards are adopted to deal with the complexity of electronic components and communication systems in cars.


ITU/J. Burgess


ITU/J. Burgess

To address these issues, it is essential to have collaboration between the car industry and the ICT industry, said Malcolm Johnson, the Director of ITU's Telecommunication Standardization Bureau (TSB), in a welcoming speech to participants. (See also the Editorial on page 4.) Jack Sheldon, Standardization Strategy Manager at the IEC, also noted how the trend towards technological convergence "requires that IEC, ISO and ITU take into account each others' work and that we cooperate…so that manufacturers can use our standards to deliver a final product to customers that functions as expected".

In his opening remarks to the workshop, Alan Bryden, Secretary-General of ISO, stated that "an automobile is an excellent example of how technologies converge". Cars produced nowadays are likely to contain dozens of microchips.

Intelligent cars

Pierre Malaterre, Vehicle System Electronic Manager at PSA Peugeot Citroën, described how, in addition to a hundred or so electric motors, there can be up to 50 electronic control units (ECU) in every car. These control such functions as anti-locking brakes, stabilizing functions, cruise control, and automatic transmission. "Eighty per cent of innovation in the auto industry is electronic," he said, and these components account for 10–30 per cent of the cost of a car.

Mr Malaterre pointed out that these ECU are usually coordinated, forming an electronic network that keeps the vehicle running smoothly. Now, the task is to make the car even more "intelligent" by improving its exchange of information with the outside world. The technology by which this is achieved is called telematics (see box).

Connected cars

In addition to ECU sensors, with telematics, cars can use wireless technology to communicate with their surroundings and with each other. This means, for instance, that toll fees can be paid automatically, and that a route map (including the location of nearby points of interest) can be displayed on the dashboard through a satellite navigation system. Traffic flows can also be improved. The example of Japan illustrates how such intelligent transport systems (ITS) have developed.

A Japanese example

Tadao Saito, the Chief Technology Officer at the Toyota-InfoTechnology Center (and Professor Emeritus of Tokyo University), explained how, in the 1970s, Japan began gathering data on traffic through such devices as roadside sensors to detect passing cars. Through a nationwide network of control centres, the information was used in measures to improve safety and the flow of vehicles, such as in the programming of traffic signals. Thus, the infrastructure was in place on which to build Japan's first ITS in 1995: a form of dedicated short-range communications (DSRC) called the "Vehicle Information and Communication System" or VICS, which uses FM multicast broadcasting and roadside beacons.

Mr Saito told the workshop about an experiment begun in 2005 at a section of the Tokyo Metropolitan Expressway that becomes particularly congested. Informa-

Telematics

Telematics means the integration of ICT with telecommunications, and most major car manufacturers use it in at least some of their models. Typically, it consists of:

- *Hardware installed in the car*
- *Hardware installed in the road*
- *Wireless communications*
- *Location technology*

- *Information on the car's condition*
- *Improved performance and emissions*
- *Emergency response*
- *Content (for example, maps and traffic conditions)*

Associated with The Fully Networked Car *workshop was an exhibition on 6–10 March*

tion sent to VICS-equipped cars resulted in "a 79-per-cent fall in the number of traffic accidents compared with the previous year," according to Mr Saito, even though only about 10 per cent of cars had the system. By 2006, of the approximately 55 million cars in Japan, 15 million were equipped to receive real-time traffic information and 22 million had navigation systems, Mr Saito said. Vehicle-to-vehicle communication is now being introduced, he added, and the goal is to reduce fatal accidents to below 5000 per year by 2012.

Advanced wireless communication systems are the key to advanced telematics systems. This was emphasized in a paper presented by Mitsuji Matsumoto (Waseda University, Tokyo), Yasuhisa Nakamura (NTT DoCoMo) and Kenichi Yanagi (Hakuhodo Inc.). In their words: "Japan foresees the rapid development and evolution of 3G and 3.5G mobile phone services, VICS, and car navigation systems. The industry, government and academia are all pressing hard to deploy networked car services that incorporate these developments."

Views from Europe and the United States

This deployment of ITS is mirrored in many other countries too, as illustrated at the workshop by Fotis Karamitsos from the Directorate General for Energy and Transport at the European Commission. He outlined how an enabling environment is being created in Europe for the development of networked cars, as well as other means of transport. A consultation process on deploying ITS in the European Union would soon start with the main stakeholders, Mr Karamitsos added, and the Commission is "looking forward to getting valuable input from the telecommunication world".

A view from the United States came from K. Venkatesh Prasad, who is Group and Technical Leader, Infotronics Technologies Research and Advanced Engineering, at Ford Motor Company. He said that people want their cars to provide both safety and environmental protection, and they expect their personal communication and entertainment devices to work seamlessly within a vehicle. Ford's aim is to "make the desirable affordable," Mr Prasad said. In 2007, the company is due to launch *Ford Sync* in some of its US models, described as "a voice-activated, in-car communications and entertainment system for mobile phones and digital music players".

Connected drivers

Intel Corporation has been involved in creating embedded processors for the automotive industry since 1976, said Ton Steenman, Intel's Vice President, Digital Enterprise Group, and General Manager of its Infrastructure Processor Division. The goal of Intel's work in this field is "extending the richness of the home and office experience to the car," Mr Steenman said. The task includes supplying cars with Internet connectivity, allowing drivers to access and download data in whatever form their devices will support.

The "mobile office" is becoming a reality, commented Steve Millstein, President and CEO of the ATX Group, at a workshop session dedicated to that topic. By using a "thin client" (a small, network computer connect-

Jack Sheldon of IEC

Tadao Saito of the Toyota InfoTechnology Center

Fotis Karamitsos from the Directorate General for Energy and Transport at the European Commission

OnStar is a telematics service of General Motors. When a driver presses the blue button on the rear-view mirror, data on the car's status and position are sent to a control centre. The red button requests an emergency response. The system uses mobile phone networks and GPS technology

ed to a server that processes data) and natural language voice technology, "all cars can surf the Internet," he said. E-mail or online information would be as readily available as at a conventional desk. In future, each vehicle could have an Internet protocol (IP) address, and "web access will replace current navigating applications with more powerful applications," Mr Millstein added. (ATX is a major provider of telematics services.)

Safer journeys

Among the services that can be provided through telematics is remote diagnosis of faults in a vehicle. The information can then be forwarded to the driver, manufacturer or a repair service. This is an important contribution to road safety. And while travelling, if a car can communicate with the road and other vehicles, a driver can be warned of approaching hazards. In addition, cars with telematics can alert rescue services following a crash. In the United States, for example, such emergency call systems are available to subscribers. The European Union plans to have a continent-wide service that covers cars of any make, wherever they are.

Brian Droessler from Continental Automotive Systems

Ulrich Dietz from Vodafone Group R&D in Germany

Europe's eCall

A session of the workshop was devoted to Europe's emergency call system for vehicles, or eCall, which is being developed for a target operational date of 2010. "The European Commission's initiative of having a pan-European automatic crash notification system is a critical step in reducing overall traffic injuries and fatalities," said Brian Droessler, Manager, Strategy and New Business Development, Continental Automotive Systems. "Nearly 2500 lives a year may be saved with such a system, the benefits to society are clear and public support is high," he added. Nevertheless, deployment of eCall has not been as quick as planned.

Delays are being caused by political and economic factors, as well as technical ones. Not all countries in the European Union have yet signed the agreement that will support the establishment of eCall, and it is not clear who will pay for maintaining and using the service. "The whole goal of the system is safety, but this has implications such as costs and the long-term reliability of technologies," explained Thomas Form, a professor of electronic vehicle systems at the Technical University of Braunschweig, Germany. "The business case for the e-Call system is very complicated," he added.

Mr Form also discussed the technical requirements for the system, while the problems of using mobile phones for the e-Call system were highlighted by Ulrich Dietz, a Senior Technology Manager for Vodafone Group R&D in Germany. "Would a handset survive an accident?" he asked, and what happens if your phone battery is flat? He said that, to ensure constant, reliable communication, an embedded device in each car is the best solution.

Mr Form and Mr Dietz both favoured in-band modem technology for eCall, as did Pierre Piver, Group Vice President, Automotive, at Wavecom. Mr Piver also stressed the need to optimize the integration of key technologies, as well to allow wireless software upgrades. Mr Droessler stated that technical developments for eCall should take an evolutionary view and find "solutions that are updateable and expandable". This would help overcome the discrepancy in the typi-

cal life cycle of a car and the faster one for communication technologies. Interoperability is another essential for a pan-European system. To achieve this, Mr Droessler said, industry should do its part by following the recommendations of standards bodies.

Standardization and harmonization

ITU's Radiocommunication Sector (ITU–R) and Telecommunication Standardization Sector (ITU–T) are undertaking work relating to telematics (see box on pages 12–13). This includes how ITS can best fit with next-generation networks (NGN), and the importance of this study was emphasized by Jean-Yves Monfort, Deputy Director of Standards Steering at France Telecom and Chairman of ITU–T Study Group 12, and by Pierre-André Probst, Chairman of ITU–T Study Group 16.

The International Electrotechnical Commission also conducts work relevant to telematics. Since cars now contain very many electrical and electronic systems, "the IEC is today present everywhere in cars, from batteries, to headlamps, to GPS screens, to satellite radio, to CD players and loudspeakers," said IEC's Jack Sheldon. Much of the Commission's work relating to telematics and ITS is carried out in its Technical Committee 100, which deals with audio, video and multimedia systems and equipment.

The International Organization for Standardization is very active in the field of ITS and telematics. The main focus of its work is in Technical Committee 204 (TC204), which was set up in 1992 to examine standardization for ITS. It has 12 working groups that deal with specific issues, such as electronic fee collection and traveller information systems. Its chairman is Michael Noblett, who moderated a session on standards at *The Fully Networked Car* workshop. (Mr Noblett is also Vice President, Global Automotive Initiatives, Connexis LLC.) ISO's Technical Committee 22, which deals with road vehicles, also examines topics in ITS and telematics. Its Subcommittee 3 focuses especially on electronic equipment, and has produced many standards in this area.

Harmonizing spectrum

Underlying all telematics services is the use of radio-frequency spectrum. Colin Langtry, the Counsellor for ITU–R Study Group 8, told the workshop that "as a global industry and market, there is a need to better articulate the requirement for global harmonization of ITS radio services". He said that the identification of spectrum for this purpose might be considered at a future World Radiocommunication Conference.

On a regional scale, harmonization of spectrum use across national borders is an important issue for the European Union. "Spectrum issues carry challenges, as the regulatory bodies of the 27 EU member States often follow different policies," explained Uwe Daniel, CEO of Silicon Networks GmbH. He said that in order to reach a consensus, a Working Group on Communications was launched in 2006 by the eSafety Forum, and plans to deliver recommendations to the European Commission by the end of this year. (The European Commission established the eSafety Forum in 2003, as a platform for all stakeholders working to improve road safety.)


ITU/J. Burgess


ITU/J. Burgess


ITU/J. Burgess

Telematics-equipped cars could be viewed at the Geneva International Motor Show

T. Russell Shields, Chairman of Ygomi LLC

Hans W. Gierlich of HEAD Acoustics

Bringing industries together

Most speakers at the workshop stressed the need for standardized solutions in order to achieve fully networked cars that can operate anywhere, across national borders and irrespective of the manufacturer. "All stakeholders agree that cooperative systems in road traffic will only be successful if the communication protocols, the system components and the architecture are harmonized and in many cases standardized," said Mr Daniel. "Nevertheless different market players have different priorities," he added, a point that was echoed by Stefan Dobler, Director of Multimedia Design Services and Products, Teleca Systems GmbH. At present, "there is still an understanding problem between the automotive and the communication industries," Mr Dobler said.

Among the biggest challenges to standardization is the significant difference in life cycles between mobile and consumer devices, telecommunications, and cars. This point was emphasized by T. Russell Shields, Chairman of Ygomi LLC. "Since the vehicle's lifespan is longer, we should keep most of the intelligence in the phone, or in land-based systems the phone links to, and have a simple interface to the vehicle," he said. This would allow several generations of mobile equipment to be used without modifying the car in which they travel. "What we need to do is make your car a docking station for your mobile device," Mr Shields said, which provides "plug-and-play" capability throughout the global market. The automotive and telecommunication industries "must work closely to come up with workable approaches," he added. "Global cooperation on standards is vital."

Meanwhile, there is a diversity of systems used by the automotive industry itself. "We don't want to have a Ford car talking one language and a BMW car talking another," said Reinhard Scholl, the Deputy Director of ITU's TSB, who moderated a panel discussion on standards at the workshop. Another vital challenge for manufacturers was mentioned by Denis Griot, Senior Vice President and General Manager for Europe, Middle East and Africa, Freescale Semiconductor. When people's lives depend on networked safety systems in cars, the components of those systems must achieve a standard of "zero-defect reliability" he said, but "improved methodologies and system architectures" will help to ensure such levels of quality.

Architecture for interoperability

Efforts are already well under way to create an infrastructure for telematics that is integrated within an entire "architecture" of integrated systems. In Europe, for example, the Global System for Telematics (GST) project aims to create a standardized open architecture for the supply of end-to-end telematics services, explained Michel Fond (a consultant to the Telematics and Automotive Group, Orange S.A.) and Jaques Garcin, Orange's Telematics and Automotive Director. The project involves 50 European partners: carmakers, mobile phone operators, service providers, component makers, insurance companies and roadside recovery services.

Stephen Hope, of France Telecom R&D UK Ltd, is also on the Board of Directors of innovITS, the United Kingdom's "centre of excellence" for ITS. He said that a major fo-

Nissan Motor Co.

cus in the work of innovITS is "developing a functional architecture that would accommodate a range of technologies to allow competition between solutions and thereby contribute to cost reduction and provide diverse services". In Mr Hope's view, car drivers and passengers in future will experience ubiquitous services and invisible delivery technology. They will be "even more connected to the environment, but less aware of this," he said.

Measuring distraction

Meanwhile, though, there is much work to be done on ways to deliver information to car drivers reliably and safely, but without distracting their attention from the road. "How to measure distractions is crucial," said Hironao Kawashima, Professor at the Centre for Open Systems Management, Faculty of Science and Technology, Keio University, Tokyo, and Vice-Chairman of ISO's Technical Committee for ITS (TC204). "Not enough research has been done into drivers' reactions," he commented, and standard definitions are not specific enough to particular applications.

At issue is the "human-machine interface" (HMI), or how people really use devices and data within their connected cars. This was discussed at a "Communications" workshop session moderated by Jean-Yves Monfort. It examined the challenges for audiovisual equipment in cars, as well as for the hands-free usage of controls and communication devices, including voice synthesis and voice recognition.

Mr Monfort also gave a presentation with Hans W. Gierlich, Head of the Telecom Division, HEAD Acoustics GmbH, describing the work of ITU's "FITCAR" Focus Group (see box on page 13). They said that its goals include developing standards in such fields as audio quality and speech recognition, so that drivers can safely and clearly communicate with devices in their cars, and with the outside world.

Reducing the environmental impact

The effect of cars upon the outside world has been receiving increasing attention, not only because of concerns about air quality, but also as we become more aware of the threat of climate change. Telematics has a role to play in this area too.

Monitoring a car's performance in such areas as fuel efficiency can reduce the amount of energy it consumes. In addition, emissions from cars' exhausts can be significantly reduced. Stephen Hope described another way that telematics can reduce the environmental impact of traffic through helping to "integrate logistics and traffic management systems in support of efficient manufacturing and retail supply chains". Better management means fewer trucks and/or shorter journeys.

This point was echoed by James Rosenstein, Senior Vice President, Marketing and External Affairs, Ygomi LLC. "If you have a more developed information system, you can control traffic better, and all that can lead to very significant reductions in pollutant emissions," he said.

Telematics helps to keep the air fresh and the environment clean

James Rosenstein, Senior Vice President Ygomi LLC

K. Venkatesh Prasad from Ford Motor Company

Overall, telematics should help provide "safe, efficient, secure and environmentally friendly mobility," said Monica Sundström, Chairman of the ITS advisory organization ERTICO. She reminded the workshop that "the fully networked car is only one element of a larger system connecting travellers and goods".

The final inch

However large a communication system, though, it is often the final link in the chain that presents the greatest challenge. This has become familiar in telecommunication circles as "the last mile." For telematics, this changes to "the last-inch challenge," said Mr Prasad of Ford. "The bridge has been built in the telecommunication world," he explained, "but not yet between mobile devices and the car".

There are challenges in the merging boundaries between the "brought-in" (such as iPods and mobile phones), the "beamed in" (wireless communications) and the "built-in" elements within each vehicle, Mr Prasad said. Nevertheless, he added, consumer experiences will become richer and their expectations for the fully networked car will grow.

James Rosenstein also stressed how "by 2010, we will see many new applications for networked cars". Having become used to connectivity and receiving multiple services from mobile phones, people now expect to have the same in their cars, Mr Rosenstein said. "The car has become an Internet node."

The work of ITU

Work related to the "fully networked car" is carried out in ITU's Radiocommunication Sector (ITU–R) and Telecommunication Standardization Sector (ITU–T). Relevant topics are considered by the Study Groups listed below, including how telematics can fit with next-generation networks (NGN).

ITU–R Working Party 6M:
Multimedia and interactive broadcasting systems.

ITU–R Working Party 8A:
The land mobile service, excluding IMT-2000, and the amateur and amateur-satellite services. It has recently published a "Handbook on Land Mobile (including wireless access)" Volume 4. This provides a worldwide summary of wireless communications in ITS, including architecture, systems, and applications.

ITU–T Study Group 12:
The end-to-end transmission performance of terminals and networks, in relation to the perceived quality by users of text, data, speech, and multimedia applications.

ITU–T Study Group 16:
Multimedia service capabilities, and application capabilities (including those supported for NGN).

FITCAR Focus Group

Recognizing the growing importance of telematics and ITS, in 2006 ITU–T Study Group 12 established the "Focus Group on From/In/To Cars Communication", which is also known as FITCAR. Its objective is to develop specifications to help advance the work of the Study Group, and to encourage participation by other standards organizations in this activity. The following areas are to be addressed by the Focus Group:

- *In car communication: quality parameters and testing methods*
- *Interaction of hands-free systems in cars with the radio channel*
- *Extension of the work to wideband hands-free systems*
- *Special requirements/testing procedures for speech recognition systems in cars.*

The Focus Group's second meeting took place in Ulm, Germany, on 15 March 2007, and a third meeting is scheduled for 22 June 2007, at ITU headquarters in Geneva.

Road safety is no accident

UN Global Road Safety Week (23–29 April 2007)

Improving safety on the roads is a fundamental aim of the fully networked car. Also in pursuit of this goal, the UN Regional Commissions and the World Health Organization (WHO) have jointly organized the first-ever United Nations Global Road Safety Week.

Under the slogan "road safety is no accident," its particular target will be young road users, who tend to be most at risk. But people of all ages will also benefit from the week's activities, which will include a large number of local, national and international events.

The main objectives are to raise awareness about the social impact of road traffic injuries and to promote preventative action. The problem is certainly significant. According to WHO figures, nearly 1.2 million people are killed on the world's roads every year, and more than 40 per cent of deaths occur among those aged below 25.

Elvis Santana

Daniel Duchon

Details of The Fully Networked Car *workshop can be found on the ITU website at:*

www.itu.int/ITU-T/worksem/ict-auto/200703/programme.html

Computer History Museum

The Computer History Museum, in the heart of the Silicon Valley at Mountain View, is the world's largest museum dedicated to recording the computing revolution and its impact

Silicon Valley meeting focuses on the digital divide

One of the world's foremost centres of leading-edge technology, the region known as "Silicon Valley" is located south of San Francisco Bay, in California, United States. Originally, it was home to many silicon chip manufacturers, but now has thousands of computer-related companies of all types.

As reported in the previous issue of *ITU News*, an event called "UN meets Silicon Valley" took place on 28 February 2007 at the Computer History Museum in the town of Mountain View, with the aim of sharing ideas and forging partnerships on new ways to bring information and communication technologies (ICT) to the developing world. Panel discussions examined such questions as the ideas of Silicon Valley's innovators regarding technology for development, the place of venture capitalism in achieving the United Nations Millennium Development Goals, and the need for local content on the Internet, especially in developing countries.

ITU was present, as well as other United Nations agencies, and the approximately 250 participants included senior government figures, international development experts, the International Chamber of Commerce, the World Bank, the Internet Society, and more than 100 Silicon Valley technology executives, venture capital firms and academics. The event was organized by the UN Global Alliance for ICT and Development (GAID) and Intel Corporation.

Private-public sector collaboration

"Increasing access to technology will be a critical driver of economic growth in emerging economies, but it will require Silicon Valley's leaders and the public sector to work together to make their respective programmes more impactful," said Craig Barrett, Chairman of Intel's Board and Chairman of GAID. He said the meeting was "designed to foster collaboration and, more impor-

"Investments in new business models and technological solutions tailored for developing countries will help meet people's needs and create new markets and business opportunities."

Intel

Craig Barrett, Chairman of Intel's Board and Chairman of GAID

tantly, create action to bring technology to countries around the world". He called on participants to support GAID's flagship partnership initiatives, which tackle areas where technology can improve entrepreneurship, education, health care and government services, including promoting broadband connectivity to Africa and community-based computer centres.

In his opening remarks, ITU Secretary-General Hamadoun I. Touré, said that "we need to work in partnership with governments, the private sector and civil society, and to exploit the dynamism of regions like Silicon Valley." He stressed that "only with the combined effort of all stakeholders can we hope to meet the challenge of connecting the unconnected by 2015, and achieve the goals set by the World Summit on the Information Society."

Dr Touré explained that, in addition to 191 Member States, ITU has more than 650 members from the private sector. "Our Sector Members and Associates help to ensure that strong, versatile and future-proof technologies emerge, that can interoperate on a global scale," he said. "We need the benefit of Silicon Valley's expertise and experience to ensure that ITU standards remain at the leading edge," he added, urging more firms to join ITU.

"Business fuels innovation, and so many of the world's problems are crying out for innovative solutions," commented GAID Executive Coordinator Sarbuland Khan. "There is a need to find innovative business solutions and to invest in the right technologies for the 4.8 billion people without access to ICT," he said. "Developing pro-poor business models and technology solutions that can make the market grow also enhance profits for those who have the courage to think beyond the traditional models," Mr Khan added.

It was a viewpoint echoed by Pakistan's Secretary for Information Technology and Telecommunications Farrukh Qayyum. "There is a bit of a challenge for Silicon Valley," he said. "While it is true that mature markets need new products, there is really a need to look at the needs of people who could be customers in the developing world." Trying to adapt existing solutions is not the answer, some participants said, explaining that one can't just build a Mercedes and then try to simplify it. They believe that the capability of Silicon Valley has yet to be fully deployed in focusing on the innovation that is required in those huge markets.

"Closing the digital divide should not be seen as charity, but as a sound business model attractive to industry."

Hamadoun I. Touré, ITU Secretary-General

Among the participating companies at "UN meets Silicon Valley" were Intel, Cisco Systems, Nokia Siemens Networks, Hewlett Packard, Google, IBM Venture Capital Group, Visa International and Microsoft, as well as representatives of Stanford University and the University of California, Berkeley.

Telepresence


Intel


ITU/M. Zouhri

Low-cost Internet access and computers

A number of speakers at the event said that lowering the cost of Internet access and computer equipment could create a wave of connectivity similar to that which has made mobile phone usage commonplace in developing countries. ITU statistics show that it is the fastest growing telecommunication sector, and has now reached more than a third of the global population.

However, other participants argued that the mobile industry meets basic communication needs that are relatively easy to satisfy. It would take longer for firms to invest in providing Internet access, they said, because its usefulness depends on the availability of content in local languages and on educating people how to use the network. They pointed out that technological innovation and affordability are only part of the solution.

Highlighting the importance of public-private partnerships that focus on tangible results, Dr Barrett described the Intel *World Ahead Program* that aims to improve education in developing countries. By working with local governments and businesses, the programme expands access to personal computers with high-speed Internet connections. As part of this effort, Intel is working with governments in 60 countries on financing programmes to make computers more affordable.

Innovation and cybersecurity

"Innovation is a key source of new products, added value and fresh growth in revenues," said the ITU Secretary-General. In developed economies, it is the private sector that is the engine of innovation and growth, accounting for between half and two-thirds of total spending on research and development in some countries. "The investment decisions in Silicon Valley today dictate the technologies we shall be using worldwide tomorrow," he said.

A number of companies at the meeting are already working on their migration to next-generation networks (NGN), whose development will focus more attention on the critical issue of cybersecurity. "Today's networks are ever more complex, and contain several different generations of code, creating weaknesses that can be exploited by hackers and cyberterrorists," Dr Touré said, explaining that cybersecurity will be a major priority for ITU in the coming years.

Changing business models

Silicon Valley is considered to have been the centre of the "dot-com bubble" of the mid-1990s. Many of the new businesses it created disappeared in the crash of 2000–2002, but those that survived now have a much bigger number of potential customers. Of the 1 billion Internet users worldwide today, more that 500 million have broadband access, from either mobile or fixed-line networks.


Creative Commons

San Jose, the self-proclaimed "capital of Silicon Valley"

The trends towards flat-rate pricing, bundling of services and the death of distance represent a challenge for traditional public telecommunication operators, including in San Francisco. Virtually the whole city will soon have access to free or low-cost Wi-Fi services that are not provided by the traditional incumbent.

ITU can help businesses adapt to the ongoing changes in the ICT sector, said Dr Touré. It offers a forum where equipment manufacturers, network operators, service and application providers and others concerned with the development of ICT can discuss the development of profitable new market opportunities, and learn from each other's experience. "Technological change is our business," Dr Touré said.

Tapping new markets

The four billion people in the world who live on few resources nevertheless have a combined purchasing power of USD 5 trillion, according to a report issued on 19 March by the World Resources Institute and by the International Finance Corporation (IFC), the private-sector arm of the World Bank Group. *The Next 4 Billion: Market Size and Business Strategy at the Base of the Pyramid* report says that accurate data on market potential gives firms a foundation for investment that reduces the "base of the pyramid (BOP) penalty." (The tendency for poorer people to be charged more for goods and services that may be of low quality or difficult to access.) The report urges firms to think creatively about new business models that meet the needs of these underserved markets, which are often rural and uncompetitive. However, it says that the introduction of mobile telephony is a classic example of how competition can drive improvements.

ITU predicts that, by the end of 2008, more than half the world's inhabitants will have access to a mobile phone. With markets in the developed world approaching saturation, the new growth will come from the developing world. Dr Barrett said investments in new business models and technological solutions tailored for developing countries will help meet people's needs and create new markets and business opportunities. Dr Touré challenged the meeting "to think beyond the borders of Silicon Valley, and beyond even the United States, to the emerging markets of the rest of the world". He said that closing the digital divide should not be seen as charity, but as a sound business model attractive to industry.


Intel


Intel

Intel showcased its Classmate PC, which is part of the company's World Ahead Program. The computer has been developed for students in emerging markets. Designed to run Windows or Linux operating systems, it is said to be compatible with a broad range of standard software. The Classmate PC is rugged and portable, and its battery provides about four hours of usage. As well as by keyboard, users can input notes with a wireless pen device. Intel plans to run Classmate PC pilot projects in more than 25 countries in 2007.

More frequencies needed for mobiles

Terrestrial spectrum sought for IMT

Contributed by José Costa

Mr Costa is Senior Manager at Nortel Networks and ***mib*** *Coordinator*

As the market for mobile telephony continues to grow, a key question for the industry and regulators alike is how to satisfy the spectrum requirements for these services. The mobile industry has stressed the importance of identifying sufficient harmonized spectrum globally to support the high data rate mobile broadband services that are on the horizon.

The need for faster speed, global compatibility and multimedia services has led to the development of third-generation (3G) mobile systems. In an effort to consolidate existing incompatible mobile environments into a seamless global network, ITU adopted radio access interfaces at its Radiocommunication Assembly in Istanbul in early May 2000, targeted for deployment in global frequency bands already identified at the World Administrative Radio Conference in 1992 (WARC-92). Known as International Mobile Telecommunications-2000 (IMT-2000), this global standard was realized after years of collaborative work between ITU and the global cellular community. At the end of May 2000, the World Radiocommunication Conference (also held in Istanbul) identified additional frequency bands for IMT-2000 use.

ITU reaffirmed its support for the development of mobile wireless communications at the World Radiocommunication Conference in 2003 (WRC-03). In particulier, it recognized the need for a global vision for the development of IMT-2000 systems and systems beyond, known as IMT-Advanced. As part of this commitment, ITU has been studying technical and operational aspects of how these systems will evolve.

IMT-2000 and beyond

It is envisaged that IMT-Advanced will be able to handle a wide range of supported data rates in multi-user environments. The target is peak data rates of up to approximately 100 Mbit/s for high mobility services (such as mobile access), and up to approximately 1 Gbit/s for low mobility services, such as nomadic/local wireless access. Compared with the original IMT-2000 deployments which supported up to 144 kbit/s for high mobility and 2 Mbit/s for low mobility, IMT-Advanced will meet an entirely new category of service requirements. The IMT-2000 radio technologies are expected to converge towards IMT-Advanced, supported by a common packet core network.

A number of studies have been carried out to identify future spectrum requirements in preparation for the World Radiocommunication Conference (WRC-07) that will take place in Geneva from 22 October to 16 November 2007. There has been a tremendous effort within the ITU Radiocommunication

Sector (ITU–R) to prepare for this event, in particular for agenda item 1.4 on the identification and allocation of spectrum for the future development of IMT-2000 and IMT-Advanced. The preparatory work is being conducted in ITU–R Working Party 8F.

Agenda item 1.4 of WRC-07 can be considered one of the most important for the mobile communications industry since 1992, when the first frequency bands were identified for IMT-2000 at the World Administrative Radio Conference of that year.

The work of mib

The Mobile Industry Backing Terrestrial Spectrum for IMT (known for short as "**mib**") is an industry group that is promoting preparations for WRC-07 agenda item 1.4, in collaboration with such industry forums as the CDMA Development Group (CDG) and the UMTS Forum. Members of **mib** have also been very supportive of the work of ITU–R Working Party 8F, particularly in the preparations for WRC-07.

The companies that form **mib** include Alcatel-Lucent, Ericsson, Fujitsu, Huawei, Motorola, NEC, Nokia, Nortel, Panasonic, Qualcomm, Samsung, Siemens and ZTE. The industry group's key messages are:

- Mobile communications facilitate economic growth and development, and enable the creation of new jobs and businesses.
- The market for mobile services continues to evolve and grow. Studies show that, in some markets by 2020, the total traffic per user per day will rise almost 50 times from today's level.
- Users will demand from mobile networks the same high bit-rate services and quality that currently can be provided through cable and fixed digital subscriber line (DSL) networks.
- More spectrum will be needed for IMT services in response to increased traffic.
- New bands for IMT-Advanced should be globally common, wide enough to support carriers up to 100 MHz in bandwidth, and low enough in the spectrum (preferably below 5 GHz).
- Existing spectrum bands will not be sufficient to carry the predicted traffic for IMT services after 2015.
- A decision at WRC-07 would enable IMT deployment within the 2015–2020 timeframe.
- WRC-07 is the right time to identify new spectrum for IMT. This is important as it typically takes about 7–10 years from a WRC decision until spectrum can be made available. Also, by providing a harmonized spectrum solution for IMT at WRC-07, unnecessary regional divergence can be avoided.

Planning for future requirements

According to **mib**, these spectrum requirements for mobile telephony will need to be met if ITU's vision of connecting the unconnected by 2015 is to be achieved. A report by ITU's Radiocommunication Sector (Report ITU–R M.2078) predicts the total spectrum bandwidth requirement.

The report says that for existing mobile cellular systems (including pre-IMT-2000, IMT-2000 and its enhancements, and IMT-Advanced in 2020), 1 280 MHz will be needed for low user-demand situations, and 1 720 MHz for high user-demand ones. It should be noted that even the lower figure

WRC-07 agenda item 1.4 will "consider frequency-related matters for the future development of IMT 2000 and systems beyond IMT 2000 taking into account the results of ITU–R studies in accordance with Resolution 228 (Rev. WRC 03)".


Samsung


Nokia

Nokia

ITU/M. Zouhri

(1 280 MHz) is greater than the requirement for some individual countries, while in other countries, the requirement is larger than the higher value (1 720 MHz). The prediction is based on an assumption of a single network deployment, so spectrum requirements will be higher when several parallel networks exist in a country, as detailed in Report ITU–R M.2078.

The mobile industry is developing technologies to make the use of spectrum more efficient, as well as studying proposed new concepts of spectrum management. However, changing spectrum management systems is a long-term issue, and it does not affect the benefits of globally common spectrum bands, such as economies of scale, global roaming, and smooth implementation. So it is still important to achieve spectrum harmonization.

To be able to respond to the future demands of the global mobile society, planning for future spectrum needs for IMT must be done today. The WRC-07 agenda was set at WRC-03 in anticipation of the rapid growth of mobile communications, which is the reality today. It is beneficial to know spectrum bands well in advance, so as to start the development of radio interface standards and detailed band planning.

Furthermore, administrations and industry must recognize that additional time is needed for spectrum to be made available to accommodate the necessary regional and national consultations that follow WRC decisions. Also, if required, sufficient time must be allowed for retiring or renewing existing spectrum equipment, as well as for designing and building new equipment and systems.

The Conference Preparatory Meeting focuses on the issue

Discussions on agenda item 1.4 of WRC-07 were among the most intense during the Conference Preparatory Meeting (CPM), the second session of which took place in Geneva from 19 February to 2 March 2007. It adopted a report that represents an important step in the national and regional preparations for WRC-07, as reported in the March 2007 issue of *ITU News*. The CPM-07 Report contains many complex and far-reaching items, many of them linked with major technological developments in key areas of radiocommunications, coupled with innovative ideas for their regulation.

The report is intended to help WRC-07 navigate through its agenda as efficiently as possible. However, the different points of view expressed during the CPM are a sign that more difficult discussions, negotiations and compromises can be expected during WRC-07. While the CPM only produces a comprehensive report for reference, WRC will make decisions that are treaty binding. It will result in a new edition of the ITU Radio Regulations, which are crucial for the success of terrestrial mobile telecommunications around the globe.

The Conference Preparatory Meeting retained for consideration at WRC-07 the candidate bands for mobile telephony identified by ITU–R Working Party 8F. These bands are:

410–430 MHz	2.3–2.4 GHz
450–470 MHz	2.7–2.9 GHz
470–806/862 MHz	3.4–4.2 GHz
	4.4–4.99 GHz

The advantages and disadvantages for each of these bands were considered and included in the CPM-07 Report. However, a number of administrations remain opposed to some of the candidate bands.

The report also outlines methods, to be considered under agenda item 1.4, for allocating spectrum for the future development of IMT-2000 and IMT-Advanced. These are:

- Existing IMT-2000 spectrum could be identified generically for IMT, and any additional spectrum could be identified generically for IMT in the Radio Regulations.
- Existing IMT-2000 footnotes in the Radio Regulations would not change, and any additional spectrum could be identified generically for IMT in the Regulations.
- Any additional spectrum could be identified specifically for IMT-Advanced, or specifically for IMT-2000 (including its future development), or for both IMT-Advanced and IMT-2000.
- No specific identification of additional spectrum for IMT, but a Resolution or Recommendation may be prepared to provide the principles and conditions for the use of the frequency bands suitable for IMT.
- No change to the Radio Regulations. This method could be applied on a band-by-band basis to all or parts of any of the candidate frequency bands.

Consultations continue

Work to prepare for WRC-07 will continue in regional organizations, and the seminars conducted by **mib** are intended to assist in those preparations. So far, **mib** has conducted a seminar for countries in the Asia-Pacific Telecommunity (APT) in Bangkok, Thailand, as well as one in Africa (Yaoundé, Cameroon). It plans to hold a seminar for countries in the Inter-American Telecommunication Commission (CITEL) in April 2007 in San Salvador, El Salvador.

For further reading

- Recommendation ITU–R M.1645, "Framework and overall objectives of the future development of IMT-2000 and systems beyond IMT-2000", 2003. www.itu.int/rec/recommendation.asp?type=folders&lang=e&parent=R-REC-M.1645
- ITU Radio Regulations, 2004. www.itu.int/publications/folderdetails.aspx?lang=e&folder=R-REG-RR-2004&menu=categories
- ITU–R Wireless Access Systems Portal. www.itu.int/ITU-R/study-groups/was/index.html
- Recommendation ITU–R M.1457, "Detailed specifications of the radio interfaces of IMT-2000", 2006. www.itu.int/rec/recommendation.asp?type=folders&lang=e&parent=R-REC-M.1457
- ITU Handbook on "Deployment of IMT-2000 Systems", 2003. www.itu.int/itudoc/gs/imt2000/84207.html
- "Migration to IMT-2000 Systems" — Supplement 1 to the Handbook on Deployment of IMT-2000 Systems. www.itu.int/pub/R-HDB-46-2005/en
- ITU–R Handbook on "Land Mobile (including Wireless Access) Volume 2: Principles and Approaches on Evolution to IMT-2000", 1997. www.itu.int/pub/R-HDB-30-1997/en

Influential ITU standard marks 25th anniversary

Recommendation 601 drives digital television worldwide

Contributed by David Wood

Mr Wood is Head of New Technology at the European Broadcasting Union (Geneva) and was the Chairman of CCIR IWP 11/4, ITU–R Working Party 11A

Hundreds of millions of digital television sets across the world today operate on the basis of an ITU Recommendation that marks its 25th anniversary this year. Analogue television will close down over the next ten years across the world, and eventually 4 or 5 billion viewers will be watching digital pictures based on Recommendation 601. It formed a bridge between the analogue and digital worlds and has been the most quoted and used technical document in the history of television.

Facilitating the development of digital television has been the task of the ITU Radiocommunication Sector (ITU–R) and of its predecessor, the International Radio Consultative Committee (known under its French acronym, CCIR). In the autumn of 1981, CCIR Study Group 11 approved a document describing the parameter values for a digital video format. In February 1982, the CCIR Plenary Assembly approved this document as Draft Recommendation AA/11 "Encoding Parameters for Digital Television for Studios". This eventually became ITU–R BT Recommendation 601. I had the privilege of chairing the drafting group that prepared the Recommendation a quarter-century ago, and I took part in the international negotiations that led to its adoption by CCIR.

Recommendation 601 (as it is often called) is now in its sixth version (ITU–R BT. 601-6) under the title "Studio encoding parameters of digital television for standard 4:3 and wide screen 16:9 aspect ratios". It is the basis for not only standard quality video, but also the higher quality forms of 720p, 1080i, and 1080p. Thus, the application of the Recommendation will stretch far into the future.

The dawn of digital television

The first experiments in digital technology for television in the 1970s took the existing composite analogue PAL, SECAM, and NTSC signals and made digital versions of them. This was called "digital composite coding".

An important technical parameter was the choice of "sampling frequency", or the rate at which the analogue signal is examined and converted to digital numbers. However, it was impossible to find a single sampling frequency that would suit PAL, SECAM, and NTSC at the same time, because of the way these systems had been developed. Applying the technique of digital composite coding would have led to different digital television production systems being used in different world regions, and

eventually to different digital broadcasting standards.

A first breakthrough came in Europe in 1979 with the agreement to use a unique digital system, "digital component coding", for both PAL and SECAM. It was the result of discussions between studio equipment manufacturers and broadcasters, culminating in an agreement at a meeting at the Television Symposium in Montreux, Switzerland. In digital component coding, the different parts of the television picture (the "luminance" and "colour difference" signals) are treated separately, rather than together as they are in digital composite coding. One of the greatest advocates of digital component coding was Chris Clarke of the British Broadcasting Corporation (BBC).

The PAL and SECAM worlds initially proposed a single digital component coded system with a sampling frequency of 12 MHz for the luminance signal (Y) and 4 MHz each for the two colour difference signals (U and V). However, it remained for NTSC countries to decide a digital production standard. Pioneers such as Joseph Flaherty of the US broadcaster CBS had the foresight to recognize what would be gained if not just PAL and SECAM had a common system, but the NTSC world adopted digital component coding too. But, for such a system, the United States and Canada preferred a higher sampling frequency of 14.3 MHz (Y) and 7.15 MHz (U,V). It soon became clear that only if both sides compromised would an agreement be reached.

The magic number

A number of factors affected the choice of a worldwide sampling frequency: the picture quality had to be good enough ("quality transparency with the source"), and the digital signal had to be capable of withstanding the various processes of television post-production ("quality headroom for post-processing"). In addition, the choice had to suit the world's two different structures for television pictures: 525 lines with 60 fields per second (525/60) and 625 lines with 50 fields per second (625/50). The quality transparency requirement seemed to be met by a sampling frequency of 12 MHz and above, but achieving the second objective — quality headroom for post-processing — needed 13 MHz or more. For the PAL and SECAM worlds, the number needed to be as close as possible to 13 MHz.

Several people worked on this problem, and many came up with the same idea: the

magic number was 13.5 MHz. However, the father of the idea, and the first to propose it, was Stanley Baron of NBC.

Of all possible sampling frequencies for the luminance signal, 13.5 MHz has a unique property: it is a common multiple of the line frequencies of both the 525/60 and the 625/50 scanning structures. This means that the sampling pattern is "stationary" and "orthogonal" in both cases, and both systems can be arranged to have another common element: the same number of samples per active line. The best combination for convenience, quality, and post processing capability was thus 13.5 MHz (Y) and 6.75 MHz (U,V).

In truth, a very important point was that the sampling frequency favoured no particular side in the debate. One by one, the world's Broadcasting Unions supported it. The last piece fell into place in 1982 at a meeting of CCIR Study Group 11, when Japanese participant Mr Y. Tadokoro from the broadcaster NHK announced that his country could accept 13.5 MHz. He and his team had worked hard to achieve a laboratory analysis of sampling frequencies in an incredibly short time, so allowing Japan to agree.

Seizing the day

The agreement at CCIR was the result of an enormous effort by numerous people. There were laboratory tests of parameter values in many parts of the world, and there was much travel, by me and others, to explain at length why the proposed values were the best compromise. So many people were involved in achieving this success, that it is impossible to name them all. Risking their anger by mentioning just a few, I recall Richard Green, who led the United States team, and the late Howard Jones and Jacques Sabatier from Europe. Also, I cannot fail to mention the remarkable Chairman of CCIR Study Group 11, Professor Mark Krivocheev, who did so much to ensure the success of the project. Finally, the unsung heroes of ITU, the secretariat, must be applauded. There was no easy way to obtain agreement, just very thorough preparation and fairness throughout the process.

Twenty-five years ago, Recommendation 601 was the right result, achieved at the right time, in the right way. Through hard work and cooperation, we were able to "seize the day" and help create a common digital system for television around the globe.

In recognition of the importance of Recommendation 601, ITU received an "Emmy" award in 1983, for developing a common world standard for digital television.

A "Technology and Engineering Emmy" is given by the National Academy of Television Arts and Sciences, of the United States, for outstanding achievement in those fields.

Professor Mark Krivocheev, then Chairman of CCIR Study Group 11

ICT success stories

Innovative technologies are crucial in helping to connect people to the information society, no matter where they live. Here, we look at some examples of how such innovation is being put to good use around the world.


Guy-Claude Portmann

Internet post offices in India

In many parts of rural India there are often long delays in delivering letters to people, due to the poor transport links. However, a system of "wireless Internet post offices" could offer the alternative of electronic mail, helping to deliver messages more rapidly.

A research project on the system was carried out by the Asia-Pacific Development Information Programme (APDIP), which is an initiative of the United Nations Development Programme (UNDP). A working prototype, set up at the Indian Institute of Technology in Delhi, was used to validate the design and to carry out performance tests.

The successful results showed that the wireless Internet post office is capable of delivering text-based messaging services to remote villages through a network of solar-powered wireless repeater stations. Customers send or collect mail on low-cost, personal digital assistants (PDA), much like dropping off and picking up letters at a post office.

An important requirement for the system's sustainability is to minimize costs and complexity. This is achieved through using off-the-shelf components, operating in the international license-free band and using directional antennas to provide inexpensive long-range wireless networking.

The project has created a website to disseminate information on how to build and deploy a wireless Internet post office system. The website provides complete specifications of the system design, as well as links to similar work. UNDP believes that the wireless post office concept can form a basis for a wide range of low-cost, wireless business services in remote areas.


Judepics

Traditional post offices in India could be supplemented by Internet services

Remote communities in Peru have a new way to receive information

Podcasting in Peru

Radio has long been acknowledged as a medium that can effectively reach people at the grassroots level. However, broadcasting has been associated with significant costs, as well as various regulatory issues that have to be overcome. Now, podcasting offers a low-cost way of broadcasting audio to targeted groups of people.

Podcasting takes its name from the well-known Apple MP3 player, the iPod, that allows users to download music from the Internet. Podcasting is a method of publishing audio files via the Internet (including speech), and users can subscribe to a feed and receive new files automatically. Any digital audio player, or computer with audio-software, can play podcasts, and they can be saved on CDs. For communities, local radio stations are able re-broadcast podcasts, while computers at local information centres can be used to view a CD library of the programmes.

In Peru, the Latin America arm of Practical Action, a non-governmental organization from the United Kingdom, is helping rural farming villages in the region of Cajamarca to benefit from podcasts in this way. They can receive expert advice, or local news, in their own languages. Programme content is tailored to local needs and interests. In Chanta Alta, for instance, the programmes provide information about cattle raising and dairy production, while in Chiliete they focus on the cultivation of grapes and beans. The language is kept simple, making the broadcasts more accessible than technical leaflets.

Practical Action hopes that if the pilot project proves successful, the scheme can be expanded to enable people to listen to podcasts on mobile phones or PDAs, and to cover more developing countries.

South Africa's new video portal

Launched in January 2007, MyVideo.co.za is a South African video portal that hopes to give local film makers, musicians and designers a chance to expose their work to the public. MyVideo, based in Cape Town, is intended as a forum for content produced in South Africa, and is expected to help the profile of the country's cultural productions.

The website allows users to view video on demand, and offers social networking opportunities. Its creators are focused on making sure that the content is of high quality and does not contain immoral material. Another purpose of the MyVideo platform is to act as a targeted communication channel between people in South Africa and the large number of expatriates, creating an online community.

The website has already positioned itself as a strong competitor in the international world of user-generated content. Even though broadband connectivity is still not within the reach of the majority of South Africans, broadband penetration is growing fast and is expected to boost this kind of interactive resource. And, after a promising start, the platform is already exploring opportunities for entering the mobile market, as well as providing additional services to users.

A new website lets you view South African video clips

Reducing waste from electronic equipment

Discarded electronic equipment can contaminate soil and water, and is a growing problem as information technology becomes increasingly popular. Finding safe ways to dispose of old computers is difficult. Burning "e-waste" causes emissions of highly toxic chemicals, which can cause cancer and affect children's brain development.

To help tackle this problem in the developing world by reducing the amount of e-waste, the United Nations has launched an initiative to extend the life of computers and electronic equipment, and make sure that these resources are used efficiently.

The Solving the E-waste Problem (StEP) initiative was launched in March 2007, and will highlight how many electronic items sent to developing countries by charitable bodies often end up unused. The project will take a "wealth from waste" approach, arguing that it is in the interest of manufacturers to recycle equipment and recover the many expensive metals — such as gold, silver and indium — that are used in flat-screen monitors and mobile phones.

The key goals of the initiative are to draw up global standards for recycling, extending the life of products by creating markets for their reuse, and harmonizing world legislation and policy on e-waste. The first country to benefit from the programme will be China. Additional, large-scale projects are expected to follow, helping developing countries to safely dismantle and dispose of electronic devices.

The StEP initiative is a consortium of major hardware manufacturers and software companies, such as Cisco Systems, Dell, Hewlett-Packard and Microsoft, as well as UN agencies, including the UN University, the UN Conference on Trade and Development (UNCTAD), and the UN Environment Programme (UNEP).

To discover many more ICT Success Stories and to contribute your own, visit ***www.itu.int/ict_stories***

The website is managed by ITU's Strategy and Policy Unit.

From monocle to mirror

How a renowned physicist speeded up telegraphy

Sir William Thomson, 1st Baron Kelvin of Largs

"There can be little doubt that the man chiefly responsible for changing submarine cable-laying from an esoteric art to an exact science was William Thomson." Arthur C. Clarke

Early promise

Thomson was born in Belfast in 1824 and moved to Scotland with his family at the age of nine. His father had been appointed Professor of Mathematics at Glasgow University, and William studied there from an early age. While still a teenager, he published his first scientific paper in 1841, on Fourier's mathematics. In the same year, he entered Cambridge University where, as well as distinguishing himself academically, he won prizes for rowing.

At the age of just 22, Thomson returned to Glasgow to become professor of natural philosophy — a post he held for more than 50 years. At the university, he established the first physics laboratory in Britain, where he conducted pioneering research into electricity and thermodynamics. Significantly for telegraphy, his studies of the flow of heat through a wire showed that the same mathematical equations could be used to calculate the velocity of electric current in a cable.

The previous *Pioneers' Page* described how telegraphy spanned the Atlantic Ocean. On board the ships that laid cable for the project was a Briton who became one of the most renowned scientists of his day: William Thomson — later honoured as Lord Kelvin. As well as contributing to great advances in physics, he invented an instrument that much improved telegraphic transmissions.

Bandwidth battles

Telegraph messages are created by varying an electric current sent along a wire. However, the electrical resistance of the wire reduces the strength of the signals, which are also slowed down because of the wire's capacitance (its ability to store an electrical charge). The effect was small in early overland telegraph wires, but in submarine cables, the water acted as a conductor to greatly increase capacitance. These problems became worse as the wire got longer, resulting in a loss of what is now called bandwidth. Fewer pieces of intelligible data could be transmitted. And when it came to a 3000-kilometre cable spanning the Atlantic, the difficulties were huge.

This task was to be attempted by the Atlantic Telegraph Company, whose "chief electrician" was Edward O.W. Whitehouse. Although not trained in physics, he had conducted practical experiments in telegraphy and believed that the bandwidth problems could be overcome by pushing very large voltages along the submarine cable. Unfortunately, this theory was proved wrong when it caused the failure (after only a few weeks) of the first transatlantic cable in 1858. And it had been very hard to discern the relatively few messages carried during its short life.

Whitehouse had rejected the theories of one of the company directors: William Thomson. The professor had discovered a "law of squares" that says if a cable is made (for instance) ten times longer, the rate of signalling it can handle will go down by a factor of one hundred. The way to overcome this was not to raise the voltage, but to find a way to detect faint signals that could be "whispered" down the wire, rather than "shouted" as in Whitehouses's design.

Question for next time

When was the fax machine invented?

Dancing lights and frictionless pens

The story goes that Thomson got the idea of his device from watching the patterns of light created on the wall of his study when he twirled his monocle in his fingers. This led him, in 1856, to create a highly sensitive mirror galvanometer for detecting faint electric current. Rather than moving a metal pointer, electromagnets in the galvanometer turned a tiny mirror that reflected a beam of candlelight along a scale. By thus amplifying the effect of the current, it could show very small amounts that arrived with a Morse dot or dash. Also, faults in the cable could be detected if the light beam flew off the scale.

In 1858, Thomson patented his invention, which achieved transmission speeds of around 25 words per minute. He introduced further refinements in 1870 with his "siphon recorder" which recorded telegraphic signals from the mirror galvanometer onto tape, allowing even faster operation. Suspended between the poles of a magnet was a small coil that moved with the variations in current in the telegraph wire. Attached to this was a frictionless "pen" that could operate as fast as the galvanometer's moving spot of light. It comprised a U-shaped glass tube of very small diameter that had one end dipped into a bottle of ink and the other suspended a few millimetres above the moving tape. The ink was given an electrical charge so that it was attracted to the (grounded) paper, and a line was made — without friction — that waved as the siphon moved with the dots and dashes of Morse code.

Setting standards

The Atlantic finally had a reliable, long-term telegraph link in 1866. At the time of Thomson's work on the project, there were no agreed ways to measure electricity. It was not until the 1880s that ohms, volts and amperes were agreed as standards. Thomson actively promoted the development of a coherent system of units in physics, and his own name (as Lord Kelvin) lives on as a scientific unit. He developed the concept of "absolute zero" temperature at which no heat energy remains, and proposed a scale with this point at its base. Nowadays, this is known as the Kelvin thermodynamic temperature scale, with absolute zero (–273.15°C) defined as zero kelvins, or 0°K (formerly called "degrees Kelvin").

Not enough time

Thomson was not always in tune with new ideas. He refuted the theory of evolution published by Charles Darwin in 1859. Based on his study of thermodynamics, Thomson calculated that the Sun (and the Earth) were not old enough to give time for evolution. The Sun's continuing heat source of radioactivity was not discovered until a few years before Thomson's death in December, 1907.

Thomson's mirror galvanometers greatly increased the capacity of telegraph systems

Science Museum/Science & Society Picture Library

From official sources

Constitution and Convention of ITU (Geneva, 1992)

The Government of the **Republic of Kiribati** has acceded to the above-mentioned Constitution and Convention. The instrument of accession was deposited with the Secretary-General on 10 January 2007. This accession applies to the Constitution and Convention as amended by the Plenipotentiary Conferences of Kyoto, 1994; Minneapolis, 1998; and Marrakesh, 2002.

Instruments amending the Constitution and the Convention of ITU (Marrakesh, 2002)

The Government of the **Republic of Uzbekistan** has acceded to the above-mentioned instruments amending the Constitution and Convention. The instrument of accession was deposited with the Secretary-General on 19 January 2007.

The Government of the **Islamic Republic of Pakistan** has ratified the above-mentioned instruments amending the Constitution and Convention. The instrument of ratification was deposited with the Secretary-General on 10 January 2007.

The Government of the **Syrian Arab Republic** has ratified the above-mentioned instruments amending the Constitution and Convention. The instrument of ratification was deposited with the Secretary-General on 14 February 2007.

Optional Protocol on the Compulsory Settlement of Disputes relating to the Constitution and Convention of ITU and to the Administrative Regulations (Geneva, 1992)

The Government of the **Republic of Kiribati** has acceded to the above-mentioned Optional Protocol. The instrument of accession was deposited with the Secretary-General on 10 January 2007.

Protocol revising certain parts of the Regional Agreement relating to the planning of VHF/UHF television broadcasting in the African Broadcasting Area and neighbouring countries (Geneva, 1989) (RRC-06-REV.GE89)

The Government of the **State of Qatar** has ratified the above-mentioned Protocol. The instrument of ratification was deposited with the Secretary-General on 7 February 2007.

Change of name

In the **Bolivarian Republic of Venezuela**, the Ministry of Infrastructure has changed its name to *Ministry of the People's Power for Telecommunications and Informatics*.

Acterna Germany GmbH, a Sector Member of ITU–T, has changed its name to *JDSU Deutschland GmbH (Eningen, Germany)*.

Bashair Telecom Co. Ltd, a Sector Member of ITU–D, has changed its name to *MTN Sudan (Khartoum, Sudan)*.

Broadcast Communications Ltd, a Sector Member of ITU–R, has changed its name to *Kordia™. (Wellington, New Zealand)*.

Heinrich Hertz-Institut für Nachrichtentechnik Berlin GmbH, a Sector Member of ITU–T, has changed its name to *Fraunhofer Gesellschaft zur Förderung der angewandten Forschung e.V. (Berlin, Germany)*.

Spacetel Syria, a Sector Member of ITU–D, has changed its name to *areeba Syria (Damascus, Syrian Arab Republic)*.

From official sources

Structural changes

Gabonese Republic: The *Agence de Régulation des Télécommunications (ARTEL)* is now responsible for technical coordination in the telecommunication domain at the international level, in lieu of Gabon Télécom. This change follows completion of the reform process of the telecommunication/ICT sector in the country. *ARTEL* shall represent Gabon within ITU.

Republic of Montenegro: The *Ministry of Transportation, Maritime Affairs* and *Telecommunications* shall represent Montenegro within ITU.

Republic of Tajikistan: The Ministry of Transport and the Ministry of Communications have merged into a single Ministry, which is now called *Ministry of Transport and Communications*.

New Sector Members

Radiocommunication Sector

Emirates Integrated Telecommunications Company (Dubai, United Arab Emirates) and *Siemens AG (Munich, Germany)* have been admitted to take part in the work of this Sector.

Telecommunication Standardization Sector

Emirates Integrated Telecommunications Company (Dubai, United Arab Emirates), Intermatica S.p.A (Rome, Italy), Siemens AG (Munich, Germany), Syniverse Technologies Inc. (Tampa, Florida, United States) and *VoiceAge Corporation (Montreal, Quebec, Canada)* have been admitted to take part in the work of this Sector.

Telecommunication Development Sector

Association des Consommateurs de Télécommunications de Côte d'Ivoire (ACOTELCI) (Abidjan, Côte d'Ivoire), Conversay Corporation (Redmond, Washington, United States), Cullen International (Namur, Belgium), Emirates Integrated Telecommunications Company (Dubai, United Arab Emirates), LADCOMM Corporation (Stittsville, Ontario, Canada), SAMENA Telecommunications Council (Dubai, United Arab Emirates), Syniverse Technologies Inc. (Tampa, Florida, United States) and *The Village Group Inc. (Waltham, Massachusetts, United States)* have been admitted to take part in the work of this Sector.

New Associates

Radiocommunication Sector

Apple Incorporated (Cupertino, California, United States) has been admitted to take part in the work of Study Group 6. *In Motion Technology (Westminster, British Columbia, Canada)* has been admitted to take part in the work of Study Group 8.

Telecommunication Standardization Sector

Ellipso, Inc. (Washington DC, United States) has been admitted to take part in the work of Study Group 2. *Alphion Corporation (Princeton Junction, New Jersey, United States), BATM (Yokneam Ilit, Israel), Corrigent Systems (Tel Aviv, Israel), Entropic Communications (San Diego, California, United States), iPhotonics (Richardson, Texas, United States)* and *Metalink Ltd (Yakum, Israel)* have been admitted to take part in the work of Study Group 15.

Diary of ITU Events

Up-to-date details of forthcoming ITU meetings and conferences can be viewed on the ITU website at

http://www.itu.int/events/index.asp

Official Visits

During March 2007, courtesy visits were made to ITU Secretary-General Hamadoun I. Touré by the following ministers, and by ambassadors and permanent representatives to the United Nations Office and other international organizations in Geneva, as well as by a chairman of the board of a communications regulatory authority.

Algeria's Ambassador Idriss Jazaïry

Azerbaijan's Ambassador Elchin Amirbayov

Kyrgyzstan's First Deputy Minister of Transport and Communications Beisehenov Zhanat Samatovich

Cuba's Minister of Foreign Affairs Felipe Pérez Roque

The African Union's Ambassador and Permanent Observer to the United Nations in Geneva, Khadija Rachida Masri

Bhutan's Ambassador Sonam Rabgye

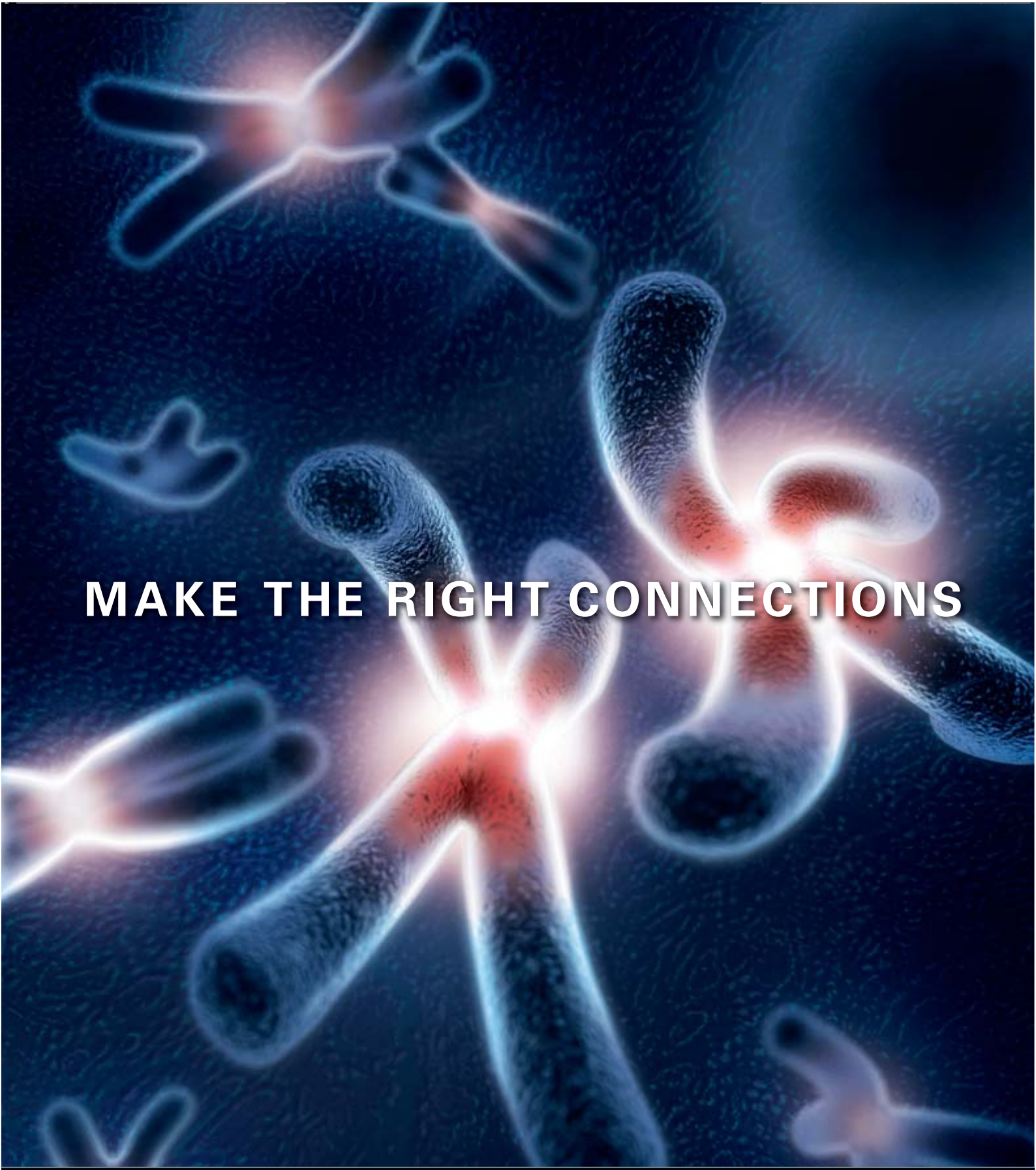
Zimbabwe's Ambassador Chitsaka Chipaziwa

Jordan's Ambassador Mousa S. Burayzat

The International Organization of la Francophonie's Ambassador Libère Bararunyeretse with the Internation Director of la Francophonie Numérique Pietro Sicuro

Spain's Minister of Industry, Tourism and Commerce, Joan Clos (right) and Spain's Ambassador Antonio March Pujol (left)

Ambassador Richard E. Mariki, Chairman of the Board, Tanzania Communications Regulatory Authority



ITU TELECOM EUROPE 2007
Sofia, Bulgaria
3-6 December

Multiplying ideas, transferring knowledge and making the right connections are what ITU Telecom Europe 2007 is all about. It's the crucial ICT networking platform for the European region. Join leaders of industry, governments, regulators, innovators and visionaries to explore, discuss and shape the future of Europe's ICT sector. Organized by the International Telecommunication Union (ITU). Visit www.itu.int/europe2007

Helping the world communicate TELECOM

Communication has always been a human need.

We believe it is also a human right.

At the International Telecommunication Union (ITU), we believe that no human right, including the right to communicate, can survive unless it is made real and relevant. As the United Nations specialized agency for telecommunications, it is our mission to bring the benefits of information and communication technologies to as many of the world's people as possible. This is why our 191 Member States and 650 private sector members work together to set universal telecommunication standards, establish international agreements and promote global development. Everyone has the right to communicate. We help give them the means.
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