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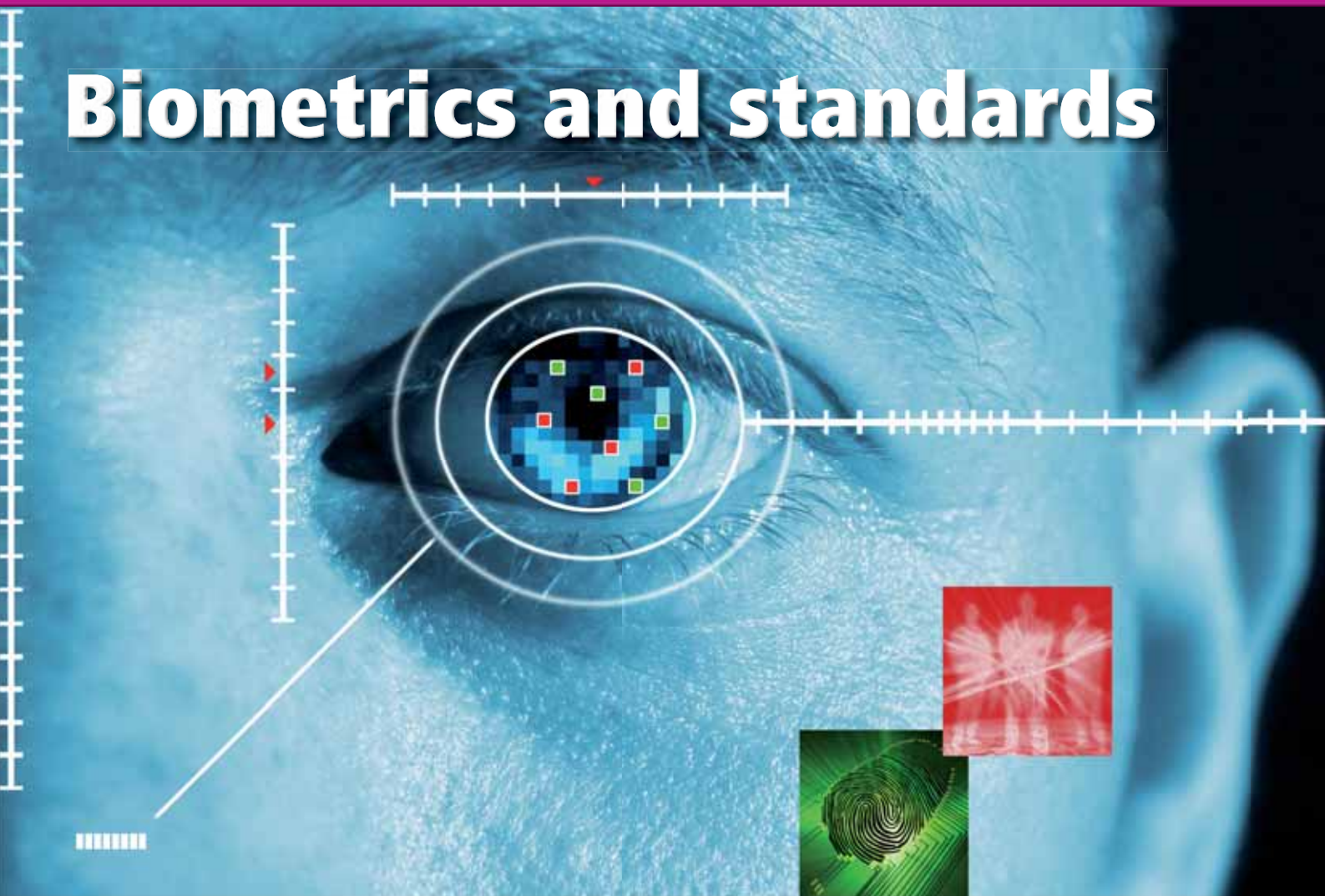
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ITU NEWS

www.itu.int/itunews

Biometrics and standards



Connect CIS Summit in Belarus





Wake-up call.

Climate change is a serious problem. So at the International Telecommunication Union (ITU), we're looking at serious solutions. For instance, by using information and communication technologies (ICTs) to monitor global climate change. Or by working with other industries to reduce greenhouse gas emissions through the innovative use of ICTs. And, of course, by promoting and adopting a carbon neutral approach within our own industry. We've heard the wake-up call. Through leadership and example, ITU is determined to answer it.

Helping Haiti

Dr Hamadoun I. Touré
ITU Secretary-General



■ As we begin 2010, we have learned of yet another, devastating natural disaster: the severe earthquake that struck Port-au-Prince, the capital of Haiti, on 12 January. We do not yet know how many thousands have died or been injured, but it is clear that there has been massive damage to the city and millions of people have been affected in a country with comparatively little emergency infrastructure.

One of the first pieces of news was the fact that — there was no news from the devastated area. All telecommunication systems were down and neither victims nor aid agencies could find out exactly what had happened or summon help. This is a dramatic example of the fundamental importance of communications in the wake of disasters.

It is a challenge to which ITU has responded immediately. From our ICT Development Fund, we have allocated some USD 1 million to support disaster relief efforts in Haiti. In addition, we have sent 40 satellite terminals to establish basic communications, and a further 60 units with broadband capacity have been dispatched (all previously donated by Inmarsat, Iridium and Vizada). ITU will also set up a Qualcomm Deployable Base Station. This is a complete system that provides a high-speed mobile network able to cope with data-rich applications such

as telemedicine, as well as voice calls. Experts are now in Haiti to help set up all this equipment, and to assess how telecommunication networks in Port-au-Prince might be rehabilitated.

ITU regularly responds to natural disasters. Most recently, equipment for satellite communications was sent to Samoa and Tonga, following an earthquake and tsunami in that region on 29 September 2009. Just one day later, the first of two major earthquakes caused great damage in Sumatra, Indonesia, and ITU sent satellite terminals there too. There have been many more instances of ITU's assistance, including support for relief efforts after Cyclone Nargis battered Myanmar on 2 May 2008 and a deadly earthquake struck Sichuan province, China, just ten days later.

We provide this assistance in partnership with our membership, whom I thank most wholeheartedly. It is literally vital work, and I appeal to all potential partners, among ICT companies and others, to contact ITU and join us in helping to alleviate suffering that most of us can scarcely imagine. The earthquake in Haiti is said to be the worst in 200 years. In the words of United Nations Secretary-General Ban Ki-moon, it is a "major humanitarian emergency". ITU will do all it can to help.





The year ahead for ITU

Emergency communications was one of the areas that I identified as a priority for ITU upon my election as Secretary-General in 2006, alongside cybersecurity and closing the digital divide. They are of even more importance today. During 2010, ITU will continue to work hard in these fields, as well as on the topic of climate change that affects us all.

Progress on spreading not only basic telecommunications, but also broadband access to the Internet, will be reviewed in May at the WSIS Forum to be held in Geneva. It will look at how the aims of the World Summit on the Information Society (WSIS) are being implemented, now that we are half way towards the target date of achieving those goals by 2015.

This year, ITU will celebrate World Telecommunication and Information Society Day, on 17 May, at World Expo 2010 Shanghai, in China. The theme of “Better city, better life with ICT” is in line with the focus of the Expo on improving life in cities, where half the world’s population now live.

Then, on 24 May, the World Telecommunication Development Conference 2010 opens in India, lasting until 4 June. As well as reviewing progress in this field, the conference will decide the focus of ITU’s future work. This is not simply an event for developing countries. Other nations and the private sector

should also take up the opportunities presented in partnerships to tackle the digital divide.

Mexico plays host to the other very significant event for ITU in 2010: the Plenipotentiary Conference on 4–22 October. It will see the election of ITU’s top officials and it has tasks that are of fundamental importance for the Union — reviewing aspects of ITU’s Constitution and Convention, and deciding upon a good Strategic Plan, backed by a strong Financial Plan.

I am very pleased to say that ITU’s finances are stable, and I am confident that we can maintain the membership’s contributions at the current level. Of course, we will also strive to do better. We need to look at making ITU’s funding mechanisms simpler and more predictable, while keeping the voluntary nature of contributions. Meanwhile, with our introduction of new management tools — especially those based on ICT — we should achieve greater transparency and efficiency. The basic aim, as always, will be to provide value for money for our membership.

The year ahead will bring opportunities for ITU to refocus on its mission to connect the unconnected — be they in areas not yet served by modern communications, or (like the population of Port-au-Prince) in need of vital help following disasters. It is a mission to which I, and all ITU staff, remain fully committed.

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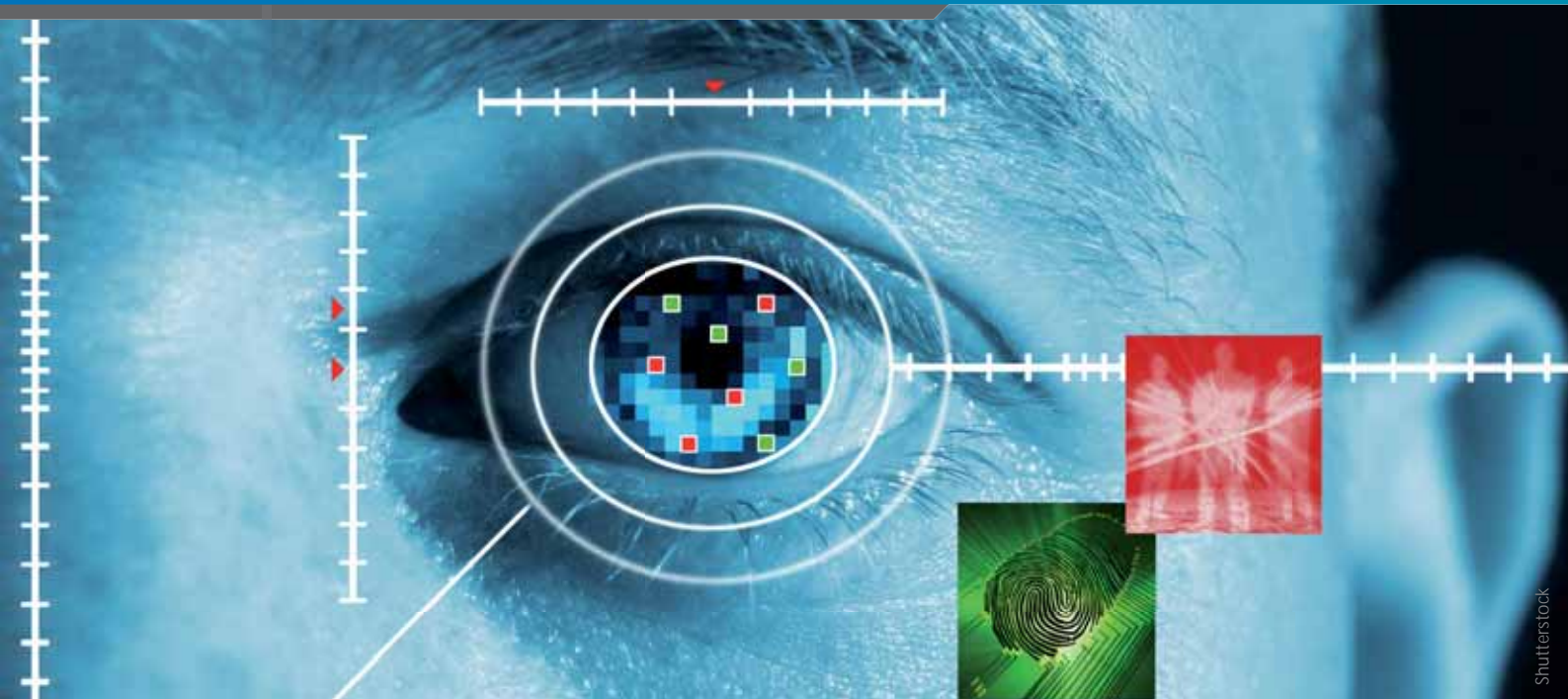
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Biometrics and standards

■ Usually, we recognize people we know by looking at their faces, sometimes by their voices or handwriting, or by the way they move. In times past, human scrutiny was the only way of checking the identity of travellers moving from one country to another, visitors seeking to enter private areas, or traders withdrawing cash from banks. This is no longer realistic, given the growth of international travel, the need for security in workplaces, and the spread of electronic banking, among many other changes in our daily lives. Nowadays, there is a new way of checking identity, using automated methods and information and communication technologies (ICT) to recognize individuals based on physical or behavioural traits — a

field known as biometrics. This is the topic of a new Technology Watch report from ITU on “Biometrics and Standards”^{*}.

Biometrics are now applied in electronic passports, as well as for finger-vein recognition in automatic teller machines (ATM) in banks, and even to prevent vending machines from selling cigarettes to children. In each case, some combination of inherent characteristics is measured and automatically compared with templates stored on a token or in a database to find a match. The measured characteristics are often physical but may also be behavioural, such as a pattern of keystrokes in entering a word or phrase. With the wide acceptance of biometrics for

^{*} This article is based on the Technology Watch Report “Biometrics and Standards” issued by ITU’s Telecommunication Standardization Sector (ITU-T) in December 2009. Technology Watch reports are prepared by the ITU-T Policy & Technology Watch Division. They evaluate emerging technologies to assess their implications for the ITU membership, especially developing countries, and to identify candidates for standardization work. The reports can be viewed and downloaded at www.itu.int/ITU-T/techwatch.

identity verification, especially in an open network environment, the challenges of privacy, reliability and the security of biometric data become more complicated and demanding.

Anyone who has queued at a check-in point at an airport will appreciate the importance of speed and accuracy in reading an electronic passport. Similarly, when you draw money from an ATM, you expect to be the only person able to gain access to your account. These uses of biometrics grew out of the development of measures to meet the need for accurate identification in the fields of criminology and forensics — the fingerprints and DNA samples that feature so prominently in crime stories. There are now three main categories of biometric applications: forensic, governmental (passports, identity cards, voter registration, and so on), and commercial (for example, network login systems, ATM, credit-card processing, and face recognition in photographic software).

To ensure that biometric identification systems are reliable, secure, interoperable and easy to use, there is an evident need for the development of international standards. Governmental authorities, in particular, are unlikely to accept a non-standardized system offered by a single manufacturer. There has to be general agreement on what biometric traits to measure, and confidence that the chosen metrics will distinguish between any two individuals. Standards are also needed to protect biometric data, both to maintain personal privacy and to prevent attacks that would open the way for fraud or impersonation. The underlying objectives in standardization are to make biometric systems easier to install, cheaper to run and more reliable to use.

Standards-setting organizations

Although the earliest biometric standards were created by governments and law-enforcement agencies in the 1980s to exchange fingerprint data, the current accelerated pace of standards development did not begin until 2002. Now, several national and international players are developing these standards. They include the International Organization for Standardization (ISO), the International Electrotechnical Commission (IEC), and ITU's Telecommunication Standardization Sector (ITU-T). Industry consortia also develop standards that support the objectives of their membership, while United Nations specialized agencies, such as the International Civil Aviation Organization (ICAO) and the International Labour Organization (ILO), develop standards within their specific domains that might not have been addressed by other organizations. In particular, ICAO is responsible for the standardization of machine-readable travel documents, including electronic passports, while ILO has provided guidelines on biometric identity documents for seafarers.

Over 30 international standards on biometrics have been developed by the ISO/IEC Joint Technical Committee 1 (JTC 1) since the establishment of its Subcommittee 37 on Biometrics in June 2002. The work of JTC 1 on biometric standards is also carried out in its Subcommittee 27 on IT Security Techniques (which covers template protection, algorithm security, and security evaluation), and in Subcommittee 17 on Cards and Personal Identification.

Within ITU-T, work on biometrics began in 2001, led by ITU-T Study Group 17 which coordinates this work across all study groups. In particular, ITU-T Study Group 17 is responsible for looking at identity management; that is, technical methods for identifying individuals and protecting those identities.

Work is intensifying to meet current challenges for more secure network infrastructure, services and applications. Clearly, telecommunication applications using mobile terminals and Internet services call for authentication methods that not only provide high security, but are also convenient for users. More than 70 ITU-T Recommendations on security have been published.

Biometric systems

All biometric systems have a storage component containing biometric data samples of individuals linked to information on their identity. There is also a sensor to capture the person's biometric data. The captured data sample is compared with a reference template, and a decision is taken on whether it matches. In telebiometrics, the communication channels between these components of a biometric system may be wired or wireless telecommunications, or private or public networks, including the Internet. Whether the biometric trait is physical (such as DNA) or behavioural (such as a keystroke pattern), each individual should have that trait uniquely. Also, the

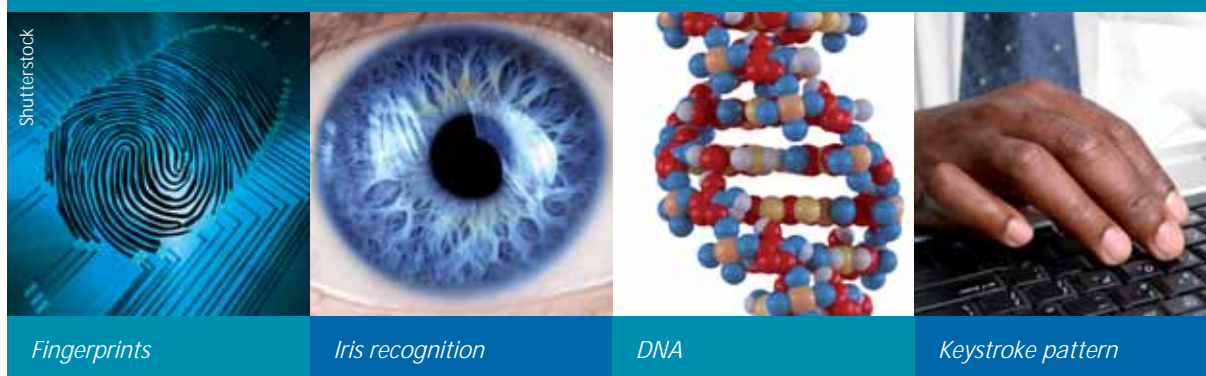
biometric trait should be invariant over a certain period of time, and should be measurable.

Recommendation ITU-T X.1081 "The telebiometric multimodal model — A framework for the specification of security and safety aspects of biometrics" is the first biometric standard to be published. It provides a model that can be used as a framework for identifying and specifying safety aspects of telebiometrics, and for classifying biometric technologies used for identification. The multimodal model covers both the physical and behavioural interactions between a person and the environment, providing a taxonomy of over 1600 combinations of measurement units, modalities and fields of study. The model is based on earlier theoretical work dealing with the way humans interact with their environment, and on the ISO/IEC 80000 series of international standards, specifying the quantities and units for all known forms of measurement of the magnitude of interactions between individuals and their environment.

Over 50 countries issue their citizens with machine-readable passports, which store biometric data that can be used to verify identity at the border.



Overview of some biometric methods



A facial image, and perhaps a digital representation of fingerprints or the iris, is stored on a tiny radio-frequency identification (RFID) chip, and this can be compared with information in a biometric database. The Joint Photographic Experts Group (JPEG), a Working Group of ISO/IEC and ITU, is responsible for the JPEG, JPEG2000, JPSearch and JPEG XR families of imaging standards. These are methods of image compression, and such methods are usually used to store a digital photograph on the chip in an electronic passport. The standards for the JPEG or JPEG2000 format are given respectively in Recommendations ITU-T T.81 and T.800, developed by ITU-T Study Group 16. JPEG XR (ISO/IEC 29199-2) is now an international standard, reflected in Recommendation ITU-T T.832. It specifies a coded image format, designed primarily for storage and interchange of continuous-tone photographic content.

Keeping data secure

A key can be lost, stolen or duplicated. A password can be forgotten. It is generally considered that biometric traits have the advantage of being virtually impossible to steal or forget, and difficult to guess. Yet biometric systems are vulnerable to attack. Any element of the biometric system could be the target: the sensor, the feature extractor, the matcher, the stored biometric templates or the decision endpoint. An attack could also take place by bypassing the biometric sensor, or by tampering with the feature extractor or template.

Biometrics are increasingly used to complement or replace traditional authentication schemes such as personal identification numbers (PIN) or passwords. But biometric data cannot be kept secret. Photographs of faces, recordings of voices and copies of signatures, for instance, are all easily made.



More than 50 countries now issue passports with stored biometric data

Biometrics rely on highly sensitive personal information, but the security of an authentication system cannot rely on the secrecy of biometric data. A system must ensure the integrity and authenticity of biometric data in order to be operationally effective, and additional protective measures are needed to safeguard privacy.

To allow for secure authentication, Recommendations ITU-T X.1084 and X.1085 specify nine authentication protocols for telebiometrics and describe protection profiles, while Recommendation ITU-T X.1086 provides guidance on countermeasures to establish a safe environment and privacy. Recommendation ITU-T X.1087 sets out procedures to protect multimodal biometric data against attempts to intercept, modify or replace the data. The procedures include encrypting, watermarking and transforming data. Recommendations ITU-T X.1088 and X.1089

provide respectively a framework for generating and protecting biometric digital keys, and a way of managing biometric authentication.

Commercial and government applications to drive growth

Advances in ICT, increased performance and availability of equipment at lower cost have smoothed the way for automated biometric recognition. Future e-commerce, e-health and e-government services may require authentication with the help of biometric personal documents issued by governments. For example, some developing countries have already started using biometrics for voter registration in the run-up to elections in order to avoid outdated voter lists and election fraud.

Market forecasts on biometric spending are generally positive. Growth is expected to come mainly from commercial and government applications, where the biometrics and smart card chip industries will benefit from government decisions to adopt electronic personal documents and biometrics. From an estimated USD 3 billion spent on biometric technologies in 2008, market researchers now forecast investment of USD 7.3 billion by 2013.

Alongside fingerprints, which will remain the dominant biometric trait, face, iris, hand and speech recognition systems are expected to emerge and be widely adopted in biometric applications.

What next?

Standards allow for the effective development of biometric systems by establishing common criteria and setting guidelines for the protection of privacy. Agreements on data formats and application software interfaces will help to reduce the cost of developing systems. Furthermore, the development

of standards for applying biometrics and for testing accuracy contributes to clarifying vulnerabilities and guides the search for countermeasures to attacks.

As well as being universal and unique, biometric characteristics should be reasonably permanent and easy to collect and measure. A biometric system should deliver accurate results under varied environmental circumstances, and should be difficult to deceive. Perhaps the most crucial aspect of a biometric system is its acceptance by the general public. For obvious reasons, non-intrusive methods are more acceptable than intrusive techniques. Although DNA is considered the ultimate biometric for identifying a person (other than an identical twin), DNA matching is too intrusive for extensive use in authenticating identity. Facial thermography, which detects the heat patterns created by blood vessels and emitted from the skin, is non-intrusive but too costly. Among the biometrics currently being considered for future deployment are blood pulse, body odour, skin composition, nail-bed pattern, gait and ear shape. More research is needed to see whether any of these will emerge as the biometric of choice.

Whatever system is used, it must be secure, ensure privacy and produce accurate results. A system that is insecure, unreliable or invasive will undermine public trust and may lead to a general lack of acceptance of biometric recognition techniques. The development of international standards is a key strategy in guaranteeing the appropriate choice and use of biometric methods. In less than a decade, huge progress has been made in improving biometric sensors, algorithms and procedures, but there remain vulnerabilities that need to be addressed. The need to protect privacy and safeguard sensitive biometric data remains fundamental. ■



Arriving at the summit (left to right): ITU Secretary-General Hamadoun I. Touré; President of Kyrgyzstan Kurmanbek Bakiyev; President of Kazakhstan Nursultan Nazarbayev; President of the Republic of Belarus Alexander Lukashenko; President of Tajikistan Emomali Rahmon, and President of Armenia Serzh Sargsyan

Connect CIS Summit

Leaders debate the digital future

As part of its *Connect the World* series, ITU organized a *Connect CIS Summit* in Minsk, Belarus, on 26–27 November 2009. It brought together some 350 participants from the Commonwealth of Independent States (CIS) and neighbouring countries, including five Heads of State from Armenia, Belarus, Kazakhstan, Kyrgyzstan, and Tajikistan, as well as representatives of government, industry and financial and development institutions. The summit was hosted by President of Belarus Alexander Lukashenko, and was preceded by a ministerial meeting on 25 November.

In his message to the summit, United Nations Secretary-General Ban Ki-moon said that “unequal access to information and communication technologies (ICT) impedes productivity and innovation”. This directly affects efforts to achieve the Millennium Development Goals, he added, and so “we want to enhance digital opportunities for all, and find new

ways for these remarkable technologies to advance economic and social development.”

Noting that “it is now time to turn words into action,” ITU Secretary-General Hamadoun I. Touré said that “this can only happen through a renewed commitment to partnership — in particular partnerships between the public and private sectors. It can only

The summit was organized in partnership with, among others, the Regional Commonwealth in the Field of Communications; the Commonwealth of Independent States Executive Committee; the World Bank; the European Bank for Reconstruction and Development; the European Investment Bank; the Islamic Development Bank; the United Nations Economic Commission for Europe, and the United Nations Global Alliance for ICT and Development.

happen if policy and regulatory frameworks are conducive to doing business profitably. And it can only happen with the political will on the part of governments to make ICT a key priority in their development agendas."

Sami Al Basheer Al Morshid, Director of ITU's Telecommunication Development Bureau, spoke about the increasingly important role of broadband Internet access for the overall economy. He said "broadband is no longer a luxury. It has become the core infrastructure of the modern economy, which is needed to support advanced applications and services for governments, businesses and consumers. If we take the right steps together now, broadband networks will serve as a platform in the coming years for innovation, growth and development across the CIS region."

The Director of ITU's Radiocommunication Bureau Valery Timofeev focused on the transition to digital broadcasting, which will "revolutionize communication in the CIS region and set the stage for a rich digital dividend," and it is very important that a smooth switchover takes place. "Digital broadcasting media enables high quality delivery of multimedia applications such as films, books and data, while using less radio-frequency spectrum," Mr Timofeev commented.

Investing in ICT

The Connect CIS Summit offered a venue for exchanging ideas and forging new partnerships, with the aim of mobilizing the human, financial and technical resources needed to support the region's transition to digital infrastructure and services.

The opening plenary session considered the im-

impact of the recent global financial crisis and the role of ICT in supporting a recovery and generating long-term growth. Broadband access to the Internet is one of the most powerful ways to achieve this. Most CIS countries have opened their markets, and incumbent operators and new entrants have invested in Internet protocol (IP)-enabled next-generation networks (NGN). However, advanced services, such as fixed broadband Internet access and third-generation (3G) mobile telephony, remain limited to major cities. The summit's first panel discussion, on the topic of "Building a broadband-enabled future", examined the status of broadband infrastructure and how it could be expanded.

The second high-level panel looked at ways to foster an enabling environment. It reviewed regulatory frameworks and considered measures that could be taken to harmonize them across the region in order to attract investment. A panel discussion on "Strengthening public service through ICT" introduced some of the new applications available



"Digital broadcasting will revolutionize communication in the CIS region and set the stage for a rich digital dividend"

Valery Timofeev, Director of the ITU Radiocommunication Bureau





Igor Shegolev, Minister of Telecom and Mass Communications, Russian Federation, said that large-scale projects are needed to foster access to ICT. Also, appropriate regulatory frameworks are essential for promoting broadband

over high-speed broadband infrastructure, such as e-health, online education and e-commerce. In addition, it examined the issues involved in moving government services online.

Another panel considered some of the essential ingredients for building a knowledge-based society, and examined how CIS countries can best build upon their strength in highly skilled personnel. It also examined how broadband connectivity for schools not only promotes ICT literacy and provides a platform for lifelong training, but also means that schools can be used as ICT centres for their surrounding communities. ITU's *Connect a School, Connect a Community* initiative was particularly noted in this context, as well as the ITU Academy that promotes specialist training.

The risks and challenges associated with the emerging information society were further topics of debate, in particular the need to protect data and privacy online, through such initiatives as the ITU-IMPACT Collaboration on Cybersecurity. Also, a session was held on the issues and the timetable for CIS countries in moving from analogue to digital broadcasting. And participants considered ways to use the "digital dividend" of radio-frequency spectrum that will be released when analogue broadcasting is discontinued.

Commitment to the future

A number of partners announced commitments to various initiatives during the *Connect CIS Summit*.

These included implementing the Transnational Eurasian Information Super Highway project, as described by Azerbaijan's Minister of Communications and Information Technologies Ali Abbasov. The Super Highway is expected to help supply 20 countries of the region with high-speed Internet access and telecommunication systems.

A joint venture in Belarus will develop national mobile payment systems based on wireless telecommunication networks. Skylogic (part of the EUTELSAT Group), offers broadband Internet access via small and inexpensive bi-directional satellite dishes, known as "Tooway". It said that, with a new satellite (KASAT) to be launched at the end of 2010, higher-speed services can be provided to consumers in Eastern Europe at no extra cost, helping to bridge the digital divide for residents of rural areas especially.

Declaration of support

At a special session, the participating Heads of State and Government outlined their vision and full support for the Connect CIS initiative. And the summit as a whole issued the *Connect CIS Declaration*, stating a "common desire to build an inclusive and development-oriented information society, where people can achieve their full potential and improve their quality of life."

Recognizing "the important contribution of ICT in stimulating economic growth, employment and broader sustainable development in the region," as well as "the essential role of governments in devising



ITU V. Martin

Jan Kubis, Executive Secretary, United Nations Economic Commission for Europe (UNECE), said it has several ICT-related activities in the region. Infrastructure, content and connectivity are vital for achieving an inclusive information society, he added

national e-strategies and establishing an enabling policy and regulatory framework to foster ICT investment,” CIS leaders reaffirmed their commitment to achieving the goals of the World Summit on the Information Society (WSIS). To this end, the declaration calls on partners from the telecommunication and ICT sector, development banks and financial institutions, international and regional organizations and civil society, “to mobilize human, financial and technical resources” for initiatives in the CIS region.

A look at the region's statistics

On the occasion of the *Connect CIS Summit*, a report was issued by ITU entitled “Information Society Statistical Profiles 2009: Commonwealth of Independent States”. This describes how, over the past decade, key ICT services have increased throughout the region. Every year between 2003 and 2008, the number of fixed telephone lines, Internet users and mobile phone subscriptions grew twice as fast as the world average. At the end of 2008, the CIS region stood out as having the world's second highest



Pictured at the close of the summit are (left to right): Sami Al Basheer, Director of the ITU Telecommunication Development Bureau; Nurudin Mukhitdinov, Director General, Regional Commonwealth in the Field of the Communications; ITU Secretary-General Hamadoun I. Touré; Nikolai Pantelei, Minister of Communications and Informatization, Belarus, and Valery Timofeev, Director of the ITU Radiocommunication Bureau



ITU V. Martin



Viktor Buruya, Deputy Prime Minister of Belarus, said his country is building on the foundations for the information society laid down at WSIS, and significant efforts are being made to create an enabling environment in Belarus

mobile penetration rate at 113 for every 100 inhabitants, just behind Europe at 116 (see Figure 1).

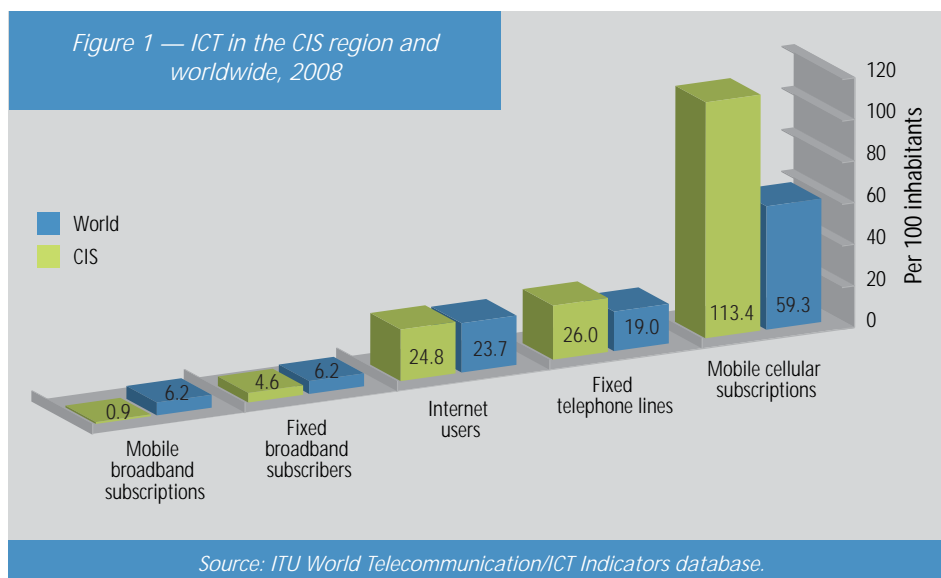
However, when it comes to fixed access to broadband Internet services, the region has a penetration rate of just 4.6 per cent, and 0.9 per cent for mobile broadband, on average. This covers a wide disparity among countries, but, overall, it remains a major challenge to bring the benefits of broadband to more people, especially in rural areas.

The report suggests that policies targeted towards the development of the ICT sector are crucial for encouraging the adoption of ICT in the region. In many countries the market is still dominated by incumbent operators that have not yet expanded broadband services beyond major cities. However,

the picture is changing with an increase in deregulation, the emergence of competitors and a strong demand for high-speed Internet services. Mobile technologies and services are expected to help overcome the broadband divide, particularly in areas with limited fixed line infrastructure.

A number of recommendations are made in the report on ways to accelerate the expansion of Internet access and broadband in the CIS region. It concludes that policy makers and regulators have a major role to play in providing an environment that supports the successful development of the market and which attracts operators and investors.

The report is available in English and Russian at www.itu.int/publ/D-IND-RPM.CIS-2009/en.



CIS preparatory meeting for WTDC-10



■ During the *Connect CIS Summit* on 23–25 November 2009 in Minsk, Belarus (see pages 10–14), a regional meeting was held in preparation for the World Telecommunication Development Conference, in Hyderabad, India from 24 May to 4 June 2010 (WTDC-10). It decided what to prioritize in promoting growth of information and communication technologies (ICT) in the Commonwealth of Independent States (CIS) region.

The meeting was attended by around 200 representatives of countries in the region; scientific and industry bodies, and regional and international organizations. Ivan Rak, First Deputy Minister of Communications and Informatization, Belarus, was elected as Chairman. The Minister, Nikolai Pantelei, said at the opening of the meeting that the work of ITU is vital to implementing national ICT strategies in the region, and thus spurring economic and social development.

Sami Al-Basheer Al-Morshid, Director of ITU's Telecommunications Development Bureau (BDT), said that ITU is ready to support Member States in using ICT to further their development, and thanked CIS countries for their active participation in ITU's Telecommunication Development Sector (ITU-D). ITU Deputy Secretary-General Houlin Zhao thanked the government of Belarus for hosting the meeting, and identified key issues, such as cybersecurity and climate change, that it needed to consider.

The meeting received reports from BDT on the implementation of the Doha Action Plan, conceived at WTDC-06. It also considered many contributions on the status of ICT development in the CIS region, and several draft resolutions for WTDC-10. These included resolutions on strengthening cooperation among ITU-D and the other Sectors of ITU, and on improving access to healthcare services through the use of ICT. Proposals were also put forward to hold seminars on infrastructure sharing and on emergency communications, and to further the development of a Russian-language “centre of excellence” for training in ICT.

Regional priorities

After considering proposals introduced by several delegations, the meeting identified the following as priority areas for the future work of ITU-D:

ICT infrastructure

Elimination of the standardization gap, and development of infrastructure to ensure universal access to affordable broadband services; effective and harmonized use of telecommunication and ICT facilities for emergency communications.

Cybersecurity and ICT applications

Ensuring cybersecurity, with particular attention to the protection of children, including a pilot



scheme to restrict access to inappropriate online content in CIS schools; wide-scale implementation of ICT applications for all activities under Action Line C7 of the World Summit on the Information Society (WSIS) Plan of Action.

Enabling environment

Implementation of the WSIS outcomes by ensuring universal access to affordable broadband services, especially in developing countries and with particular attention to children, women, indigenous peoples and people with disabilities.

Capacity building and other initiatives

Training in sharing passive infrastructure and in implementing emergency communication systems.

Regional initiatives

The CIS regional initiatives address specific ICT priority areas through partnerships to mobilize resources. The following initiatives were proposed:

Electronic meetings

Establishment of a digital network, based at the ITU area office for the CIS countries, for the holding of videoconferences among administrations in the region.

Terrestrial digital broadcasting

Countries in the region to be helped to make the transition from analogue to digital broadcasting in television and radio; implementation of the GE06 Agreement for terrestrial digital broadcasting in the region, as well as interactive multimedia applications and single-frequency digital television broadcasting.

Virtual laboratory

Countries to be helped to train specialists in testing and implementing broadband access technologies, with a view to establishing a “virtual laboratory” for training specialists from developing countries.

Power supplies in rural areas

A pilot project to be started on alternative energy systems for telecommunication facilities in remote and rural areas, with the added objective of reducing greenhouse-gas emissions.

Capacity building

Countries to be helped to increase their human resources in ICT, and the level of specialist skills.

Broadband access

Countries to be assisted to introduce broadband networks, including mobile ones.

Changes to study Questions

The meeting in Minsk also proposed changes to the Questions considered by the ITU–D study groups:

- ▶ Revision of Question 19-1/1 “Implementation of IP telephony in developing countries”, to become “Economic and regulatory aspects of the implementation of IP telephony in developing countries”.
- ▶ Merging of Questions 18-1/2 “Implementation aspects of IMT-2000 and information-sharing on systems beyond IMT-2000 for developing countries” and 20-2/2 “Examination of access technologies for broadband telecommunications”.
- ▶ A new study group Question on the development of national mobile payment systems based on wireless telecommunication networks.



Participants on the opening day of the meeting

Europe sets development goals ahead of WTDC-10

■ Delegates from around Europe gathered in the Principality of Andorra on 1–3 December 2009 to discuss regional priorities for the development of information and communication technologies (ICT). Their conclusions will be presented to the ITU World Telecommunication Development Conference 2010 (WTDC-10), which takes place from 24 May to 4 June in Hyderabad, India.

The meeting, held in the capital city of Andorra La Vella, was chaired by Jaume Salvat Font, CEO of Andorra Telecom. In opening remarks, Vicenç Alay Ferrer, the Principality's Minister of Territorial Planning, Environment and Agriculture, highlighted the importance of ICT in job creation and raising the quality of life. For Andorra, he added, ICT constitute a very important component of national economic development, and they must be innovative, affordable and available to all. Mr Alay promised that Andorra will continue to contribute to the assistance and activities that ITU coordinates with the aim of helping developing countries to deploy ICT and related services.

ITU Deputy Secretary-General Houlin Zhao noted that "in spite of the global downturn, ITU has seen over the last year that our Member States continue to recognize the essential role that ICT play in all areas of our daily lives and how important they are for

social and economic development." The European region has its own characteristics and its own needs, he said, and the meeting was "a great opportunity" to assess those needs in order to determine future work plans for ITU.

The Director of ITU's Telecommunication Development Bureau (BDT), Sami Al Basheer Al Morshid, said that "WTDC-10 is a landmark, global conference which will provide our Members and other stakeholders with an opportunity to assess the progress that has been made since we met in Doha in 2006 for the last WTDC". Since then, there have been many changes and new developments, and Mr Al Basheer invited participants at Andorra "to embrace this opportunity and get your voice heard." He added that as well as identifying the needs of the European region, the meeting could "go beyond to look at global issues that may help shape the global ICT landscape, which can help the world develop and reduce poverty."

Priorities for ICT

The meeting reviewed the 2006 WTDC "Doha Action Plan" and its implementation, and endorsed the proposal in a document presenting a "fresh look" at how BDT's activities might be organized and consolidated so that resources can be allocated in a



more efficient way. The next task was to establish priorities for future development of ICT, under the proposal's headings. It was decided that emphasis should be placed on promoting the following areas:

ICT infrastructure

Fixed, mobile, broadband network development (including broadcast networks and spectrum management); rural communications, and emergency telecommunications and disaster relief.

Cybersecurity and ICT applications

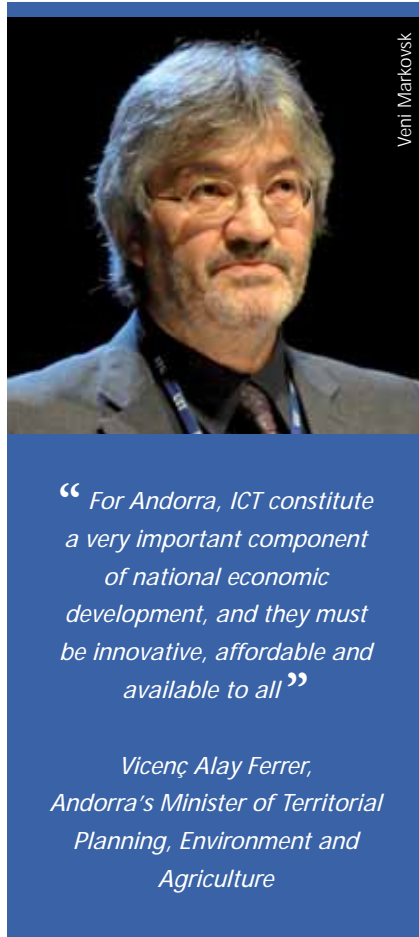
Applications such as e-government, e-health, and e-environment; promotion of cybersecurity, including the protection of young people and children.

Enabling environment

Improving telecommunication and ICT policy and regulations, through such means as market analysis and cost modeling, as well as compiling statistics and indicators.

Capacity building and other initiatives

Facilitating access to information and knowledge for all, in particular to engage women, young people and children, indigenous people, underserved communities and other disadvantaged groups.



“ For Andorra, ICT constitute a very important component of national economic development, and they must be innovative, affordable and available to all ”

*Vicenç Alay Ferrer,
Andorra's Minister of Territorial
Planning, Environment and
Agriculture*

Regional initiatives

For the first time, the WTDC preparatory meeting for Europe proposed a set of key regional initiatives, under which projects will be implemented through partnerships.

Accessibility for the visually impaired

The meeting considered contributions on this topic from Bulgaria and Romania, which proposed a regional initiative focusing particularly on Central and Eastern Europe. The goal is to provide assistance to ITU Member States in enabling blind people to use the Internet. It is envisaged that specialized national and regional libraries will be created of resources for those with visual impairments, and facilities established to train instructors.

Digital broadcasting

Also in Central and Eastern Europe, ITU Member States will be assisted to make a smooth transition from analogue to digital broadcasting. Policy and regulatory frameworks for digital terrestrial broadcasting (including mobile television) will be reviewed, and help will be given in deploying interactive multimedia services and applications.

E-health

It was agreed that best practice should be shared across Europe in using e-health applications. The objective is faster and easier storage, transmission and access to medical data and health advice, alongside reduced operational and administrative costs in implementing healthcare services, particularly in rural and remote areas.

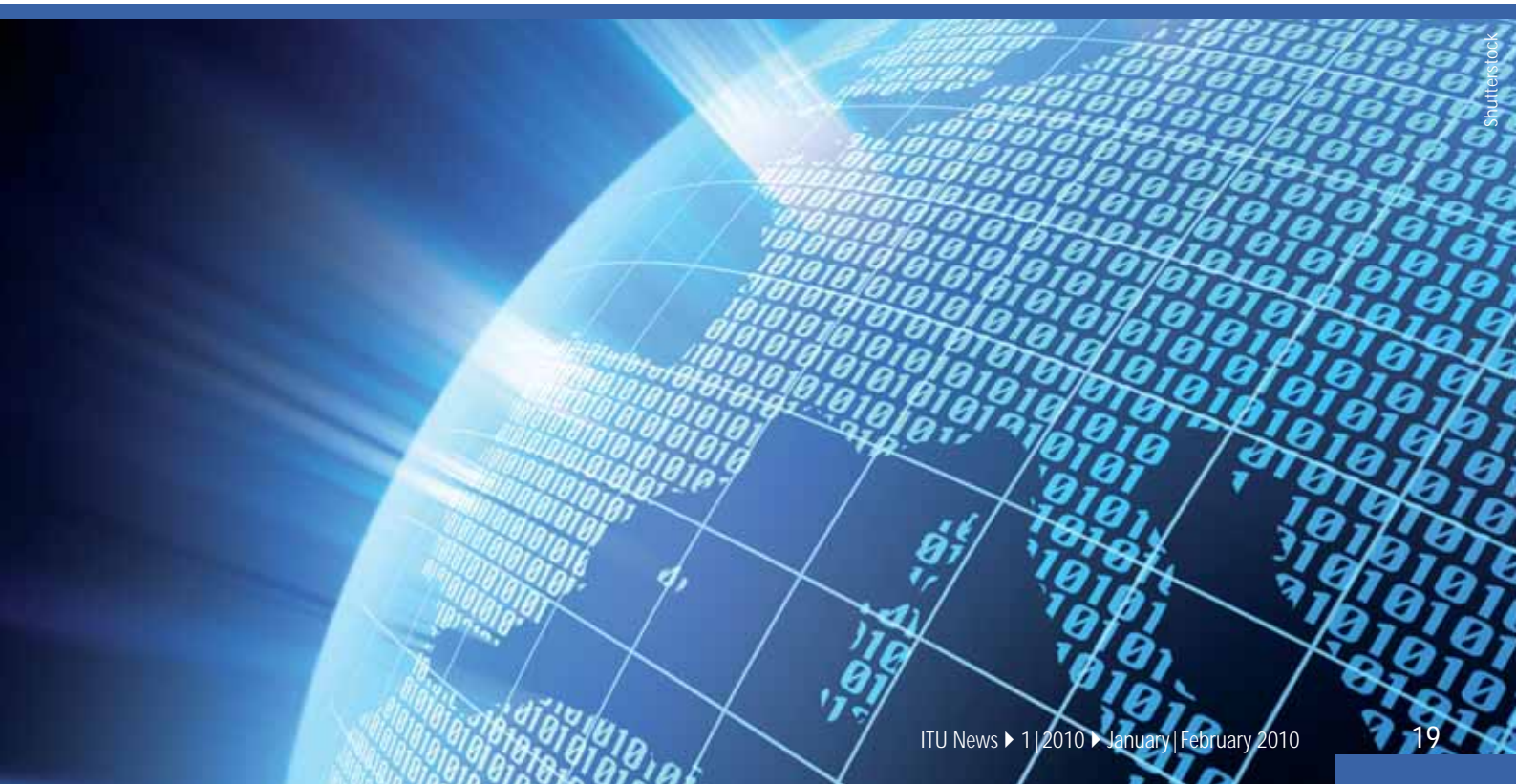
The information society in Europe

In conjunction with the meeting, ITU released a new report entitled *Information Society Statistical Profiles 2009: Europe**. It shows that while Europe has around ten per cent of the global population, by 2009 it accounted for more than 18 per cent of the world's mobile subscriptions, 21 per cent of fixed telephone lines, 22 per cent of Internet users

and 31 per cent of fixed and mobile broadband subscriptions.

"The majority of European countries have surpassed the 100-per-cent mobile penetration mark, and close to two out of three Europeans are using the Internet," commented Mr Al Basheer. "This region has for a long time developed, as well as embraced, new technologies before many others. It was the first region to adopt a uniform standard for mobile telephony in the early 1990s, and to introduce next-generation mobile networks in 2000," he continued. "The influence and leadership of the European region in promoting universal access is in no doubt," said Mr Al Basheer. "I am ready, and so is my team, to work with you all and take the experience of Europe to other regions, so that ICT can become a truly globalizing engine of our times," he concluded.

* The report can be read online at www.itu.int/publ/D-IND-RPM.EUR-2009/en.





Participants from governments worldwide, and many organizations, attended the UN Climate Change Conference in Copenhagen

Going forward from Copenhagen

■ ITU attended the United Nations Climate Change Conference, held in Copenhagen, Denmark, on 7–19 December 2009. A high-level delegation from the Union succeeded in raising the profile of information and communication technologies (ICT) as uniquely powerful tools for reducing greenhouse-gas emissions across all sectors of industry — while also contributing to sustainable economic development.

The Copenhagen event is also known as “COP 15”, or the 15th Conference of Parties to the United Nations Framework Convention on Climate Change (UNFCCC). It marked the culmination of a two-year negotiating process to strengthen international cooperation on tackling this challenge. More than one hundred world leaders attended, as well as some 40 000 people from all kinds of organization and representing many governments and international bodies. Among them were ITU Secretary-General Hamadoun I. Touré and Director of ITU’s

Telecommunication Standardization Bureau Malcolm Johnson.

Dr Touré made an urgent plea to delegates not to miss the opportunity of harnessing advanced technologies to dramatically reduce greenhouse-gas emissions across all industrial sectors. “At Copenhagen, we have a real and reachable opportunity to help save the planet through astute deployment of modern ICT,” he said. “Studies clearly show that more effective use of ICT can deliver tremendous CO₂ savings. I therefore urge delegates to look to the high-tech sector, and take maximum advantage of the power of ICT to reduce emissions worldwide”.

The Secretary-General met with many world leaders at Copenhagen, including presidents and ministers in charge of environmental issues. At a meeting on 16 December, Dr. Touré held talks with United Nations Secretary-General Ban Ki-moon, and with the Directors-General of other United Nations organizations. He also took part in a side event on “The

United Nations System delivering as one on climate change," as well as in other activities.

Malcolm Johnson participated in the side event "Advancing work on adaptation to climate change: a United Nations system perspective" which showcased good practice, as well as one on "The effective use of ICT and the intellectual property system for mitigating climate change," which was jointly organized by ITU and the World Intellectual Property Organization (WIPO). At the latter he talked about

how a mechanism is needed if investment in smart technologies is to be stimulated in developing countries in return for carbon credits. To achieve this, "a common approach to measuring the positive impact of ICT on greenhouse-gas emissions is needed. This is why ITU is developing a methodology in cooperation with many other organizations, governments and the private sector," said Mr Johnson. "Interoperability and standardization are vitally important," he concluded.

Other ITU staff attended some of the many events held during the conference, and presented information on work throughout the Union on ICT and climate change. The ITU programme itself also included 11 sessions at the "iseeT@the Climate Change Kiosk," within an exhibition organized by UNFCCC. These sessions featured a wide range of speakers from the world of ICT, including those (such as Stephan Scholz from Nokia Siemens Networks — see article on pages 25–26) who reduced their carbon footprint by appearing via videoconferencing.



"Interoperability and standardization are vitally important"

*Malcolm Johnson,
Director of ITU's Telecommunication
Standardization Bureau*

Onwards to Bonn

ITU's delegation targeted the key players at the conference and raised awareness of the fundamental importance of ICT in the climate change issue — and how investing in it can also help narrow the digital divide and promote economic sustainability. There was strategic coordination with other key players, including other United Nations agencies. Representatives from all stakeholder groups, and both the public and private sectors, expressed interest in work-

ing with ITU in this field.

However, as has been reported extensively in the world's press, the discussions at the conference resulted in a *Copenhagen Accord* — a political consensus on the long-term, global response to climate change, rather than a binding agreement. The next step will be taken at Bonn, Germany, at the 32nd session of the UNFCCC subsidiary bodies, held from 31 May to 11 June 2010. ITU has observer status and will continue pressing for full recognition of the role of ICT in mitigating and adapting to the effects of climate change.

Many people hope that at COP 16, scheduled for 29 November to 10 December 2010 in Mexico City, Mexico, a treaty can be concluded that can replace the Kyoto Protocol at the termination in 2012 of the period it set for committed reductions in greenhouse-gas emissions. ITU will continue to take part in the process and make known how vital it is to put ICT at the heart of solutions to this major challenge of our times: climate change.



Climate change: ITU must continue to act

Chris Tuppen

Chief Sustainability Officer, BT Group

In the wake of the United Nations Summit on Climate Change, held in Copenhagen, Denmark in December 2009 (see article on pages 20–21), many will be asking whether the event was worth the cost — both in money and in carbon.

Hopes for a binding agreement had been dashed long before delegates arrived at the summit. Nonetheless, many expected countries to promise increased cuts in CO₂ emissions. In the end, they did not — while the *Copenhagen Accord* capped global warming at 2°C, pledges fell well short of what this implies.

But nothing that came out of Copenhagen suggests that efforts to tackle climate change should be scaled back. The climate is changing — fast. Countries accept the need to act. Regulations and fiscal interventions will follow. As they do, markets for low carbon products will open up.

ICT can help

In the information and communication technologies (ICT) industry, we are fortunate that our products and services can do so much to help businesses and individuals reduce their greenhouse-gas emissions.

"SMART 2020"¹, a report I helped create, said new applications of ICT could reduce global CO₂ emissions by 7.8 gigatonnes a year by 2020. That represents 15 per cent of what might be produced if things continue as they are.

Huge opportunities await us in such areas as smart grids, smart cities, smart buildings, smart transport and the replacement of older "gas guzzler" ways of doing things with new energy- and carbon-efficient alternatives.

Dematerialisation is one example: the replacement of paper invoices with electronic ones, of music CDs by downloads, and so on. Another is the use of videoconferencing instead of travel. There is no doubt that business habits are changing and carbon emissions are being reduced as a result. Independent researchers estimate that the use of videoconferencing in BT alone prevented the emission of more than 50 000 tonnes of CO₂ in 2008.²

But set against such opportunities are two key threats.

First, there is the impact on our businesses of changing weather patterns, rising sea levels and so on. The equipment and cables on which our industry

¹ "SMART 2020: Enabling the low carbon economy in the information age", The Climate Group, 2008.

² "Conferencing at BT 2008", The University of Bradford and SustainIT, 2009.

depends are spread all over the world. We protect them as well as we can, but severe storms, extreme temperatures, droughts and floods inevitably take their toll. The cost of damage quickly mounts up, and scientists say such incidents will become increasingly common as our planet heats up.

Second, our industry is responsible for the emission of a great deal of CO₂. Worldwide, it is estimated that the manufacture and use of computers, phones and other such devices already generates about two per cent of global CO₂ emissions — roughly as much as the entire economy of the United Kingdom, for example.

Overall, though, ICT can do more to alleviate climate change than worsen it.

Efforts at BT

At BT we thought the evidence for climate change was compelling, well before the Copenhagen summit. We had decided not just to act, but to set one of the most aggressive corporate emissions-reduction

targets in the world. By 2020, we hope to have cut the carbon intensity of our global business by 80 per cent compared to its level in 1990.

Our strategy is clear: we invest in changes to reduce CO₂ emissions not just because we think it is the right thing to do, but also because there is a sound business case for doing so. If we use more energy than we need to, profits we could make quite literally go up in smoke.

Since setting our first carbon reduction target in 1992, we have received an excellent return on our investments. The use of new technologies and new ways of working to reduce our carbon footprint has benefited us by around GBP 400 million over the last five years alone.

As we do more to reduce our emissions, we expect the financial benefits to grow. The global energy saving campaign we launched in 2008 will, we hope, reduce our costs by GBP 15 million by 2011 and prevent the emission of 75 000 tonnes of CO₂.



An engineer from BT Wholesale installs 21CN equipment to create a next-generation network that uses less power



Looking ahead, though, the challenges will get tougher and tougher — the law of diminishing returns applies as much to reducing CO₂ emissions as elsewhere.

The changes we have made so far — changes that have reduced the carbon intensity of our global business by 43 per cent compared to our 1997 baseline — were relatively easy to introduce. Decisions made and implemented centrally had a big impact. In 2004, for example, we decided to get the majority of the electricity we use in the United Kingdom from low carbon sources, such as wind farms and combined heat-and-power schemes. Forty-one per cent of the electricity we use in the UK now comes from renewable sources. Also significant was the decision we made the same year to replace our existing networks with a next-generation network, 21CN. As ITU points out, next-generation networks use much less power than their predecessors. They reduce CO₂ emissions as a result.

To go further, our energy consumption must be cut significantly. Everyone in our business will have to help, including those sceptical about climate change. With more than 100 000 employees spread across the world, this will be no mean achievement. And as time goes by, we know it will be harder and harder to identify cost-effective ways to cut energy use, reduce emissions and implement the changes required.

Follow ITU's lead

Tough though such challenges are, we are determined to succeed. But our destiny is not entirely in our own hands. Many of the products we buy operate according to international standards, for example. If their power consumption is to be cut, ITU and other standards bodies must act. Energy efficiency must be paramount, just as it was when, in October 2009, ITU specified a standard for the new universal charging solution for mobile phones and other devices.

So, while some may use Copenhagen to argue for delay, my view is clear: the amount of CO₂ the world produces must quickly be reduced. When it comes to tackling climate change, ITU must continue not just to act, but to encourage others to follow its lead. ■

The ICT industry should work hard to reduce energy use and CO₂ emissions — in all sectors



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ICT has a unique role in helping all sectors meet the challenge of climate change

Stephan Scholz

Chief Technology Officer and Head of Research and Technology Platforms
Nokia Siemens Networks

The potential of information and communication technologies (ICT) to have a positive impact on climate change has been recognized by many global studies, such as the work of The Climate Group on the “SMART 2020”¹ report of 2008 with the Global e-Sustainability Initiative (GeSI), and “Mobile’s Green Manifesto,”² produced in collaboration with GSMA in 2009. However, this understanding has to be brought to the attention of governments so that they take the role of ICT into consideration when defining environmental policies and those for sustainable development.

Energy efficiency is a key focus

The ICT industry is taking serious measures to improve its own energy efficiency, but it is imperative that attention is also turned to the benefits that ICT can bring to other business sectors. In line with this thinking, Nokia Siemens Networks recently announced that it is using its existing portfolio, combined with new partnerships, to address opportunities in the energy sector. Energy producers can benefit from the technologies and expertise of the telecommunication sector and apply it to make power grids more intelligent and efficient — thereby enabling whole economies to use less energy.

For example, we are collaborating with Irish software company ServusNet to help wind farm operators optimize generation and delivery of energy from a renewable source. A customer of ServusNet might have multiple wind farms distributed across Europe, each comprising up to hundreds of turbines. As energy markets evolve, these operators face increased competition to supply national or regional grids, and must guarantee their prices and levels of supply. ServusNet is carrying out customer trials of their solution, which is based on Nokia Siemens Networks Open Element Management System (OES) Suite, in order to raise the productivity and efficiency of wind farms. It also improves the predictability of their energy supplies, thus optimizing energy generation.

Bringing the intelligence of ICT networks into the energy sector can bring such benefits as the management of energy consumption in real time, distributed generation using renewable energy sources, and optimization of generation versus use of energy. For this reason, we are involved in various research programmes and initiatives concerning smart grids. For example, in the Nordic region the company is working with fourteen others, including leading energy and network companies and a number of research institutions.

¹ “SMART 2020: Enabling the low carbon economy in the information age”, The Climate Group, 2008.

² “Mobile’s Green Manifesto”, The Climate Group, 2009.

Stephan Scholz spoke on the topic of ICT and climate change as part of the ITU programme of business talks at the United Nations Climate Change Conference, held in Copenhagen, Denmark, in December 2009. "ICT is fundamental to measuring — and directly improving — energy efficiency across all industries, including its own, which makes it different from all other industry sectors", he said. In a demonstration of one aspect of this potential, Mr Scholz gave his presentation at the "iseeT@the Climate Change Kiosk" via telepresence from Finland (see pages 20–21).

We are also constantly working on minimizing our own and our customers' carbon footprints. Around 86 per cent of energy used by a mobile operator is consumed by its network, and energy is a significant percentage of a service provider's operating costs. In mature markets it accounts for up to 10 per cent of costs, while in developing markets it can range from 15 to 30 per cent. The solutions offered by Nokia Siemens Networks are designed to reduce network operating costs and lower the power consumption of telecommunication networks. The range of solutions consists of elements that target specific areas of network energy consumption, management and sourcing. They also allow for the profitable and efficient expansion of networks in rural and remote areas by eliminating the need for diesel generators to power base stations, providing a more cost-efficient and environmentally friendly way to extend connectivity.

Expanding connectivity

Mobile telecommunication providers Telenor Pakistan and Zain recently signed contracts with Nokia Siemens Networks to build off-grid solar-powered sites for communication facilities in Pakistan and in East African countries. So far, our company has deployed more than 390 sites running on renewable energy in 25 countries in the Asia-Pacific region, China, Europe, the Middle East, Africa and Latin America. By 2011, renewable energy will be our first choice for powering base stations in remote and rural areas.

The potential investment in energy improvements across the world's telecommunication networks is of the order of many billions of euros — but with a return on investment measured in just a few years, not decades. All told, the telecommunication industry has the key to uniting people and businesses to meet 21st century environmental standards. Now it also has the tools to play its own part in the energy stakes.



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The digital dividend: opportunities and challenges

Alexandre Kholod

Federal Office of Communications
(OFCOM), Switzerland



John Lewis

Consultant in international
spectrum management, Added
Value Applications Limited



■ For several years, the digital dividend has been a hot issue extensively discussed by broadcasters and operators of telecommunication and other services. Apparently, there is a lot at stake for these industries and, therefore, also for end-users. The crucial role of governmental bodies in this process is also evident. Some important choices have been already made; however, further decisions are still to be taken.

This article considers hopes and concerns that have been voiced in regard to the digital dividend and looks at the activities of telecommunication administrations on this issue.

What is the digital dividend?

Digital compression systems now available for digital television systems allow the transmission of several (up to six, depending on the coding and modulation techniques) standard digital television

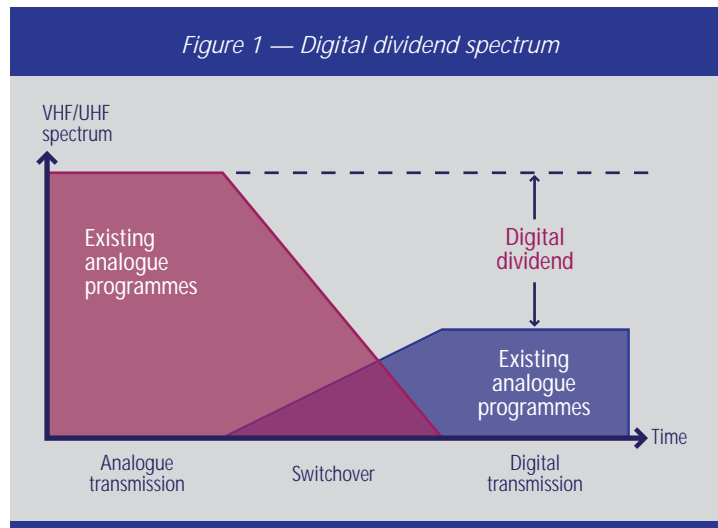
channels of acceptable quality in the radio-frequency spectrum previously used by a single analogue channel. Typically, there are four or five terrestrial analogue services in a given region, so their digitization into a single digital television channel will considerably reduce the overall use of spectrum.

A number of Recommendations from ITU's Radiocommunication Sector (ITU-R) dealing with coding, compression and modulation techniques for digital terrestrial television broadcasting have indirectly contributed to the process that is finally yielding the digital dividend. For example, the pioneering Recommendation ITU-R BT.798 stipulates "that digital television terrestrial broadcasting should fit in the channels (6, 7 and 8 MHz) intended for analogue television emission in the VHF/UHF bands". This Recommendation, forbidding the bandwidth used for digital programmes to go beyond the analogue



channel bandwidth, paved the way for the development of sophisticated digital compression techniques.

The amount of spectrum in the VHF and UHF bands that is above that nominally required to accommodate existing analogue programmes, and that might be thus potentially freed up in the switchover from analogue to digital television, is defined as the digital dividend. This is illustrated in Figure 1.



How can the dividend be used?

The amount of spectrum to be released in the switchover depends primarily on national peculiarities such as the geography and topography of a country, the degree of penetration of cable and/or satellite television services, requirements for regional or minority television services, and spectrum usage in neighbouring countries. The amount also depends on the digital television technology being implemented to replace analogue services. Therefore, the size of the digital dividend will vary from region to region, and from country to country.

The range of users to which the digital dividend spectrum can be opened is wide and includes additional terrestrial broadcasting services, mobile multimedia applications, mobile communications, and wireless broadband access systems. Broadcasters can significantly expand their services to potentially include delivery of new interactive and high-definition television programmes. Mobile television, being a good example of a convergent service, is also a promising potential user of the digital dividend spectrum.

New potential users that do not belong to the broadcasting family of applications consider the dividend spectrum as an opportunity to respond to the growing demand for new wireless communication services. These would include delivery of ubiquitous broadband Internet access to areas not yet reached by landlines, thus helping to overcome the digital divide. Moreover, there might also be a possibility for broadband access in the empty spaces between television channels in a particular region, for example in white spaces (temporally and/or geographically unused television channels).

The digital dividend spectrum is located between 200 MHz and 1 GHz. These frequencies possess superior signal propagation characteristics to those at, for example, 2.4 GHz. The industry has expressed interest in using these lower frequencies to facilitate provision of coverage and thus to achieve an optimal balance between transmission capacity and operational range. This would mean that less infrastructure would be required to provide wider mobile coverage, all resulting in lower costs for communication services, especially in rural areas.

Spectrum issues in accessing the benefits of the digital dividend

If the digital dividend is to be utilized by mobile services, a worldwide (or at least region-wide) frequency harmonization is a required condition. Such harmonization would create enormous benefits in terms of social impact and increased productivity. In particular, mobile operators and equipment manufacturers would be able to address a large market, leading to economies of scale and preventing high costs for handsets.

The possibility of harmonization depends primarily upon the timing and coordination of the analogue-to-digital switchover process; the digital dividend spectrum will be fully available only after analogue switch-off. In this respect, the GE06 Agreement (adopted in Geneva at the ITU Regional Radiocommunication Conference 2006) calls for the transition to be completed by 17 June 2015 for the countries in Region 1 (except Mongolia) and the Islamic Republic of Iran. In Europe, many countries will close down their analogue television transmissions by 2012.

The situation is quite different in Region 3, where some countries have made their plans for the analogue switch-off, while others are only considering this possibility. Moreover, different analogue standards and different channel raster are used across Region 3. Another constraint is that broadcasting channels are scattered on a non-contiguous basis across the whole UHF band. Though digital terrestrial television services have been introduced in some countries of Region 3, they are based on different standards (DVB-T, ATSC, ISDB-T, DMB-T), all using a different channel raster. In contrast, a single standard (DVB-T) is chosen in the countries that are contracting members of the GE06 Agreement.

It should be noted here that parts of the UHF band are also allocated to primary terrestrial services other than broadcasting. Protection of other primary services may limit the ability to use the digital dividend in some countries.



The range of users to which the digital dividend spectrum can be opened is wide and includes additional terrestrial broadcasting services, mobile multimedia applications, mobile communications, and wireless broadband access systems

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ITU activities

The World Radiocommunication Conference 2007 (WRC-07) allocated the upper part of the UHF band (790–862 MHz) to the mobile service in Region 1 as from 2015, and allowed some countries of this region to use this allocation immediately, under certain conditions. These conditions include protection of the GE06 Agreement and all its future developments. Countries that wish to implement mobile services in the band 790–862 MHz are required to protect broadcasting services against harmful interference. Also, before putting mobile services into operation, agreements from neighbouring countries must be obtained.

These ITU allocations open up the possibility (but not the obligation) of choosing for the digital dividend up to 72 MHz of spectrum (18 per cent of the UHF television band) currently allocated to the broadcasting service. It should be said that 320 MHz (82 per cent of the UHF television band) is being reserved predominantly for the broadcasting service in Region 1.

Furthermore, WRC-07 identified the UHF frequencies allocated to the mobile service on a primary basis in all three ITU regions for use by administrations wishing to implement International Mobile Telecommunications (IMT). This can be considered as a signal to industry to develop equipment for world-wide use.

However, recognizing the potential for interference between the mobile service and other primary services in the band 790–862 MHz, WRC-07 decided that ITU would conduct technical studies on sharing among the mobile and other allocated services in the band in Regions 1 and 3. The results of these studies will be reported to the World Radiocommunication Conference 2012 (WRC-12) under Agenda item 1.17, in order to ensure the adequate protection of serv-

ices to which this frequency band is allocated, and take appropriate action.

In view of the complexity and importance of the issues related to Agenda item 1.17, a dedicated Joint Task Group 5-6 (JTG 5-6) was established. It studies how the mobile service can share the relevant band with the broadcasting, aeronautical radionavigation and fixed services. Recognizing that there is a lot at stake with respect to the future of the digital dividend, administrations are attaching much importance to the activities of the group, whose work is scheduled for completion in May 2010.

End of the story — or a new beginning?

The digital dividend arises from the ability of digital compression systems to allow the multiplexing of several television programmes and their transmission over the spectrum previously used by a single analogue television channel. It means that the process of gaining access to the digital dividend spectrum is still progressing, as more advanced digital terrestrial television standards for infrastructure and for compression (e.g. the second generation of digital terrestrial television broadcasting transmission systems), offering higher bit rate capacity per Hz than existing systems, are being gradually developed and introduced.

The digital dividend spectrum can be used for innovative services, from improved and new interactive television broadcasting to mobile communications and wireless broadband Internet access. Only a fair and well-balanced distribution of this spectrum among different information and communication technologies will deliver the full social and economic benefits of the digital dividend, thus maximizing its value for all users. This can only be achieved by efficient and effective spectrum management. All concerned sectors need clarity on this issue when developing their strategies for the coming years.



Nigeria is increasingly connected

Okoh Aihe

Special Assistant to the Executive Vice
Chairman on Media and Corporate Affairs,
Nigerian Communications Commission

Nigeria has been one of Africa's biggest success stories in its expansion of telecommunications and information and communication technologies (ICT) — this was what ITU Secretary-General Hamadoun I. Touré emphasized during his visit there in September 2009, while attending the African Telecom Development Summit, held in the nation's capital, Abuja.

From a subscriber base of less than half a million in 2000, Nigeria now has a total of over 73 million mobile and fixed connections, which is a teledensity of about 50 per cent. Investment in telecommunications has shot up to about USD 18 billion. Operators are gaining generous returns, making the country an attractive environment for further investment. In addition, Nigeria added 11 million new Internet users between 2000 and 2008 — representing close to 40 per cent of the total additions in sub-Saharan Africa during that period.

Providing all the essential factors

In addressing the summit, Dr Touré noted that today, Nigeria has one-quarter of Africa's phone subscribers. "You need to have all the conditions together for the telecommunication sector to thrive: a vibrant private sector, the technology, and a government that will take the right policy decisions. In addition, you need a referee in the game, which is the

regulator". Nigeria, the Secretary-General said, has met all those conditions.

Nigeria's auction of spectrum for mobile communications in 2001 was acclaimed as transparent and highly successful. In 2003, the Nigerian Communications Act established a Universal Service Provision Fund. Its objective is to subsidize service provision in areas (especially the rural and underserved parts of the country) where ordinary service providers would not do business.

The country has also benefited from the reforms conducted by the Nigerian Communications Commission (NCC). It has set up structures and institutions to help people gain knowledge and skills in ICT, thus laying an important foundation for growth (see box on page 32).

The right environment

It is perhaps the regulatory framework that has contributed most to the remarkable growth in Nigeria's telecommunication industry by making it easier for companies to gain licences and enter the market. This success indicates what could be achieved in development generally. Speaking at the summit in Abuja, Minister of National Planning Shamsudeen Usman said: "I often use the development of the telecom companies in Nigeria to highlight the possibility



of change in Nigeria". He added that progress "has so far been achievable by the government creating an enabling environment, establishing good regulations, and encouraging the private sector to invest properly in telecommunications".

Promoting broadband

NCC is also looking at ways of making the Internet accessible across the country. As well as a planned licensing of the 2.3 GHz band for broadband services, it is encouraging several licensees to push forward with ambitious projects. Phase3 Telecom and Suburban Telecom are taking fibre-optic cables into West Africa, while the Glo-1 submarine cable from Europe landed in Nigeria in September 2009 and the Main One Cable, also from Europe, landed in October.

In addition, NCC is strongly promoting a project to roll out broadband services to all parts of the country — and beyond — at an achievable cost. Called "Fibre Without Borders", the project encourages the creation of cross-border fibre-optic links to build a platform across Africa. One result will be that African countries will not have to route calls through Europe in order to talk to their neighbours.

Digital broadcasting ahead of schedule

The deadline for moving from analogue to digital broadcasting in Africa was set by ITU as June 2015. In Nigeria, though, the target date has been brought forward to June 2012 and great efforts to meet it are being made by broadcasting companies.

While in Abuja, Dr Touré visited African Independent Television (AIT), which is operated on the platform of Daar Communications Plc. After appearing on one of its flagship programmes, he toured the company's facilities and saw trucks that

broadcast high-definition television, complementing the heavy studio investments by Daar. The firm is already digitally compliant, far ahead of the country's switchover date. Commencing business in 1993 in an industry deregulated a year earlier, Daar has a chain of radio and television stations across Nigeria, and by mid-2008 had added a digital satellite television service that offers subscribers more than 40 channels.

NCC programmes boost ICT in Nigeria

The Digital Appreciation Programme (DAP) is aimed at encouraging the use of ICT in primary, secondary and tertiary educational institutions. NCC, by deploying some of the Universal Service Provision Fund, has been able to contribute computers to a number of schools across the country, as well as very small aperture terminals (VSAT) for Internet access.

The Advanced Digital Appreciation Programme (ADAPT) focuses on teachers (mostly in tertiary institutions), who must be computer literate to gain the benefits of ICT and pass on their knowledge to students. Through this programme, NCC has trained thousands of teachers across the country and has supplied some with computers.

The Digital Bridge Institute (DBI) was established to help overcome the shortage of skilled personnel that resulted from the boom in the mobile communications industry. Staffed by experts from different parts of the world, DBI has three campuses, in Abuja, Lagos and Kano.

Daar was the broadcaster for the football world championship for players up to 17 years of age, *FIFA U-17*, staged in Nigeria from 24 October to 15 November 2009. AIT worked with the service provider, Host Broadcast Services, to produce and send clean feeds to the rest of the world. The *Fédération Internationale de Football Association* (FIFA) has very strict specifications for equipment to cover its tournaments, because audiences anywhere in the world must be able to watch the events. A Nigerian broadcaster's ability to meet such rules has been hailed as a landmark achievement. South Africa, too, is using its hosting of a football tournament — the 2010 FIFA World Cup — to benchmark its digital switchover.

Nigeria runs one of the most liberalized broadcasting sectors in Africa. Led by the National Broadcasting Commission, in 2008 the industry started a phased transition to digital broadcasting by cable and satellite television broadcasters. Dr Touré noted that this can result in less use of energy resources, and thus

a relatively quick return on investment. However, the change cannot take place without new equipment being available, and the costs of this remain a burning issue in the developing world. The Nigerian government has promised to look into ways of possibly subsidizing costs for less wealthy citizens, so that everyone can have access to the new broadcasting system.

Extraordinary growth

Dr Touré said at the summit that “it has been an extraordinary decade for Africa. Just ten years ago, virtually nobody in Africa had a mobile phone; today mobile cellular subscription teledensity has reached 32.6 per cent, and more than 30 million people in sub-Saharan Africa can access the Internet.” Nigeria's developments are a shining example of what can be achieved, and what should be the goals for the future.

A high-definition outside broadcast trailer used by African Independent Television





Poland's new law to support development of telecommunication services and networks

Magdalena Gaj

Vice Minister-Undersecretary of State
Ministry of Infrastructure, Poland

■ For many governments, 2009 was a test to discover how well they could overcome the global financial crisis — and the Polish Administration was no exception. The government of Poland created a so-called “stability plan” which focused on new regulations in many fields, but especially in telecommunications. The basis and main objectives were very simple: to help create a society based on technology and effective management.

Today we are witnessing shifts in our industrial sectors: new trends are followed by new approaches, influenced by the financial crisis. To take advantage of the potential of new technologies, Poland is putting the emphasis on policy to support the development of telecommunication services and networks.

The aims of the new law

On 3 November 2009, Poland's Council of Ministers approved a draft new law on supporting the development of telecommunication services and networks. A bill is likely to be considered by the Polish parliament by the end of January 2010. The new law was developed under the “Digital Poland” initiative established by Polish Prime Minister Donald Tusk to promote Internet access for all citizens. It should be emphasized that, in framing the law, Poland was able

to take advantage of excellent and innovative regulations of our fellow members of the European Union.

The proposed Act on “Support for the development of telecommunication services and networks” will help to achieve the goals of the Stability and Development Plan to enhance the Polish economy in the light of the world financial crisis. One of the most important elements of the plan is encouragement of more investment in the telecommunication sector. Information and communication technologies (ICT) are one of the most important factors for stimulating economic growth and employment.

The main aim of the bill is to improve the investment process, increase competition in the telecommunication market and, in consequence, help to eradicate digital exclusion, both social and geographic. Under the new law, local authorities would be able to undertake economic activity in the telecommunication field and to build their own infrastructure, subject to certain conditions. Such activity by local authorities would not be permitted to disturb competition in the telecommunications market. Also, the bill includes the regulation that local authorities must provide access to, and share, their infrastructure and networks on an equal and transparent basis with all interested parties.

The bill regulates economic activity in telecommunications by utilities within the public sector, such as those that supply energy, water and sewage systems. And it states that telecommunication businesses must be given access to the relevant technical infrastructure owned by the public utilities. The new regulations also enlarge the category of entities that can demand rights of way for access to real estate for the purpose of telecommunications.

Regional broadband networks are another important element of the proposed new law. It eases the investment path so that funds from the European Union can be utilized for broadband projects by local authorities in Poland, within the fixed time limit for spending the funds.

Promoted by the new law, the expansion of broadband will enable more people to use advanced online services



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A better future

Thanks to the new law, it will be easier to invest in modern telecommunication infrastructure in Poland, including the development of next-generation networks (NGN). The expansion of broadband will enable more people to use advanced online services such as e-commerce, e-banking, and e-education. Competition in the market will increase, and, as a result, development of the Polish information society and eradication of the digital divide is expected to follow.

The Polish Government will work as much as possible with the private sector in order to ensure that the new regulations meet the needs of those who implement them on a daily basis. Our next step will be to promote the new law, as part of a cooperative project between the private sector and government at all levels, national and local, called the "Communication and education plan to promote the development of telecommunication services and networks".

This plan is dedicated to all interested parties, including the general public. Conferences, workshops, and seminars will be organized, and guidance published for future investors. The overall aim will be to exchange ideas and solutions for the development of broadband infrastructure and ICT throughout Poland. We look forward to a great success, and a great future!



The ITU Library and Archives Service

Guardians and disseminators of information

- Are you reading *ITU News* to keep up-to-date with what is happening in telecommunications in general and the Union in particular? What if you would like to look at the magazine's forerunner, the *Telecommunications Journal*, dating back to 1934, or even to view the original *Journal télégraphique*, founded in 1869? You can do either of these things, and many more, by turning to the ITU Library and Archives Service.

In Montbrillant and in the cloud

The ITU Library is on the sixth floor of the ITU Montbrillant building in Geneva, and welcomes users from within and outside the Union. There are open stacks, reading places, workstations connected to the Internet, as well as a corner where you can read newspapers and drink coffee.

On the Montbrillant shelves you can find the paper collections: books, journals, magazines, periodicals, dictionaries, directories and encyclopedias,

as well as copies of ITU Recommendations and of course the Union's publications and official documents. Through the library you can also gain access to collections in the cloud of online information, such as e-journals, e-conference proceedings, e-books and other digital resources.

Even if you are not in Geneva, you can still visit the library through its website at www.itu.int/library, or access the catalogues of its holdings. The librarians will respond to requests for information from anywhere in the world.

Institutional knowledge

In the rapidly advancing world of telecommunications, information is being created every day. The activities of ITU, including conferences, workshops and studies, generate treaties, decisions, guidelines and standards. These publications are all available through the library. But along with the published documents, there is a flow of correspondence, internal

memoranda and other records, sent or received by ITU, that help to explain what the Union does — why a particular course of action is pursued or put on hold or abandoned. The guardian of all this institutional knowledge is the Archives Service, whose mission is to ensure that the right records are available to the right people at the right time.

Because of the burgeoning activity in ITU, each day adds yet more records, whatever their form or medium. It is the responsibility of the Archives Service to manage this flood of information. There are two main challenges. The first is to organize the records so that they can be retrieved and used. The second is to determine how long records should be stored, which records need to be preserved indefinitely as historical archives, and which can be destroyed.

Since 2009, the Library and Archives Service has been involved in a Records and Information Management (RIM) project, with the objective of developing an efficient and transparent electronic system for the management of ITU official records. The

goal is to provide for better and more timely decision-making by ITU. The benefits include a single and comprehensive electronic repository of documents, a reliable workflow for the treatment of documents, shared access to electronic documents, powerful search tools, and a file classification scheme for applying retention policies and security rules.

For the physical records, the Archives Service has a secure storage facility in the basement of the ITU Montbrillant building. In its long banks of shelves, this storage facility houses semi-active records and historic collections. The historic collections are available for consultation (on-site only) by anyone, including the general public. The Archives Service will, however, provide copies, on request.

History and memory

A pioneering organization such as ITU has much to record. The Library and Archives Service holds conference and meeting documents, and circular and collective letters, in an unbroken series dating back



A specialized book scanner can digitize materials, including fragile historic documents



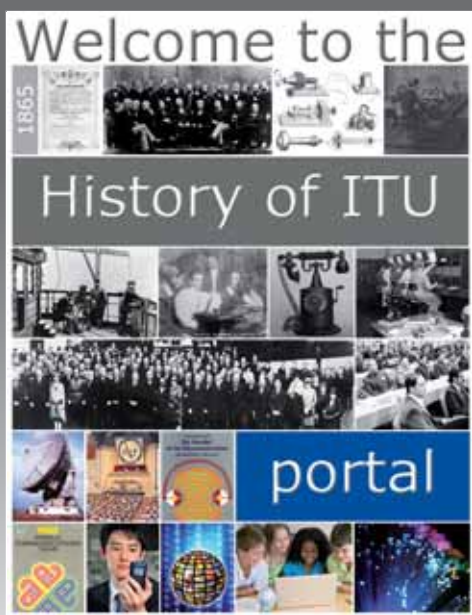
to 1865. There is historic correspondence from the period 1869 to 1947, and a collection of world and regional maps of telecommunication networks from around 1875 to 1930. The service also holds the proceedings of ITU seminars and colloquia, regulatory publications, Recommendations, manuals and handbooks, photographs and posters.

To keep the memory of history alive, the Library and Archives Service has embarked on an ambitious programme to make unique ITU records widely available to ITU staff and all kinds of researchers. This activity, the Historical Documents Digitization Programme, has the dual objective of improving access to ITU information and ensuring the long-term preservation of historic documents. So far, more than 15 500 pages of conference documents have been scanned. These documents will be available on the new History of ITU portal (see box).

Customer services: research assistance and facilities

The Library and Archives Service responds to requests for information by e-mail (library@itu.int), telephone (+41 22 730 69 00), fax (+41 22 730 53 26) or in person in the Reading Room on the sixth floor of the Montbrillant building. Copies of documents can be made and — since 2008 — a specialized book scanner designed to prevent damage to bound and fragile documents can be used to digitize materials. The Reading Room provides photocopying facilities, WiFi and workstations with Internet access for research purposes.

The History of ITU — a new web portal



Founded in 1865, ITU is the world's oldest international organization. On its website a new portal is being launched on "The History of ITU", which offers links to the many documents, landmark dates and important figures that chart the Union's history and its contribution to connecting the world. The portal will be open in February and can be accessed at www.itu.int/history

BDT Director launches web portal for Sector Members

Sami Al Basheer Al Morshid

Director of the ITU Telecommunication Development Bureau



■ It was a great pleasure to launch the ITU-D Sector Members Portal at ITU TELECOM WORLD 2009, which took place in Geneva in October. With more than 150 guests attending the launch, it was a lively event. It was also an opportunity to express my appreciation for Sector Members' participation in the activities of ITU's Telecommunication Development Sector (ITU-D), and to encourage those who had not yet done so to join the fifty companies already represented in the portal. I am pleased to say that the number has now risen to more than sixty.

The portal's aim is to showcase information on ITU-D Sector Members and to strengthen communication between them and the Telecommunication Development Bureau (BDT). It provides them with an

invaluable means to enhance their visibility and take advantage of networking opportunities.

Besides presenting an external source of information, the portal offers a useful new tool for consulting data on Sector Members. The logo of each entity is displayed, linking to a short profile and the Sector Member's own website. There is also a facility for subscribing to RSS feeds of news from the wide range of companies and others that use the portal. To facilitate networking, filter and navigation tools make it possible to search for information by such parameters as region, country, or type of activity.

The Partnership, Promotion and Membership team of BDT is continuing to update and improve the portal, and I strongly encourage ITU-D Sector Members to contact us and participate. I believe the portal is an important element in achieving the BDT's goal of serving the interests of Sector Members and providing them with the services they deserve. ■

The ITU-D Sector Members Portal is accessed at www.itu.int/ITU-D/membership/portal/index.asp

To participate in the portal, contact Fernando Lagraña, Head of the Partnership and Promotion Division, at the following e-mail address: MembershipITUD@itu.int



Official Visits

During December 2009, courtesy visits were made to ITU Secretary-General Hamadoun I. Touré by the following ambassadors to the United Nations Office and other international organizations in Geneva, and other important guests.



Pablo Guzmán Laugier,
Bolivia's Deputy Minister of Foreign
Trade and Integration



Juri Seilenthal,
Ambassador of Estonia



Kshenuka Senewiratne,
Ambassador of Sri Lanka



Swashpawan Singh,
Former Ambassador and Permanent
Representative of India



Hans Dahlgren, Ambassador of Sweden (left) and
Eckart Guth, Ambassador of the European Union (right)



Uglješa Zvekic,
Ambassador of Serbia

All photos are by V. Martin/ITU.

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