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Technology Watch

▸ **Mobile applications reach new milestone**

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Editorial

ITU TELECOM WORLD 2009

Heads of State and Government to focus on the global economy

Dr Hamadoun I. Touré
ITU Secretary-General

ITU TELECOM WORLD 2009
Geneva
5-9 October

Charting the best way forward for our global economy in today's financial climate is a priority concern for all world leaders. That is why ITU has invited Heads of State and Government to participate in ITU TELECOM WORLD 2009, in Geneva on 5–9 October. The event provides them with a golden opportunity to engage in a strategic dialogue with policy-makers, industry leaders and international experts and examine how information and communication technologies (ICT) can push forward economic recovery, investment and growth.

The financial crisis is presenting a major challenge to many firms in the ICT sector. The good news is that this sector is dealing with the onslaught better than most. I believe that the crisis will also give birth to new technologies, new entrants and new business models, and will revitalize the industry as we know it.

There is wide recognition that investing in ICT is of vital importance for economic recovery. Governments are already responding to the crisis with stimulus packages that include ICT investment, notably in broadband networks that are needed to support key government and business applications.

Industry needs to know what further plans governments will implement to boost competition and attract more investment. At the same time, the private sector, with its limitless capacity for innovation, will be looked upon to create new opportunities for the growth of the ICT sector and with it economies as a whole.

ITU TELECOM WORLD 2009 is the place where leaders of government and industry can come together to forge a global pact on carrying us beyond the crisis. The meeting is a platform for creating innovative public-private partnerships that will result in win-win solutions for developed and developing countries alike. Rather than assistance, it is true partnerships that developing countries seek, as they experience double-digit growth in their ICT markets.

With world political and industry leaders sharing ideas and visions, I believe that ITU TELECOM WORLD 2009 will be a defining moment for the future of the ICT industry and for the road to economic recovery.

Technology Watch

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Mobile applications
reach new milestone

In July 2009, a milestone was reached that illustrated an important change in the mobile marketplace. Just one year after its launch, 1.5 billion software applications (also called "apps") had been downloaded from the website of Apple Inc, for use on the iPhone or iPod "Touch". This tremendous (and unexpected) boom has led more and more handset manufacturers, mobile network operators and suppliers of mobile operating systems to join in to capitalize on growing consumer demand.

Mobile apps are add-on software for hand-held devices, such as smartphones and personal digital assistants (PDA). Research firm Ovum expects the market for smartphones to grow by 23 per cent in the period 2008–2009, against an overall decline in the total mobile phone market caused by the economic crisis. Smartphone shipments are forecast to reach more than 400 million by 2014, nearly all capable of running apps from at least one store.

However, as more smartphones are sold, the creation of mobile applications to run on them is constrained by the fragmentation of the market between different platforms. This is one of the issues examined in a "TechWatch Alert,"* published by ITU's Telecommunication Standardization Sector (ITU–T) shortly after the milestone was achieved.

What is an app?

In the beginning, a typical application would be purely for entertainment: a game, perhaps, or something that turns the screen of your phone into (for instance) a functioning piano keyboard. Recently, though, useful apps have become more popular. These include programmes for tracking expenses, foreign language phrasebooks, and currency converters. Other apps provide reviews of nearby restaurants, lists of local events, or audio walking tours of tourist sites.

Such localized content is an important element of the app environment. Its creation is supported by the ease with which software developers (many

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* "Mobile Applications" is the first publication in a series of TechWatch Alerts. It describes the mobile application market and identifies initiatives that aim at creating standards for an open and interoperable mobile environment. Alerts are intended to provide a brief, but concise, overview of emerging technologies and trends in the ICT field. "Mobile Applications" can be downloaded at www.itu.int/ITU-T/techwatch/reports.html

Table 1 — Characteristics of selected mobile platforms			
Vendor	**Operating system (OS)**	**Programming Language**	**Application store (launch date)**
Apple	iPhone OS	Objective-C	App Store (July 2008)
LiMo Foundation	LiMo Platform (Linux)	Java, native (C/C++)	R2 (autumn 2009)
Microsoft	Windows Mobile	Visual C#/C++	Windows Marketplace for Mobile (autumn 2009)
Open Handset Alliance	Android (Linux)	Java	Android Market (October 2008)
Palm	Palm OS	C/C++	Palm App catalog (June 2009)
	webOS (Linux)	JavaScript, HTML 5	
Qualcomm	BREW	C/C++	Plaza Retail (May 2008)
RIM	BlackBerry OS	Java	BlackBerry App World (April 2009)
Symbian Foundation	Symbian	C++	Nokia Ovi Store (May 2009)

of them amateurs) can produce an application and have it placed in a store for downloading. Although many of these creations will have a limited market, they are relatively simple and cheap to produce, by using the software development kits supplied by manufacturers.

A list of some of the platforms for mobile applications is given in Table 1. They use at least one of a device's communication interfaces (such as Wi-Fi, WiBro/mobile WiMAX, GSM/EDGE, W-CDMA/UMTS/HSPA, or Bluetooth), as well as — in some applications — a device's audio and video processors, camera, or satellite navigation capability.

A study produced in May 2009 by Gravitytank (a market consultancy firm in the United States) showed that 69 per cent of smartphone owners they surveyed had installed an application in the previous month and that users had an average of 21 installed applications, of which about a quarter were paid for.

Many applications are offered free of charge, in order to win new customers for a future paid application; others are for customers of an existing service, such as a newspaper subscription.

Commercial opportunities and challenges

In most cases, mobile applications are created by third-party developers, but store owners take care of distribution, payments and limited marketing, in return for around 30 per cent of the price of downloads that are sold. This is potentially very profitable for the stores (and leads to higher sales of hardware). Developers too are finding more ways to make money. The latest upgrade of the iPhone, for example, allows developers to sell premium content or services within their apps, using the store to collect one-off or subscription fees. Additional revenues are promised by the mobile marketing that is starting to take off, in the form of branded applications.

However, some mobile network operators fear "cannibalization" of existing services and are therefore restricting such applications as:

▶ Voice over Internet protocol (VoIP) apps that challenge conventional phone calls

▶ Instant messaging apps that challenge the short message service (SMS)

▶ Apps that speed up surfing and so reduce online traffic.

In addition, the fear of malware makes vendors hesitant to give developers direct access to the core functionalities of a device.

Variations or ambiguity in these restrictions, as well as the lack of interoperability among platforms, are obstacles to development of the mobile applications market. Products written for one device must be rewritten for another, since application programming interfaces (API) and software development kits are specific to each of the major platforms. This means that it takes longer for an app to appear, and prevents customers from using apps on a range of different devices.

Unifying the market

The good news is that attempts are under way to unify the mobile ecosystem. For example, the open-source "Android" operating system has been developed by the Open Handset Alliance, which has 47 member companies. Another industry forum, the Open Mobile Terminal Platform, aims at "simplifying the customer experience of mobile data services and improving mobile device security." It recently published the "BONDI" specification, which defines interfaces for secure access to the core functionalities of a device from its web browser or user interface.

This avoids developers being locked into one particular platform and enables them to write applications for all handsets using BONDI.

The GSM Association's "OneAPI" initiative seeks to define a commonly supported API, so as to allow operators to disclose information about, and the capabilities of, their mobile networks to application developers. The API supports the creation of content and applications that are portable across the networks of different operators, and provides a common interface for messaging, location services, user data, connection and charging.

ITU has contributed to the considerable success of mobile communications and applications, including through its role as the global manager of the radio-frequency spectrum, as producer of the IMT-2000 family of standards (3G), and as pioneer in the IMT-Advanced standards (beyond 3G). A unique international mobile subscriber identity (IMSI) conforming to the standard ITU–T E.212 is stored in each SIM card and used for identification when interconnecting between (mobile) networks. Many handsets carry implementations of ITU–T Recommendations; for example, speech and audio codecs, such as G.718 or G.722.2 and the multimedia decoders for H.263 and H.264. Many also conform to handset specifications in the ITU–T P.300 series of Recommendations.

Software developers are demanding lightweight standards and interfaces that are easily understood and can be adopted in their applications. An increased focus on standards for open and interoperable API would help mobile applications to grow, offering a huge variety of services to millions of people.

The future Internet

A Technology Watch Report

The Internet has grown from a small experiment into a collaborative network with more than 1.6 billion users today. From a simple means of communication among computers, the Internet, coupled with the spread of broadband, has emerged as a fundamental part of modern society. In addition, the Internet has gone mobile with devices already used by millions of people, and potentially billions. According to analysts Nielsen Mobile, the number of people surfing the Internet on mobile phones has doubled since 2006 — and some predict that by 2012 there will be more wireless Internet users than wired. This is especially true for developing countries, and the Internet must meet the needs of those users.

Meanwhile, the deployment of higher speed mobile Internet access in developed countries continues apace, alongside the launch of smartphones. And increasingly, sensors are being added to networks. This is extending the system to objects that are fitted with radio-frequency identification (RFID) tags, creating an Internet of things.

On top of all these networks and devices lies a vast array of applications that range from YouTube and Facebook to e-commerce, e-government, e-education and e-health.

To meet the demands of new applications, services and users, and to fulfil its role as a vital part of national and global infrastructure, the Internet is continually evolving. But is the underlying architecture robust enough to continue adapting to ever-growing demands?

ITU's Telecommunication Standardization Sector (ITU–T) issued its tenth *Technology Watch Report** in April 2009 entitled "The Future Internet". It examines

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* The Future Internet *and all previous ITU–T Technology Watch Reports can be downloaded at* www.itu.int/ITU-T/techwatch.

▶ the debate over the Internet architecture and provides pointers for future standards work within ITU–T and the broader standards community.

The Future Internet was published as part of ITU's function of surveying the environment of information and communication technologies (ICT), by identifying new and emerging technologies and assessing their likely impact on future standardization work and on developing countries. Formal recognition of the *Technology Watch* function was given in Resolution 66 of the World Telecommunication Standardization Assembly in Johannesburg in October 2008.

Framing the debate

The existing architecture of the Internet dates back to the 1970s and was designed to create simplified network and implementation protocols, guided by concepts such as layering and packet switching.

Phecsone

Among the goals of this architecture are connection of existing networks; cost-effectiveness; survivability; support of multiple types of services; accommodation of a variety of physical networks, and allowing distributed management and resource accountability.

To cope with the unforeseen spread of the Internet and new applications, various solutions have been found that are seen by some observers as temporary "patches". There have been periodic calls to purge the Internet of the accumulation of such patches and to adopt a radical "clean-slate" approach. Those who hold this view contend that an "Internet of the future" should be created on a new architecture that would offer better security. In contrast, others say that the existing architecture should be allowed to continue to evolve.

The evolutionary view

The evolutionary view is that the Internet should continue as it has over the past decade, with targeted patches being added to fix problems as they emerge. To meet the challenges of disruptive technologies, one suggested solution is the use of overlay networks that can provide performance and reliability without competing with existing infrastructure. This position is based on the view that the Internet is now fully commercial and the investments by operators and individuals make an evolutionary approach essential. In any case, firms that have invested billions of dollars will ensure that the current form of the Internet survives and prospers. It has also been pointed out that the original architecture has already shown that it can be adapted to new services and applications that were not imagined when the Internet began.

Some supporters of the evolutionary view say that such common problems as security and spam are not the result of architecture. In a presentation at the Internet Governance Forum in Hyderabad, India, in December 2008, Bob Kahn, one of the original creators of the Internet, proposed new standards for "digital object architecture", to enable better information flows across the Internet. He contends that this would address the problems, but keep the basic architecture intact.

The clean-slate approach

The proposal to start anew with a different architecture was put dramatically by Professor Dave Clark of the Massachusetts Institute of Technology in the United States, who served as the Internet's chief protocol architect during much of the 1980s. In an article entitled "The Internet is Broken" published in 2005, he wrote that "the Net's basic flaws cost firms billions, impede innovation, and threaten national security. It's time for a clean-slate approach."

A number of initiatives are already under way to reinvent the Internet in this way. Among the major challenges being addressed in these efforts are security and privacy; resistance to distributed denial of service attacks; end-to-end quality of service and quality of experience; mobility; reliability; addressing, and identity.

The United States, for example, has provided government funding for projects on Internet design, such as that of the US National Science Foundation (NSF), which has invested around USD 20 million in two projects: the Global Environment for Network Innovations (GENI) and Future Internet Design (FIND). The GENI vision is to create a national facility to explore radical design for future global networking infrastructure, based on people and content.

Another initiative is the interdisciplinary Clean Slate Internet Design Program by Stanford University in the United States, launched in March 2007 to "reinvent the Internet". It is predicated on two questions: "With what we know today, if we were to start again with a clean slate, how would we design a global communications infrastructure?" and "How should the Internet look in 15 years from now? It is supported by industry partners such as Cisco Systems, Deutsche Telekom, NTT DoCoMo, NEC and Xilinx, as well as the United States National Science Foundation.

▶ In Japan, the National Institute of Information and Communications Technology has launched the Akari programme to develop a "new generation" of network architecture by 2015–2020. The aim is to find an ideal solution starting from a clean slate, unimpeded by existing constraints. Major initiatives under the European Union's Framework Programmes for technological development include the think-tank Evolved Internet Future for European Leadership (EIFFEL), established by a group of researchers in 2006, and the Future Internet Research and Experimentation (FIRE) project. FIRE is focused on exploring "new and radically better technological solutions for the future Internet", while preserving its current advantages of openness, freedom of expression and ubiquitous access.

Meeting future needs: the key trends

Meanwhile, several trends are shaping the future demands to be placed on the Internet's architecture and design. These include powerful search engines, social networks, online media and mobile access. The Technology Watch Report points to mobile Internet access, Web 2.0 and cloud computing as emerging trends to be considered by the ITU–T membership in its future standards work. The report underlines that the growing popularity of cloud computing as a business model will place further strains on the Internet, particularly with regard to security, reliability and cost of access. ITU published a Technology Watch Report on cloud computing in March 2009 (see *ITU News* of April 2009).

Progress in 3G and 4G

ITU's Radiocommunication Sector (ITU–R) continues its work, in partnership with organizations in the wireless mobile broadband industry, to harmonize the advances being made in third-generation (3G) and 3.5G wireless technologies known as time division multiple access (TDMA), code division multiple access (CDMA) and orthogonal frequency division multiple access (OFDMA). In their latest versions, these technologies offer very significant improvements in throughput, performance and overall user experience. Using an all-IP packet-based network, they enable operators to reduce the number of network elements between subscribers and the Internet. Higher speeds and increased support of full mobile broadband will allow the end user to run applications and services that are associated today with wired broadband networks.

To set the stage for the new wireless future, in 2003 ITU–R provided a strategic vision called IMT-Advanced, and a plan and related standards are in

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Steve Woods

place to achieve it. IMT-Advanced (or 4G) is a leap beyond IMT-2000 (or 3G), as it offers new capabilities for the physical layer of the radio interface and brings into play better management and control of radio resources, advanced capabilities for spectrum channel and bandwidth aggregation, and improved performance at all levels, including quality of service (see the December 2008 issue of *ITU News*).

The Internet of services

The Internet of services (IOS) is another area that has been very successful. The best known class of services is e-commerce, with such leading firms as eBay and Amazon. The importance of searching and of the related advertising revenues enabled the growth of Google. Similarly, the development of social networking saw Facebook and its competitors grow rapidly. Now location-based services, such as those that tell you where your friends are, or where to find a suitable local restaurant, are expected to extend social networking systems to mobile devices. The problem for network design has been the unpredictable nature of the successes (and failures) of services, making it difficult to know the nature and levels of traffic they will generate.

Internet and television

Already, in some countries, people spend more time online than watching television. As the Internet encroaches on the market share and advertising revenues of traditional broadcast media, new technologies are emerging to facilitate Internet viewing over television sets.

For instance, the electronics manufacturer LG, of the Republic of Korea, recently introduced a television set that allows wireless Internet viewing. Chip maker Intel is partnering with Yahoo to produce a widget that lets television viewers send e-mails, trade shares or check the weather while watching programmes.

New web technologies

New web technologies may change the nature of data flows and searches on the Internet. An example is the "semantic web" that has been described by Tim Berners-Lee, inventor of the World Wide Web, as the "web of the future". It would allow any item, such as a photo or a bank statement, to be linked to any other. Instead of a collection of pages, the semantic web would enable direct connectivity between much lower-level pieces of information, giving rise to new services. However, it would also raise new privacy and security challenges.

Internet islands

It has been widely observed that the open, transparent nature of the Internet is one of the key reasons for its success and its global reach. But there are concerns that the global system could break up into "islands" or that some parts could be closed off, due in large part to security concerns.

Professor Jonathan Zitrain of Harvard Law School in the United States has warned that we face a wholesale revision of the Internet and personal computer

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environment of the past 30 years. "The change is coming partly because of the need to address security problems peculiar to open technologies, and partly because businesses want more control over the experience that customers have with their products." He adds that "the trend from open systems towards closed ones threatens the culture of serendipitous tinkering that has given us the web, instant messaging, peer-to-peer networking, Skype, Wikipedia and a host of other innovations".

Others refer to the possibility of the Internet becoming a "gated community", where users may have to sacrifice certain freedoms and anonymity in return for better security. This is already the case for many corporate and government Internet users.

Will there be traffic jams?

The rapid growth of the Internet has placed new demands on communication networks. New technologies that generate large quantities of traffic include video-sharing sites, videoconferencing, movie downloads, online gaming, remote medical imaging and online storage of documents.

Some claim that the Internet will collapse under the weight of traffic. A recent study by analysts Nemertes Research concludes that, by 2012, demand will exceed total broadband capacity at the access layer of the Internet and will require investment of some USD 137 billion over the next five years to keep pace.

Other observers consider that the growth will be manageable, largely due to declining unit costs. Andrew Odlyzko, a computer scientist at the University of Minnesota, United States, estimated that Internet traffic in 2007 was between three and five exabytes worldwide (an exabyte is 10^{18}, or a quintillion, bytes). This represented an annual growth of 50–60 per cent — down from 100 per cent in prior years, indicating that the rate of growth is slowing. TeleGeography Research has published figures showing that between 2007 and 2008, capacity grew faster than traffic.

Conclusion

The existing architecture of the Internet has proved to be capable of permitting the creation and rapid expansion of such features of modern life as eBay, Google, YouTube, Skype and Facebook. Despite some critics, evolutionary changes to the original design have been adequate to meet most new needs. The next few years are likely to see further deployment of IP over mobile networks and, in developed countries, over fibre-to-the-home.

However, security concerns and rising cybercrime lend support to calls for a clean-slate approach to the future Internet. The evolutionary approach is ongoing, but will there be a tipping point that would favour a move to a clean slate? Only time will tell.

ITU/V. Martin

Brazil's President Luiz Inácio Lula da Silva visits ITU

President Luiz Inácio Lula da Silva of Brazil visited ITU in Geneva on 15 June 2009 to receive his World Telecommunication and Information Society Award, which he had accepted in a message via video link on 18 May. The Award is given each year to distinguished people for their contributions to building an inclusive and more equitable information society.

Addressing Geneva's international diplomatic community and ITU staff, President Lula said he was pleased to see international recognition for the Brazilian government's work to promote digital inclusion and a safe and democratic cyberspace, especially for children and teenagers. "We are determined to fight digital exclusion, which is today one of the major constraints in the quest for development. To reduce inequalities we need to increase access to modern communication technologies for a larger number of people," the President said. And he stressed that "people should be able to use these technologies in a critical and interactive way. This is important to promote the involvement of all people in the knowledge society".

Presenting the Award, ITU Secretary-General Hamadoun I. Touré described how the President has consistently put social problems and information and communication technologies (ICT) at the top of the agenda. "Brazil's progress in the development of ICT is remarkable, and puts the country firmly at the forefront of the wireless revolution," Dr Touré noted. With 155 million mobile phones, of which 5 million are third-generation (3G), the country has a mobile teledensity of almost 80 per cent. At the beginning of 2009, over a third of the population was online, with more than ten million subscribers to fixed broadband services and almost three million to mobile broadband. And the law approved by President Lula in 2008 against the sexual exploitation of children on the Internet "should serve as a shining example for all countries," Dr Touré commented.

Sixty years ago, on 15 August 1949, Brazil ratified the International Telecommunication Convention of Atlantic City. Dr Touré gave President Lula a copy of the ratification certificate, saying "it is a commemoration of the long, shared road ITU and Brazil have travelled together".

▶ President Lula commended ITU for launching the Global Cybersecurity Agenda. He noted that the World Summit on the Information Society (WSIS) had given ITU a mandate to strengthen cybersecurity and said ITU is the right place to coordinate this endeavour. "The challenge of cybercrime demonstrates the importance of discussing Internet governance," the President added, and ITU is where governments and civil society can come together for that debate. He said that in fighting online paedophiles, ITU could define standards to be adopted by all countries. "We need a multilateral instrument that would stimulate effective international cooperation," he said.

Historic connection with ITU

Brazil and ITU have had a fruitful partnership since1877, when Brazil joined the Union just 12 years after its foundation. In 1906, it was one of the 27 countries which signed the first Radiotelegraph Convention. Brazil has hosted many important events for ITU, including major broadcasting planning conferences, regional Telecom events, the World Telecommunication Standardization Assembly in 2004, and other key meetings, including on 3G mobile communications. Since 1992, it has been the home of ITU's Regional Office for the Americas.

Brazil's satellites help monitor our planet

Dr Touré drew attention to Brazil's position as "one of the world's most important players in satellite communications". It has operated geostationary and non-geostationary satellite networks since the early 1970s, and given the country's large size, "Space systems play a vital role in helping to connect remote populations, as well as in remote sensing and monitoring climate change," Dr Touré said.

Brazil's National Institute for Space Research (INPE), established in 1961, is responsible for programmes to use satellite imagery in environmental surveys; for developing software for image processing, and for providing training courses for users of remote sensing and geographic information systems. The data are made freely available to academics and all who need them, showing such features as changes in land use in the Amazon basin, water resources, and hazardous meteorological events. So far, some 500 000 images of Brazil have been distributed to around 15 000 users from the country's public and private institutions.

As well as scanning its own territory, Brazil's satellites make significant contributions to global efforts to monitor the planet. In 1988, the China-Brazil Earth Resources Satellite (CBERS) programme was

inaugurated by INPE and the Chinese Academy of Space Technology, aimed at establishing a complete remote sensing system (with Space and ground elements) to supply both countries with multispectral remotely sensed imagery. The first satellite, CBERS-1, was launched in 1999, followed by CBERS-2 in 2003 and CBERS-2B in 2007. The satellites CBERS-3 and CBERS-4 are to be launched in 2011 and 2014.

CBERS-2B scans the entire planet over a 26-day period with three different imaging cameras. It transmits multispectral, 20-metre-resolution images and other data to three ground receiving stations in China and one in Brazil. The satellite also carries a transponder for collecting data from weather stations, river gauges and other ground-based observation platforms. This is particularly helpful for obtaining data from remote regions such as rainforests and mountains. The CBERS programme enables the two countries to gather data cost-effectively on their huge national territories.

The CBERS satellites can provide vital Earth-observation data to countries worldwide

INPE

Free distribution of data

Under the government of President Lula, Brazil adopted a policy in 2004 of sharing satellite data freely worldwide, in order to support sustainable development and protect the environment while improving people's welfare. Since May 2006, INPE has been offering, at no cost, images to countries in Latin America that are covered by its receiving station in the State of Mato Grosso. China has introduced a similar policy on open access, and more than 200 000 CBERS images have been distributed for free, with China's Earth and Natural Resources Ministry as the main user.

The CBERS programme is a successful example of South-South cooperation that is leading to broader distribution of data from Earth-observation satellites to nations that might otherwise not have access. For example, a service to provide images at no charge to users across Africa was announced in 2007 at a ministerial meeting in South Africa of the Group on Earth Observations (GEO). Brazil and China have also signed agreements with South Africa, Spain and Italy on using ground stations to download and process CBERS imagery and distribute it via the communication satellites of the GEONETCast system. The four receiving stations are located in the Canary Islands; Hartebeesthoek, South Africa; Malindi, Kenya, and Matera, Italy. The service, launched in 2008, initially in South Africa, will provide the continent with satellite imagery to monitor and respond to natural disasters and environmental threats.

In future, Brazil plans to continue offering open access to the data from all of its Earth observation satellites, including "Amazonia-1", to be launched in 2011 to monitor deforestation in the tropics.

President Dmitry A. Medvedev of the Russian Federation at the forum with ITU Secretary-General Hamadoun I. Touré

New technologies will be key in overcoming the economic crisis

President Dmitry Medvedev of the Russian Federation speaks at the St Petersburg International Economic Forum

Responding to the financial crisis that is affecting countries around the world requires their concerted effort and the adoption of new approaches and technologies. That was the message of President Dmitry A. Medvedev of the Russian Federation at the St Petersburg International Economic Forum, held on 4–6 June 2009 in one of the country's most historic cities.

The President was addressing a plenary meeting on *The global economic crisis: first lessons and leading the way forward.* "No-one has managed to avoid being caught up in the global crisis. Modern communications and financial technologies enabled the

> " *No-one has managed to avoid being caught up in the global crisis. Modern communications and financial technologies enabled the crisis to spread incredibly fast and affect all countries. Only Antarctica is probably still an oasis of stability.* "

crisis to spread incredibly fast and affect all countries. Only Antarctica is probably still an oasis of stability," Mr Medvedev said. "The conclusion is obvious," he continued. "The only way we can overcome this crisis is by working together. To be successful in addressing the problems before us, we need to have an intensive exchange of information and ensure a high level of coordination in our work". He went on to say that "those whose job it was to forecast events and facilitate this coordination were not ready for the depth of the crisis and turned out to be too rigid, unwieldy and slow in their response".

The President noted that despite these conditions, "we have managed to avoid a worst-case scenario because different countries and governments have shown a willingness to cooperate more closely than in the past; indeed, perhaps work together more closely than at any other time in the whole of economic history". The G20 group of economies has already met twice to address these issues, Mr Medvedev said, and although they "have not reached the point of complete agreement and specific common decisions… clear progress has been made". For example, institutions such as the Financial Stability Board have been established that make it possible to engage in open dialogue and take into consideration all participants' interests to arrive at mutually advantageous solutions.

Outlining his country's long-term development strategy, known as the "Four I's" (institutions, infrastructure, innovation, and investment), the President reminded participants what he had said at the forum a year before. Another word beginning with "I" needs to be added: intelligence. "Our goal now is to form an intelligent, 'smart' economy, and a corresponding intelligent and smart society," he said. As well as fostering entrepreneurial skills, this means supporting companies that adopt modern technologies and energy-efficiency measures. "Today, we are thinking about more than just getting out of the crisis as quickly as possible. We must get out of the crisis with a renewed and stronger economy," he stressed. "The current crisis will most certainly reshape the world. And the new models that will emerge over the coming years will

> " *The financial crisis will challenge many businesses. But it will also give birth to new institutions, revitalize communications, and enable new entrants, new business models, and new technologies to emerge,* "

have to go through the test of time and prove their effectiveness," the President concluded.

ITU Secretary-General addresses the forum

These sentiments were echoed by ITU Secretary-General Hamadoun I. Touré, who attended the Forum at the invitation of the Russian Federation's Ministry for Economic Development. In a session on *The power of Innovation: when tomorrow begins,* Dr Touré spoke about the important role of information and communication technologies (ICT) in helping to overcome the economic crisis, and why cybersecurity has become essential in the information society.

ICT are a driving force for economic growth at the global level, with more than 4 billion mobile phone subscriptions, and over 1.6 billion Internet users worldwide today. "Underpinning the massive growth of the Internet are next-generation networks (NGN)," Dr Touré commented. He added that NGN are already beginning to replace the traditional circuit-switched networks that have served as the basis of telephony for more than a century. ITU is leading this transition with its NGN Global Standards Initiative — one of the largest, most wide-ranging standardization projects ever undertaken.

"The financial crisis will challenge many businesses. But it will also give birth to new institutions, revitalize communications, and enable new entrants, new business models, and new technologies to emerge," Dr Touré noted. He underlined that investment in ICT infrastructure brings direct benefits in increased employment today, as well as increased

Dr Touré at the forum with Igor Shegolev, the Russian Federation's Minister of Telecommunications and Mass Communications

social and economic prosperity tomorrow. New communication, transmission and data storage technologies are also bringing sizeable and important productivity gains to other economic sectors.

Highlighting these trends, Dr Touré said he was tremendously encouraged to see a fresh commitment — fuelled at least in part by the current crisis — to the rolling out of new, fast, broadband network infrastructure in many countries around the world. These networks will be crucial in delivering affordable access to broadband Internet services, and there is impressive cooperation between the public and private sectors in financing their construction. Dr Touré stressed the importance of creating the right kind of environment for business to flourish. "And we are very lucky, in the ICT industry, to have, as our greatest natural resource, a resource that will never run out: human brainpower."

The Internet is "an increasingly critical platform" for business and the delivery of services ranging from personal communication and entertainment, to education and health, said the Secretary-General. However, he added, "the very tool that is bringing us a host of exciting and empowering new services is also bringing with it a special set of risks which are compromising the safety and integrity of the

Internet." That is why ITU took the step of launching the Global Cybersecurity Agenda, which involves international cooperation to combat these threats. Such cooperation is also "absolutely crucial" to developing ICT and helping to overcome the economic crisis, Dr Touré said. He drew attention to an ITU event that will promote such cooperation on ICT in the Commonwealth of Independent States (CIS): the *Connect CIS Summit,* scheduled for 26–27 November 2009 in Minsk, Belarus

On 6 June, Dr Touré enjoyed a tour of the Museum of Communications in St Petersburg, one of the world's oldest museums of science and technology and which is named after Russian scientist and radio pioneer Alexander S. Popov. The Secretary-General then visited the St Petersburg State University of Telecommunications, where the rector, Professor Alexander A. Gogol, explained its work on developing 3-D television. He and Dr Touré also discussed cooperation between the university and ITU and the possibility of providing training for personnel from developing countries.

Belarus to host ITU's Connect the Commonwealth of Independent States Summit

The summit will take place in Minsk

Alekcey

ITU will hold the *Connect CIS Summit* in Minsk, Belarus, on 26–27 November 2009. The event is expected to attract leaders of government and industry from the Commonwealth of Independent States (CIS) and from around the world, as well as international and regional financing and development agencies. Its objective is to mobilize the human, financial and technical resources needed to support a rapid transition to the digital infrastructure and services that are widely recognized as the engine of future economic growth. Priorities include rolling out broadband Internet access, expanding rural connectivity, creating a regulatory environment to support investment, enhancing ICT training, and creating locally relevant applications and services.

The summit will be held under the auspices of President of Belarus Alexander Lukashenko. He said that his country decided to host the event "recognizing that the sharing and creation of knowledge contributes significantly towards strengthening economic and social development, both at the national and regional levels". The President added that "Belarus is striving to strengthen and maintain its leading role in the development of information and communication technologies (ICT) in the CIS region".

On the summit programme will be high-level panels, round table discussions and networking sessions, as well as announcements of new partnerships.

The event will be televised and made available via webcast. A ministerial meeting will be held on 25 November, ahead of the Summit.

Highlighting the collaborative approach of the summit, ITU Secretary-General Hamadoun I. Touré said that "in this period of global economic turbulence, it is all the more important that all partners should work together to leverage the power of ICT for social and economic development". Director of the ITU Telecommunication Development Bureau Sami Al Basheer Al Morshid commented that "while the CIS region enjoys significant mobile phone coverage, we are convinced that more can be done by partners to expand ICT access and use, with an emphasis on developing affordable broadband Internet infrastructure and services to support the ever-growing demand for business and government applications".

The *Connect CIS Summit* will be held in conjunction with the CIS Regional Preparatory Meeting for the forthcoming World Telecommunication Development Conference in 2010. The meeting takes place on 23–24 November 2009.

While in Mexico, the ITU Secretary-General held talks with President Felipe de Jesús Calderón Hinojosa

ITU and Mexico sign agreement to hold Plenipotentiary Conference in Veracruz in 2010

During a visit to Mexico, ITU Secretary-General Hamadoun I. Touré signed an agreement on 23 June 2009 that confirms the country as host of the 18th ITU Plenipotentiary Conference. It will take place in the city of Veracruz on 4–22 October 2010. Dr Touré said that ITU is delighted to be holding the event in Mexico, which "is fast emerging as a key economic hub for the region, and is renowned for both its excellent facilities and for the warm welcome it extends to international visitors."

The agreement was also signed by Juan Francisco Molinar Horcasitas, Mexico's Secretary of State for Communications and Transport. He stressed that "the Mexican government believes that information and communication technologies (ICT) have a critical role to play in helping drive economic and social development". Mexico has experienced solid ICT growth over the past few years, and it "has been a world leader in promoting access to ICT to underserved communities through its *Digital Community Centres*," explained Mr Molinar Horcasitas.

Dr Touré said the Plenipotentiary Conference is "the key event at which ITU Member States decide on the future role of our organization, and thereby determine our ability to influence and affect the development of ICT worldwide". He cited the expansion of broadband as "absolutely crucial", because "in the 21st century, affordable broadband access to the Internet is becoming as vital to social and economic development as networks like transport, water and power".

ITU is promoting progress in this area, through such initiatives as the *Wireless Broadband Partnership* that is mobilizing key stakeholders to build and operate infrastructure. ITU's *Connect a School, Connect a Community* project is "a new public-private partnership to promote broadband school connectivity to serve both students and the communities in which they live," the Secretary-General explained. Meanwhile, ITU's *Connecting Villages* programme is helping provide at least basic forms of access to the Internet in rural areas.

Dr Touré also mentioned the ITU Academy, an umbrella framework for its numerous learning and development initiatives that offer training to thousands of people in developing countries every year. One of the partners in this initiative is Mexico's *Comisión Federal de Telecomunicaciones.*

The ITU Secretary-General receives his award from President Leonel Fernández of the Dominican Republic (right) in the presence of the First Lady, Dr Margarita Cedeño de Fernández
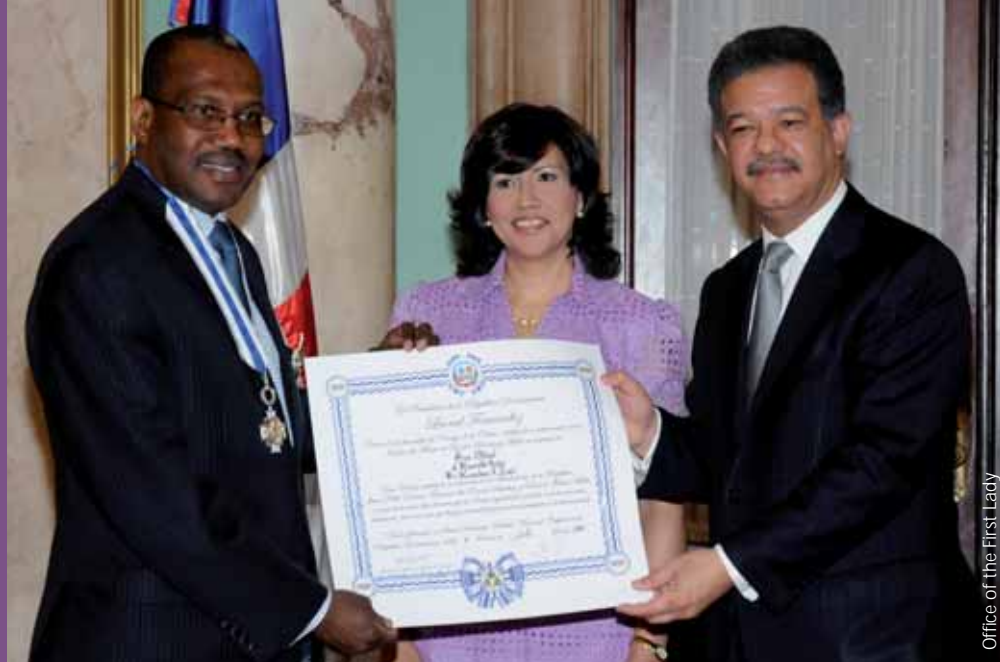
ITU Secretary-General receives Dominican Republic's highest order

ITU Secretary-General Hamadoun I. Touré has been honoured by the President of the Dominican Republic Leonel Fernández, who granted him the title of Grand Officer of the Order of Merit of Duarte, Sánchez and Mella *(Orden al Mérito de Duarte, Sánchez y Mella)*. Established in 1931, the Order of Merit of Duarte, Sánchez and Mella is the principal Order of the Dominican Republic and is conferred by the Head of State for distinguished services.

The award ceremony took place on 9 July 2009 in the Hall of Ambassadors at the National Palace in the capital city, Santo Domingo. It was attended by the First Lady of the Dominican Republic Dr Margarita Cedeño de Fernández. Also present were the President of the Dominican Institute of Telecommunications José Rafael Vargas, the Secretary of the Presidency César Pina Toribio, and John Gagain, Executive Director of the Presidential Commission on the Millennium Development Goals.

Upon receiving the decoration, Dr Touré paid tribute to the leadership of President Fernández and his strong commitment to national development.

"I would like to praise your efforts in driving development, and I am greatly honoured to accept this award," the Secretary-General said.

Dr Touré was on an official visit to the Dominican Republic, where he stressed the importance of information and communication technologies and broadband networks as vital enablers of social and economic development. He noted the enormous progress that has been made in the country over the past five years, with the number of mobile phone subscriptions growing from 2.1 million at the beginning of 2004 to 7.2 million by the start of 2009, and Internet access increasing from 731 000 to 2.6 million over the same period.

Dr Margarita Cedeño de Fernández awarded Dr Touré with the medal of the Office of the First Lady *(Medalla del Despacho de la Primera Dama)*, and the Mayor of Yamasá presented him with a Guest of Honour Certificate from the Yamasá City Hall *(Certificado de Huésped de Honor del Ayuntamiento de Yamasá)*.
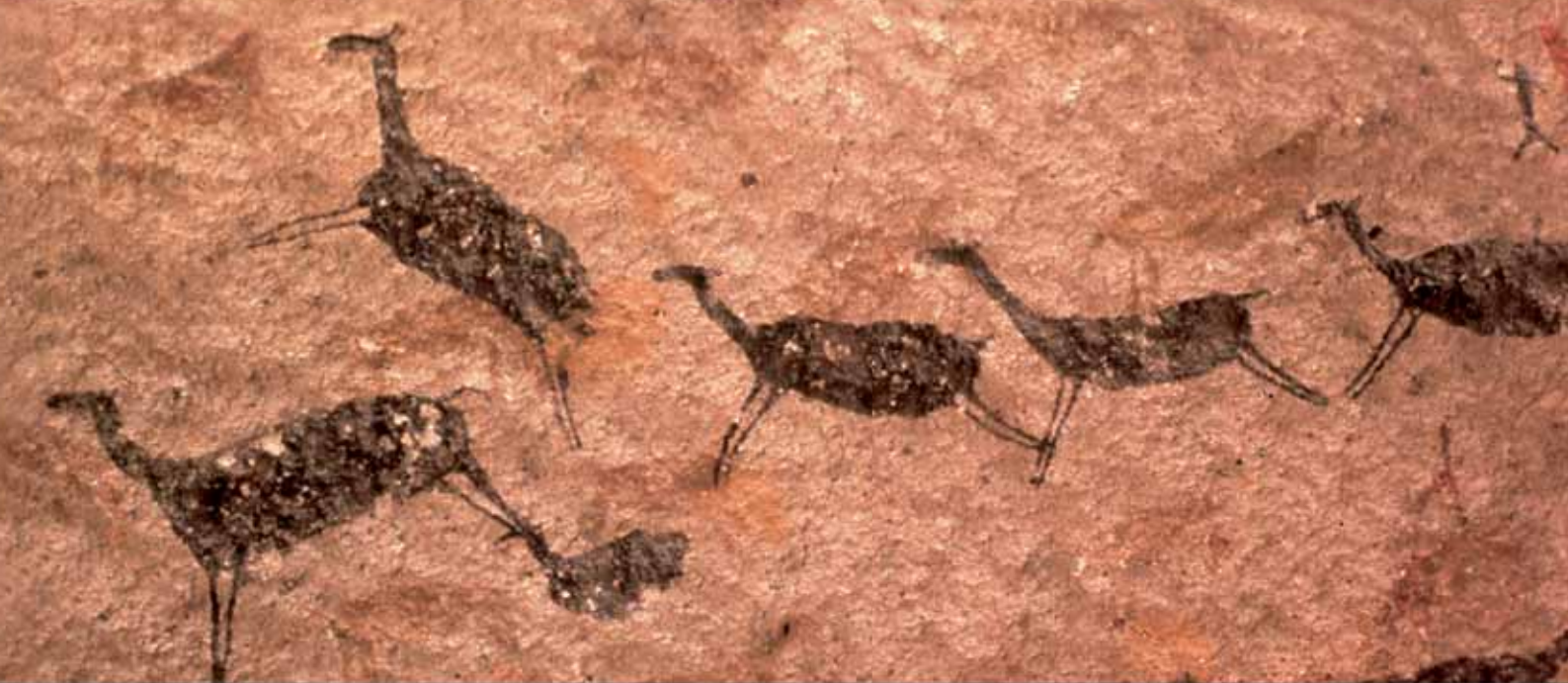
Communication has always been a human need.

We believe it is also a human right.

At the International Telecommunication Union (ITU), we believe that no human right, including the right to communicate, can survive unless it is made real and relevant. As the United Nations specialized agency for telecommunications, it is our mission to bring the benefits of information and communication technologies to as many of the world's people as possible. This is why our 191 Member States and more than 700 Sector Members and Associates work together to set universal telecommunication standards, establish international agreements on spectrum and promote global development. Everyone has the right to communicate. We help give them the means.

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ITU

Africa prepares for WTDC-10

Regional meeting agrees priorities for ICT development

Highlights from Kampala

Overview

Africa remains the region with the highest mobile growth rate, according to ITU's latest report "Information Society Statistical Profiles 2009: Africa." The report was released at the Africa Regional Preparatory Meeting for the forthcoming World Telecommunication Development Conference in 2010 (WTDC-10), held in Kampala, Uganda, on 13–15 July 2009. It says that the fixed-telephone market is stagnating, and this is constraining fixed broadband growth. Between 1998 and 2008, Africa added only 2.4 million fixed-telephone lines, which represent less than 1 per cent of the total number of telephone lines added globally in the same period. Mobile broadband growth has been much stronger than that of fixed broadband. By the end of 2008, there were twelve countries in the region with commercially available mobile broadband networks, with a total of seven million subscriptions, compared with 635 000 fixed broadband subscribers.

All speakers at the opening of the meeting in Kampala observed that despite rapid growth, much remains to be done to spread the benefits of information and communication technologies (ICT) to most of Africa's people. The meeting was attended by 130 representatives of government and industry from 31 countries across the continent, as well as international and regional organizations. They examined the progress made in implementing the Doha Action Plan issued by WTDC-06, as well as contributions from ITU Member States and Sector Members from Africa, and agreed on priorities to boost ICT development in the region. These priorities (see page 28) will be considered by WTDC-10, which will set the future direction of ITU's development activities worldwide.

The opening

The participants were welcomed by Chairman of the Uganda Communications Commission Dr A.M.S. Katahoire, and by Minister of Information and Communication Technology Aggrey S. Awori. The meeting was opened by the 2nd Deputy Prime Minister of Uganda, Henry M. Kajura, on behalf of Prime Minister Professor Apolo Nsibambi. Mr Kajura noted that Africa had made significant gains in ICT, but gaps remain. Speaking of Uganda's experience, he highlighted the important role which the private sector has played in making ICT more widely available. "Private entrepreneurs have invested heavily in Uganda and helped transform the sector," Mr Kajura said. The country is also developing its human capacity in ICT. A number of its universities are focusing more and more on ICT-related capacity building programmes. Makerere University, for example, has built the largest computing centre in Africa, with a capacity of 12 000 students at any one time. Mr Kajura called on governments and industry to become more proactive in responding to the rapid changes in the sector. In this regard, he reminded participants of one of the dictums of the modern business world: "adapt or die".

"ICT have the power to change people's lives and have become the basic foundation of modern societies, crossing cultural divides, giving access to vital information, facilitating health care and stimulating commerce," said ITU's Deputy Secretary-General Houlin Zhao. He added that ITU is committed to ensuring that people in all regions of the world in general, and in Africa in particular, can share these benefits. He then described ITU's efforts in fostering dialogue on the financial crisis, climate change, emergency communications, and cybersecurity and told participants that a debate on these issues would continue at ITU Telecom World 2009, to be held in Geneva on 5–9 October.

The Director of ITU's Telecommunication Development Bureau (BDT) Sami Al Basheer Al Morshid emphasized the intrinsic link between ICT development and socio-economic development. He called on countries to invest in ICT and to improve broadband access in the region, despite the current economic downturn. Lack of full liberalization in some markets, limited availability of infrastructure and shortage of international Internet bandwidth are among the challenges facing African countries in increasing their ICT levels. According to the new report, Africa as a whole had around 12Gbit/s of international bandwidth in 2008 — this corresponds to less than one-third of India's total international connectivity. In addition, high prices are a barrier to further ICT uptake in the region.

The Africa Regional Preparatory Meeting was chaired by the Executive Director of the Uganda Communications Commission, Patrick Masambu. He also underlined the need to narrow the digital divide, develop broadband networks, build human capacity, deal with the issues emerging from the increasing convergence in ICT, and strengthen cybersecurity.

> " ICT have the power to change people's lives and have become the basic foundation of modern societies, crossing cultural divides, giving access to vital information, facilitating health care and stimulating commerce, "

Broadband development agreement

Wireless broadband networks will soon be deployed in Burundi, following an agreement signed during the meeting by Mr Al Basheer and Philippe Njoni, that country's Minister of Transport, Posts and Telecommunications. These networks will deliver free, or low cost, Internet access for schools, hospitals, and underserved communities in the rural areas of selected African countries. The agreement is part of a project being undertaken by ITU and the McCaw Foundation as follow up to the *Connect Africa Summit* that took place in Kigali, Rwanda, in October 2007. ITU is also working with potential funding partners, including the African Development Bank (see article on page 35), to help meet the growing demand for broadband connectivity.

High-Level Panel focuses on the impact of the financial crisis on ICT development in Africa

Mr Al Basheer chaired a high-level panel, during which participants took stock of the impact of the global financial crisis on ICT development in Africa. They also considered how ICT could help pave the road to recovery. Panellists included the Chief Executive Officer of the Regional African Satellite Communications Organisation (RASCOM) and Chairman of the African Regional Working Party on Private Sector Issues, Dr Jones Killimbe; the Director General of the Tanzania Communication Regulatory Authority, Professor John S. Nkoma; Uganda's Minister of Information and Communication Technology, Aggrey S. Awori; Burkina Faso's Minister of Posts and Information and

From left to right: Burundi's Minister of Transport, Posts and Telecommunications Philippe Njoni and the Director of ITU's Telecommunication Development Bureau Sami Al Basheer Al Morshid sign agreement for wireless broadband in Burundi, in the presence of ITU Deputy Secretary-General Houlin Zhao

▶ Communication Technology, Noël Kaboré; and Senior
Research Fellow at the United Nations University, Dr
Tomasz Janowski.

Taking action to stimulate investment in the ICT
sector emerged as a key theme, especially in the
broadband networks that are needed to support
government and business applications which un-
derpin entire economies. To this end, panellists em-
phasized the importance of continued reform of ICT
policy and regulations, as well as innovative public-
private partnerships.

Implementing Regional Initiatives from Doha

At WTDC-06 in Doha, five regional initiatives were
adopted for Africa covering human and institutional
capacity building; strengthening and harmonizing
policy and regulatory frameworks for the integration
of African ICT markets; development of a broadband
infrastructure and achievement of regional intercon-
nectivity; ICT applications and the introduction of
new digital broadcasting technologies.

Since Doha, ITU has developed 14 projects in
Africa within the scope of these regional initiatives.
The projects have been, or are being, carried out with
a total of more than USD 16 million in funding from
ITU, the private sector, and various donor countries
and organizations (see examples in the table on page
29). More activities are planned for 2009, such as the
establishment of national Internet exchange points,
financed by Spain to the tune of USD 456 500, as
well as the construction of multipurpose community
telecentres in a number of countries.

A closer look at the issues

Infrastructure

The African Telecommunication Union (ATU) out-
lined the Programme for Infrastructure Development
in Africa (PIDA), and welcomed ITU's project with the
European Union on Harmonization of the ICT Policies
in Sub-Sahara Africa (HIPSSA), launched in December
2008 (see article on page 30).

Senegal stated that the main obstacle to ICT
development in Africa "remains the scarcity, and in
some cases complete lack of, broadband networks".
It said that BDT "can, and must, play a role" in mo-
bilizing funds and coordinating all players involved
in creating the infrastructure that "holds the key to
affording our continent genuine access to the infor-
mation society".

Because least developed countries cannot achieve
broadband connectivity alone, ITU should "design
strategies for the development of broadband servic-
es for rural communities", said Ethiopia, and allocate

funds for projects and training. Meanwhile, basic infrastructure too needs to be expanded, and Chad pointed out that "nothing can be done without a reliable energy source".

The Uganda Communications Commission also focused on least developed countries — most of which are in Africa. It said the assistance programme for these countries under the Doha Action Plan has "yielded significant results". However, "a lot still remains to be done, in view of the… critical role of ICT in the socio-economic development of any country." The Commission recommended that the assistance programme should be continued following WTDC-10.

Establishing the necessary infrastructure for the future of broadcasting was mentioned by Mali. WTDC-06 set the objective of helping African countries with the transition from analogue to digital broadcasting. Mali said it wants to see this objective pursued in order to boost production of programmes in Africa, for Africans.

Human resources

Many participants emphasized Africa's need for skilled ICT professionals to maintain infrastructure and the services that use it. This requires "more training sessions, better focused on targeted concerns," said Senegal. Among those concerns it cited migration to next-generation networks (NGN) and the new version of the Internet protocol IPv6, cybersecurity, and combating climate change. Participants said that the capacity-building programme initiated by WTDC-06 should be continued after 2010, such as through strengthening the ITU Centres of Excellence and other training institutions.

Harmonization

Alongside ICT technicians, Africa also needs people who can effectively implement policies and help to create a harmonized regulatory environment across the continent, with the ultimate aim of establishing an integrated market. ATU pointed to the need to implement the framework for harmonization agreed by the Conference of African ministers in charge of ICT in May 2008 in Cairo, Egypt, and described ITU as a "key partner" in that effort.

Burkina Faso described how it has revised its legal framework "to create the optimum conditions for guaranteeing healthy competition and to promote the convergence of networks and services." However, because many African countries have not yet followed suit, the meeting proposed that the regional initiative on harmonization should continue following WTDC-10.

It is also important for countries to adopt a coordinated approach to cybersecurity. "Cybercrime… is compounded in African countries, insofar as they are ill-equipped to repress these attacks for lack of suitable legal frameworks and technical and human resources," said Côte d'Ivoire. It recommended that ITU should continue assisting African countries with training in this area, and in establishing national and regional emergency response teams to deal with cybercrime.

▶ ## Consensus on future priority areas

After debating the issues, the meeting identified the following as priority areas for the future work of ITU's Telecommunication Development Sector (ITU–D), if approved by WTDC-10.

Priority areas for programmes

Information and communication infrastructure
▶ Transition from analogue to digital broadcasting
▶ Broadband infrastructure

Cybersecurity and ICT applications
▶ Cybersecurity strategies and consumer protection
▶ Migration to IPv6

Enabling environment
▶ Harmonization of regulatory policies in Africa
▶ Policy, strategies, and financial issues for broadband deployment

Capacity building and other initiatives
▶ Enhancing human and institutional capacity building, including ITU Centres of Excellence
▶ Telecommunication/ICT access for people with disabilities

Least developed countries and small island developing States
▶ Modernization and expansion of networks, including national backbone infrastructure
▶ Development of rural connectivity
▶ Introduction of broadband, and migration to next-generation networks

▶ Provision of ICT facilities in schools, health centres and local government offices and post offices
▶ Migration to digital broadcasting
▶ Formulation and implementation of policy and legislative frameworks on cybersecurity
▶ Establishment of Computer Emergency Response Teams (CERT)
▶ Creation of converged regulatory authorities.

African Regional initiatives
▶ Human and institutional capacity building
▶ Strengthening and harmonizing policy and regulatory frameworks for integration of African telecommunication/ICT markets
▶ Development of a broadband infrastructure and achievement of regional interconnectivity and universal access
▶ Introduction of new digital broadcasting technologies
▶ Implementation of the recommendations of the *Connect Africa Summit*

Proposed Study Group Questions
▶ Protection of the environment and preventing harmful radiation from mobile phone masts
▶ Power supplies for telecommunications and ICT
▶ Impact of ICT on climate change
▶ Indicators for consumer satisfaction and quality of service.

Regional Initiative projects in Africa from 2007

Project	ITU Funding (USD)		Partner and contribution (USD)	In-kind contribution (USD)	Total (USD)
	ICT Development Fund	Regional Initiative funds			
Feasibility study on roadmap for digital broadcasting in Africa			Republic of Korea 45 000		45 000
Roadmap for transition to digital terrestrial television broadcasting and mobile television in Africa	200 000	90 000	Republic of Korea 345 655		635 655
Direct assistance to Benin and Sierra Leone for adopting ECOWAS* Supplementary Acts on harmonizing ICT policy and regulatory frameworks			Germany (GTZ) 181 111		181 111
Broadband wireless network projects	2 400 000	90 000	Craig and Susan McCaw Foundation 4 000 000		6 490 000
Centres of Excellence network for Spanish and Portuguese speaking countries in Africa			Spain and Portugal		
			1 318 708	191 148	1 509 856
Centres of Excellence network for Africa	470 000				470 000
Sectoral Strategies Elaboration for African Countries: pilot project on e-employment		25 500	UN Economic Commission for Africa 100 000		125 500
Internet for Schools project (IFSP)			Netherlands 64 684		64 684
Harmonization of the ICT Policies in Sub-Saharan Africa (HIPSSA)	166 665		European Commission 5 833 335		6 000 000
Multipurpose community telecentres (Malawi)	102 145		US Department of State 37 855	Malawi Communication Regulatory Authority 44 100	184 100
Computer training and Braille transcription service (Ethiopia)	107 500		Adaptive Technology Centre for the Blind		107 500
Adoption of ECOWAS Directive in Burkina Faso and Senegal			Ministry of Foreign Affairs, France 78 000		78 000
Development of rural telecommunications, ICT services and entrepreneurship			South Africa; Universal Postal Union 500 000		500 000
Multipurpose community telecentres, pilot project (Cape Verde)		40 000 from BDT Operational Plan			40 000
Total (USD)		3 691 810	12 504 348	235 248	16 431 406

Note — USD amounts are approximate because of currency conversions
* ECOWAS is the Economic Community of West African States

The HIPSSA project
Coordinating policy across the continent

shutterstock

With the support of the European Union (EU), ITU is conducting work on harmonizing policy and regulations for information and communication technologies (ICT) across Sub-Saharan Africa.

Building on the success of a joint project conducted in West Africa in 2003–2005 by ITU and the EU, a new initiative called Harmonization of the ICT Policies in Sub-Saharan Africa (or HIPSSA) was launched in December 2008 in Addis Ababa, Ethiopia, and will last to the end of 2011. The intention is to create a harmonized regulatory environment that should greatly encourage investment in ICT infrastructure and services, thus stimulating economic and social development.

The HIPSSA project will benefit 43 African countries. Its purpose is to help Regional Economic Communities and individual countries to develop harmonized policies and regulatory frameworks for each subregion's ICT market, with the possibility of expanding this to a pan-African context. Also, the project will help to improve institutional capacity and train people in relevant skills.

Recommendations and guidelines will be developed by a team of experts, and validated by national staff at workshops in particular countries. The material will then be transferred to regional organizations with a view to joint adoption at the technical level, and the development of directives to which countries can choose to commit at the political level. Courses will be offered to regional and national trainers, who will use their expertise to enhance the required skills of target groups of personnel.

HIPSSA is one of three programmes being jointly conducted by ITU and the European Union to promote harmonized policies for ICT markets in a range of developing countries. The other two are "Enhancing Competitiveness in the Caribbean through the Harmonization of ICT Policies, Legislation and Regulatory Procedures (HIPCAR)" and "Capacity Building and ICT Policy, Regulatory and Legislative Frameworks Support for Pacific Island States (ICB4PIS)". The EU is contributing a total of EUR 8 million for all three projects, and ITU will provide USD 500 000.

Communications in Uganda

Overview

Uganda is a land-locked country located in East Africa, about 800 kilometres inland from the Indian Ocean. It is bordered by the Democratic Republic of the Congo, Kenya, Rwanda, Sudan and Tanzania, and lies along the Equator. It has an area of 241 038 square kilometers and a population of about 33 million inhabitants.*

Uganda Communications Commission (UCC) is the country's regulator of the communications sector. UCC was established in 1998 by the Uganda Communications Act (Cap 106 Laws of Uganda) to facilitate and enable the development of a modern communications sector and infrastructure in the country.

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* Estimated by the United Nations Department of Economic and Social Affairs, Population Division

Today, Uganda's communications sector is one of the fastest growing in Africa. As in the rest of the continent, this is largely due to the rapid expansion of mobile telephony. According to statistics from UCC, the number of telephone subscribers had reached 10 million in March 2009 — up from more than 8.7 million in December 2008 — which is about one-third of the country's population. Of the 10 million subscriptions, 9.8 million are mobile phone subscribers while around 200 000 are fixed-line owners (see Figure 1).

Despite the bleak global economic outlook, 1.35 million telephone connections were added to the Ugandan market between December 2008 and March 2009, making these three months the highest quarter-to-quarter growth in subscriptions in the country to date. This growth translates into a nationwide teledensity of 32.8 lines per 100 inhabitants, compared to the 29.5 teledensity of December 2008.

Figure 1 — Telephone subscriptions (March 2008—March 2009)

Source: Uganda Communications Commission.
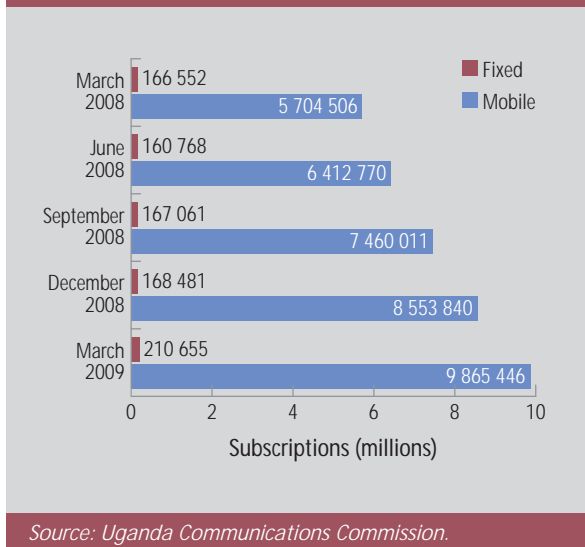
The Commission figures show a remarkable improvement in the telecommunications sector, both in capacity and distribution. The population coverage for mobile telephony is close to 100 per cent, while geographical coverage is about 65 per cent.

Mobile market players

Since 2007, Uganda has opened up the sector fully to competition. Currently, Uganda's major mobile telephony providers are MTN Uganda, Orange Uganda Limited, Zain (formerly Celtel) Uganda Telecom Mobile and Warid Telecom. The boom in Uganda's mobile market is the result of continuous positive growth of the country's gross domestic product (GDP) and a clear policy of liberalization and competition.

There are two main categories of licences in the telecommunications sector under a licensing regime introduced in 2006. One is the public infrastructure provider (PIP) licence, which allows operators to set up their infrastructure in any part of the country. The other is the public service provider (PSP) licence, which allows telecommunication services to be provided using infrastructure deployed by PIP companies.

Under this licensing regime, the Commission has licensed 24 public infrastructure provider companies and 35 public service providers. In addition, the Commission has encouraged the sharing of infrastructure and introduced a simplified licensing procedure, both serving to boost the entry of new companies into the market.

Broadband and the Internet

A third-generation (3G) mobile broadband service was launched in major cities in March 2008 by Uganda Telecom Mobile, and Orange Uganda has said it plans to provide a 3G service within 2009. The fixed-line operators Uganda Telecom and MTN Uganda offer a range of data services, but mobile phones seem likely to predominate as the means for accessing the Internet. According to UCC, mobile wireless Internet accounts have continued to grow, rising to an estimated 215 000 by March 2009, compared with about 22 000 fixed-line subscriptions. This is partly due to the emergence of new entrants into the retail broadband services. However, the regulator estimates that, with the dramatic increase in the number of public facilities such as Internet cafés, around 2.5 million people were going online.

Broadband Internet access will be boosted with the 2500-km fibre-optic national backbone network being installed across the country, using investment by the Ugandan government and the private sector. It is soon to be connected to the international submarine cables that are due to land on the coast of Kenya. A regional regulatory taskforce has been

established to set up frameworks and standards for inter-State access and pricing regulation of sea cable systems.

The new players who have rolled out commercial services in the broadband segment include Tangerine (Nomad) Communications and TMP Uganda. Warid Telecom, which previously provided voice services only, has also joined the fray to offer both fixed and mobile Internet services.

Reaching the countryside

Because the Ugandan mobile market is very competitive, prices have fallen and average revenue per user (ARPU) is decreasing. In response, companies are looking to expand into rural and other communities that have previously been underserved. The government has also backed major initiatives to expand telecommunication services and the Internet to rural areas, partly supported by a universal service fund known as the Rural Communications Development Fund (RCDF).

© Image Source Pink/Alamy

Essentially, the RCDF is intended to act as a means of intervention to ensure that basic communication services of acceptable quality are accessible, at affordable prices and at reasonable distances, by all people in Uganda. The Fund also aims to promote use of modern information and communication technologies (ICT) by introducing at least one "vanguard" institution and supporting the establishment of an Internet point of presence (PoP) in every district.

Most districts in Uganda now have some of the following facilities as a result of implementing the RCDF: Internet PoP, Internet cafés, ICT training centres, public payphones, multipurpose community telecentres, ICT laboratories in government-aided secondary schools, e-health or telemedicine projects, and call centres. In addition, a number of research and postal support projects have been implemented.

One of the most popular services in the countryside could be "mobile money", or the ability to make payments and store credit on a mobile phone. Companies are already moving to satisfy this demand. In March 2009, Uganda Telecom and MTN Uganda each launched mobile banking, while in June Zain began offering its "Zap" service. Customers can top up (or transfer) mobile airtime, send and receive money, and pay utility bills.

SMS on the rise

The short message service (SMS) is popular in Uganda. According to UCC, some 294 million SMS messages were sent during the January–March 2009 period, compared to 190 million in the preceding quarter (October–December 2008). And operators now offer information services via SMS, including news, weather forecasts and sports results. The use of SMS to ask for information from expert sources is another way that communications can be improved

▶ for rural residents. Such a service was launched in June 2009, for people to send a query by SMS on, for example, farming techniques, and receive an answer from a searchable database. For users who have difficulties with reading or writing, "voice SMS" is particularly useful, through which people can send pictures or short voice messages. Uganda Telecom and Warid Telecom are among those providing this service.

The digital switchover

Radio broadcasts began in Uganda in 1952, and television was available from 1963. Both types of broadcasting were provided solely by the government until liberalization in the early 1990s. Since then, there has been a large increase in the number of private radio and television stations. The number of licensed radio stations now stands at 222, of which 192 are operational, while 35 of the 50 licensed television stations are on air.

At ITU's Regional Radiocommunication Conference in 2006, it was agreed that, by 2015, broadcasting would be switched entirely from analogue to digital networks in Africa, Europe, the Middle East and the Islamic Republic of Iran. In Uganda, the government is considering the consultation document "Digital Broadcasting Migration Strategy", issued in April 2009. This proposes that the country should make an earlier switchover, in December 2012, and that at least one more signal distributor should be licensed in addition to the public Uganda Broadcasting Corporation.

There is recognition in Uganda of the challenges that must be met in order to migrate to digital broadcasting — from the need for consumers to install set-top boxes, to harmonization with neighbouring

countries. But it is also seen as having great potential in supporting the country's social and economic development.

Growth area

According to ITU data, in July 1999, Uganda became the first African country — and only one of a dozen in the world — where the number of mobile users surpassed that of fixed-line subscribers. And analysts Pyramid Research anticipate that over the next few years, Uganda will experience Africa's second highest percentage rise in mobile subscriptions (after Cameroon), and that by 2014, more than 70 per cent of Ugandans will have mobile phones. Pyramid Research also foresees rapid growth in fixed and wireless broadband access to the Internet. The future looks bright for Uganda's communications sector.

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AfDB

The African Development Bank Group's commitment to connecting Africa

Donald Kaberuka
President of the African Development Bank

The broadband challenge

ITU has repeatedly highlighted the importance of broadband for development. Many of the effective applications and services that can foster development, for example, e-commerce, e-government and e-banking, are only available through a high-speed Internet connection. But broadband penetration is low across Africa, with only 635 000 fixed broadband subscribers in 2008, according to ITU's latest report "Information Society Statistical Profiles 2009: Africa".

In an increasingly "virtual" global economy, this digital divide is a growing impediment to Africa's growth. Recent estimates from ITU call for hundreds of millions of dollars of investment, mostly from the private sector, in order to build and improve regional and national infrastructure for information and communication technologies (ICT) across the continent. To attract this investment, there must be the right mix of policy and regulation and carefully crafted public-private partnerships.

Efforts by development institutions suggest that extending broadband communications requires investment in the whole supply chain (submarine cables, regional networks, national backbones and rural access); leveraging private investment; policy and regulatory reform, and stimulating demand for, and use of, networks. It is also widely acknowledged that access to broadband infrastructure, public sector capacity and regulatory frameworks are highly interdependent and need to be addressed in an integrated manner.

One of the big challenges facing Africa is the mobilization of the required resources. ITU estimates that around 92 000 kilometres of fibre-optic links (including 25 000 kilometres of international submarine cable routes) are required to bridge regional and international broadband gaps. This represents an investment of USD 1 billion for an international submarine fibre-optic network and over USD 1.6 billion for regional links. Depending on a country's size, each will need between USD 50 million and 500 million to deploy national backbone networks.

Achieving the goals of the Connect Africa Summit

Historically, the African Development Bank (AfDB) Group's public sector arm typically financed projects and programmes with ICT components that often

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▶ included institutional development, provision of hardware and software, systems studies, and management information systems in health, education and agriculture. More recently, the role of AfDB in ICT has been modest, and mostly focused on providing funds to foster deployment of physical infrastructure through private-public partnerships.

However, at the *Connect Africa Summit,* in Kigali, Rwanda in October 2007, AfDB took a significant step forward to become more actively engaged in African ICT. Along with other partners, including ITU, the World Bank, the Infrastructure Consortium for Africa, and the Commonwealth Telecommunications Organisation, AfDB started working to implement activities aimed at meeting the five goals agreed at the *Connect Africa Summit* (see box at the end of this article).

Under the first goal of building broadband infrastructure, AfDB has financed studies by the Southern African Telecommunications Association (SATA) on missing transmission links that will interconnect member countries of the Southern African Development Community (SADC). The Bank has also contributed some USD 1.5 million for feasibility studies on cross-border links in East and West Africa, concerning the East African Community Broadband Infrastructure Network (EAC-BIN), and ECOWAN — the Economic Community of West African States' Wide-Area Network.

AfDB is also a partner of the World Bank in conducting studies on the Central African Backbone project and West African Power Pool Broadband interconnection system, and is considering financing studies for the Seychelles Fibre-Optic Backbone. Upon completion of all these studies, stakeholders' workshops (with participation by the private sector) will be organized by the respective Regional Economic Communities to develop project proposals for consideration by funding partners, including members of the Infrastructure Consortium for Africa.

To help achieve the summit's Goal 2, AfDB has provided a grant of USD 495 000 for a feasibility study on the Lake Victoria Maritime Communications System. The Bank will continue work on identifying other projects for rural connectivity that it can help by financing such studies.

Most of the studies supported by AfDB, such as the SATA backhaul links and ECOWAN, have policy and regulatory components which fall under Goal 3 of the Connect Africa Summit. Concerning Goal 4 on capacity building, the Bank has started discussions with Tunisia and Rwanda on setting

up Regional Centres of Excellence. Also, AfDB and the Government of the Republic of Korea signed a Memorandum of Understanding in October 2008 which includes aspects of capacity building and provides for training courses in ICT during 2009–2010.

Under Goal 5, AfDB (in collaboration with other partners) is developing an e-government programme that will support the development and implementation of e-services. The focus areas for the programme include e-procurement, e-government, and information security.

Strategy going forward

In order to strengthen AfDB's ability to deliver its commitment to help connect Africa, the Bank's Board of Executive Directors approved an ICT Strategy that covers the period 2008–2012. For the first two years the focus is on two pillars — direct financing of broadband infrastructure development, and support for Africa's efforts to attract private investment through improving policy and regulatory frameworks, with the overriding objective of reducing poverty and bringing about sustainable economic growth throughout the continent. For 2010–2012, the focus will be to create affordable access, competitiveness and economic growth in regional member countries through expanded use of ICT by institutions, enterprises and the public at large.

Through supporting policy harmonization and infrastructure development, and alongside the African Union and the Regional Economic Communities, AfDB is helping to achieve not only the goals of the *Connect Africa Summit,* but also those of regional and global initiatives. These include the harmonization framework endorsed in Cairo in May 2008 by African ministers responsible for ICT, as well as the *Geneva Plan of Action and Declaration of Principles,*

and the *Tunis Commitment and Agenda for the Information Society,* adopted at the two phases of the World Summit on Information Society in 2003 and 2005.

Goals of the Connect Africa Summit in 2007	
Goal 1	Interconnect all African capitals and major cities with ICT broadband infrastructure and strengthen connectivity to the rest of the world by 2012.
Goal 2	Connect African villages to broadband ICT services by 2015 and implement shared access initiatives such as community telecentres and village phones.
Goal 3	Adopt key regulatory measures that promote affordable, widespread access to a full range of broadband ICT services.
Goal 4	upport the development of a critical mass of ICT skills required by the knowledge economy, notably through the establishment of a network of ICT Centres of Excellence in each sub-region of Africa and ICT capacity-building and training centres.
Goal 5	Adopt a national e-strategy, including a cyber-security framework, and deploy at least one flagship e-government service as well as e-education, e-commerce and e-health services using accessible technologies in each country in Africa by 2012.

Accessibility for all

What the United Nations Convention on the Rights of Persons with Disabilities says

Cynthia Waddell

Executive Director of the International Center for Disability Resources on the Internet

The United Nations Convention on the Rights of Persons with Disabilities entered into force in May 2008. Its purpose is to ensure that the estimated 650 million people with disabilities worldwide can enjoy the same rights and opportunities as everyone else, and lead their lives as full citizens who can make valuable contributions to society. It is wide ranging and covers civil, political, economic, social and cultural rights.

A regional seminar on the Convention took place at the Houses of Parliament in London, United Kingdom, on 27–28 April 2009 and was organized by the Inter-Parliamentary Union. The aim was to inform European parliamentarians about the Convention and how they can encourage their governments to ratify and implement this important treaty. I was invited to speak as an ITU consultant on the accessibility provisions of the Convention and its impact on information and communication technologies (ICT).

> *The purpose of the Convention is to ensure that the estimated 650 million people with disabilities worldwide can enjoy the same rights and opportunities as everyone else, and lead their lives as full citizens who can make valuable contributions to society.*

Taking part

As a participant in the seminar and someone with significant hearing loss, I was especially grateful that the organizers provided captioning to make it easier to follow my fellow speakers. I was asked to share something about my disability because hearing loss can often seem invisible. Even though doctors said I would never learn to speak because of my hearing loss, I thank my parents, who encouraged me and never felt sorry for me at a time when it was common for our neighbours to label me

"deaf and dumb" when I was growing up. I was fortunate to have been born into a family that could provide me with hearing aids. And, for 15 years, every day after school I would attend speech and lip-reading lessons. I think those neighbours would be surprised today to learn that I went on to earn a doctorate in law with distinction as a Public Interest Scholar. My lifetime goal in my work as a disability rights advocate, has been to understand how best to bring about systemic change to improve the quality of life for persons with disabilities. One of the keys to achieving this is the promotion of accessibility for all.

The principle of accessibility

Article 3 of the Convention enshrines "accessibility" as one of the treaty's eight general principles. In the preamble of the Convention, we learn that accessibility is closely tied to the evolving definition of disability. This is because accessibility enables us to address the attitudinal and environmental barriers that hinder full and effective participation in society on an equal basis with others.

Universal design

Accessibility is a means of empowerment and inclusion for people with disabilities. It is also closely tied to Article 4 on the general obligation of parties to the Convention to promote universal design of goods, services, equipment and facilities. Universal design is defined as meaning that products, environments, programmes and services must be usable by everyone, to the greatest extent possible, without the need for adaptation or specialization. It does not exclude the provision of assistive devices where needed.

The obligation under Article 4 also includes promoting the availability and use of products and services that follow the principle of universal design, as well as the development of standards and guidelines that promote universal design.

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StockXpert

A blind person uses a screenless laptop computer to access the Internet

▶ **Accessibility and ICT**

The Convention also addresses the accessible design of mainstream ICT. Advances in mainstream technologies, along with the growing convergence of audio, text and video functionalities, enables mainstream ICT to become accessible as never before. One example of a mainstream product of this kind is the *Kindle 2,* an electronic book offered in the United States and developed by the online retailer, Amazon.com Inc. Texts are downloaded from the Amazon website, and it can hold over 1500 titles despite being no bigger than a typical book and weighing less than 300 grammes. Unlike its predecessor, *Kindle 1,* the device has a text-to-speech feature that uses a synthetic voice to read a book out loud.

For the first time in the history of mainstream technology, an electronic book provides easy access to reading materials for people who cannot read print because of blindness, dyslexia, illiteracy and other disabilities. However, a controversy has arisen in the United States, because the Author's Guild has said that electronic books do not include audio rights. When visiting the Amazon website I found a *Kindle 2* electronic book for sale where the text-to-speech feature was marked "not enabled." A popup box explained that this was at the request of the

book's publisher. Hopefully, the controversy will be resolved quickly so that everyone, including people with disabilities, will be able to benefit from this new feature.

There are significant provisions throughout the Convention that will have an impact on national policies and strategies for ICT and the future of the web. In fact, 14 out of the first 32 non-procedural articles explicitly mention countries' obligations regarding ICT. We may well see more controversies like the *Kindle 2* in the future since ICT are so important because of their ability to enable people with disabilities to fully participate in society.

Meanwhile, an increasing number of countries have begun to adopt standards on ICT accessibility and to incorporate them into their procurement structures. In this way, businesses and industry are rewarded in the marketplace for their investment in the accessibility effort — and at the same time, consumers with disabilities can enjoy equal access to ICT.

Accessible Internet

Since the invention of the World Wide Web, access to information via the Internet has increased the independence of people with disabilities and has removed barriers that previously could not be readily

overcome. At a time when over-the-counter government services are being replaced by interactive websites, it is crucial that websites should be designed so that everyone, including people with disabilities, can use them and navigate through the online world.

The international industry standards for web accessibility are the World Wide Web Consortium's Web Content Accessibility Guidelines 1.0 and the recent 2.0 version. Accessibility for websites means that where there is video and audio content, real-time captioning is provided so that people with hearing loss can understand what is being said. Designing for accessibility also means that the content of on-line forms, images, graphics, tables, charts or photos can be accessed by assistive computer technology. For example, people who are blind can use software that reads web pages out loud. In addition, people with dexterity problems, who cannot use a mouse, can use assistive devices to input commands onto a keyboard. Even people who have difficulty with keyboards can use speech recognition software to write correspondence, pay bills, or work online.

Including everyone

Accessibility is integral to many of the rights that are defined in the Convention, from matters of work and employment, to participation in political and cultural activities. It should, therefore, be clearly understood that the Convention specifically recognizes the importance of accessibility to the physical, social, economic and cultural environments, including health, education and ICT. This is essential so that our community can fully enjoy all human rights and fundamental freedoms.

About the author

Cynthia Waddell is a senior accessibility consultant with ITU and an internationally recognized expert on the issue. She served as the built environment and accessible technology expert for the United Nations Ad Hoc Committee during the drafting of the Convention on Rights of Persons with Disabilities. She is Co-Editor and Co-Author of the ITU/G3ict "Toolkit for Policy- Makers on e-Accessibility and Service Needs for Persons with Disabilities." She wrote the ITU–T action plan for the implementation of Resolution 70 of the World Telecommunication Standardization Assembly held in October 2008 in Johannesburg.

Ms Waddell has served as a US Department of Justice mediator for complaints under the Americans with Disabilities Act. A frequent writer and speaker, her books and papers have been translated and cited by organizations including the National Council on Disability, an independent advisor to the President of the United States, in their report "The Accessible Future", published in 2001. Most notably, she wrote the first accessible web design standard in the United States that led to recognition as a best practice in 1995 by the federal government and contributed to the eventual passage of legislation for Electronic and Information Technology Accessibility Standards (Section 508).

In 2007, Mahabir Pun received the Ramon Magsaysay Award for his community leadership and "innovative application of wireless computer technology in Nepal, bringing progress to remote mountain areas by connecting his village to the global village". The award has been called "the Nobel prize of Asia".

Himalayan villages go online
The Nepal Wireless Networking Project

Mahabir Pun was born in what is now the Federal Democratic Republic of Nepal. After finishing his studies at a university in the United States, in 1992, he returned home with a dream: to provide opportunities for the people in his native village of Nangi, amid the western Himalayan foothills in the district of Myagdi. He joined with local residents to upgrade the village school to become the Himanchal Higher Secondary School. This has become not only a source of education, but also the hub of community development. Its effectiveness in this role is greatly supported by another innovation promoted by Mr Pun: connecting the school to the Internet in a network that now covers thousands of people in nearby communities.

Two computers were donated to the school in 1997, but, with no mobile phone coverage or fixed-line telephones — as well as the difficulty of gaining access to remote areas in a harsh climate — achieving Internet connectivity was a hard challenge.

Eventually it was decided that wireless networking would provide the best and most cost-effective solution, through Wi-Fi technology linked to the nearest Internet service provider in the city of Pokhara. International volunteers were recruited to help bring in donated equipment, set up the network, and teach villagers how to expand and maintain it, while Mr Pun and his group also learned how to assemble computers themselves. By 2002, the high school in Nangi was connected to the Internet.

The following year saw the formal launch of the Nepal Wireless Networking Project, with the aim of expanding the Wi-Fi network throughout Myagdi and the neighbouring districts of Parbat and Kaski. Funds were raised nationally and internationally through the intensive efforts of Mr Pun and his supporters,

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* More details of the Nepal Wireless Networking Project are available at: www.nepalwireless.net/index.php

and also through international partnerships with aid agencies. By 2008, Internet connections had been provided to community centres, schools and clinics in 42 villages, with plans to add 19 more. ITU contributed equipment worth some USD 30 000 to the work.

Connecting computers

The Myagdi network of the Nepal Wireless Networking Project is owned and run by the Himanchal Higher Secondary School. The organizational structure involves many community stakeholders, allowing for democratic participation as well as the sharing of profits and risks. The school builds and manages the network, but services are provided through independent communication centres in each village that are run by local people.

The networking system has two relay stations to forward the wireless signal to a base station and server facility in Pokhara, with a connection to Om Hospital in the city. In the mountain villages, access to services is provided mainly through used desktop computers and laptops. Internet telephony equipment and high-resolution network cameras facilitate phone services, telemedicine and e-education. Many of the computers have been donated by individuals and businesses from inside the country and abroad, while others were assembled by local people from donated parts.

A variety of wireless devices maintain connectivity. The network's backbone connects the Pokhara base station to the two major relay stations, which are linked to villages via client connections. In five cases, connected villages also act as relay stations, due to the difficulty of transmitting the signal over the mountains. The network server in Pokhara uses open source Linux software, which has proved to be capable of maintenance by local volunteers through

Y. Kawasumi

Antennas connect a school to a network relay station

the use of graphical user interfaces and customized management software.

Sustainable power

Because of their isolation, the villages do not have access to a mains electricity grid. Instead, the relay stations use such sources as solar energy. The electricity for a computer laboratory at the school in Nangi comes from a micro-hydroelectric system in a local stream. There are plans to increase its output to power a grid for the entire village.

Services for the community

The services that are now available in these remote mountain villages include:

▸ Internet Access: for students, teachers, local residents and tourists

Cattle are driven past a village telecentre

▸ **E-mail:** Villagers use the free accounts available through nepalwireless.net or other web mail services, such as Yahoo or MSN Hotmail

▸ **Telephone service:** Ordinary landline phone calls can be placed through Internet telephony equipment and the private branch exchange (PBX) software on the network server

▸ **e-Education:** To help address a shortage of qualified teachers, there are programmes to provide live lessons to school classrooms using networked cameras

▸ **Telemedicine:** In collaboration with Om Hospital in Pokhara, medical services are offered to residents of remote areas through audio and video links

▸ **Community:** Using an online forum, villagers can exchange news and opinions, place advertisements, and engage in community affairs

▸ **Money transfers:** In collaboration with thamel.com, a business based in Kathmandu, the capital of the Federal Democratic Republic of Nepal, money transfers (used by family members working abroad) and credit card transactions are available.

These services have been enthusiastically taken up by local people. They can go online at community centres for a low fee, and voice-over-Internet-protocol (VoIP) phone calls can also be made. Lessons in basic computer skills are offered too, by students from a technical college in Kathmandu. And women health workers in the villages are trained at hospitals in the capital or in Pokhara.

While remaining affordable by local people, the charges for services generate revenue for the Nepal Wireless Networking Project, to sustain and expand its work. Meanwhile, residents in neighbouring Himalayan villages that are not yet connected understand the benefits of the project: they sometimes walk for several hours to reach centres where they can access the Internet or VoIP phone services.

A village clinic with Internet access

The ITU mission team with staff of Himanchal Higher Secondary School and residents of Nangi village

Y. Kawasumi

Job creation

One of the most important goals of the project is to give rural residents a better way to trade goods, and to create jobs. Also, Himanchal Higher Secondary School offers vocational training programmes and is engaged in community development projects such as animal husbandry, forest conservation, and handicrafts.

Yak and cattle farming is one example. The wireless network is used to manage a project in which the animals are kept in fields near the relay stations, high up on the mountain slopes. Despite the isolation, herders can communicate with other staff using e-mail on a laptop computer. Projects like these are also targeting the tourist market. Camp grounds for trekkers have been established near where the yak graze, and the animals' milk is used to make cheese that is sold to tourist lodges.

ITU visit

Ten of the connected villages were visited in May 2008 by a team representing Study Group 2 of ITU's Telecommunication Development Sector (ITU–D), examining Question 10-2/2 on *Telecommunications for rural and remote areas.* Their mission was to study cost-effective technological solutions for rural communications in developing countries. In addition, the team delivered more equipment for the network, donated by ITU.

The team's report gave high marks to the effectiveness and sustainability of the Nepal Wireless Networking Project, which it concluded "has greatly contributed to social and human development in Himalayan mountain villages".

Future expansion

Before the project, there was no telecommunication infrastructure in the Myagdi area, very limited electricity supplies and few roads. Despite this, a wireless network has been established to bring information and communication technologies to villagers in the Himalayan foothills. Partnerships are being sought with the national and local governments, and a "One dollar a month" campaign has been launched to raise donations. There is a strategic plan to expand the Nepal Wireless Networking Project to as many rural areas of the country as possible that otherwise could remain unserved.

From official sources

Constitution and Convention of ITU (Geneva, 1992)

The Government of the **Democratic Republic of the Congo** has acceded to the above-mentioned Constitution and Convention and to the instruments amending it: Kyoto, 1994; Minneapolis, 1998; Marrakesh, 2002; and Antalya, 2006. The instrument of accession was deposited with the Secretary-General on 25 March 2009.

Instruments amending the Constitution and Convention of ITU (Antalya, 2006)

The Government of the **Republic of Estonia** has ratified the above-mentioned instruments. The instrument of ratification was deposited with the Secretary-General on 23 April 2009.

The Government of the **Kingdom of Bahrain** has ratified the above-mentioned instruments and has confirmed the Declarations and Reservations made at the time of signature. The instrument of ratification was deposited with the Secretary-General on 7 May 2009.

The Government of **Spain** has accepted the above-mentioned instruments and has confirmed the Declarations and Reservations made at the time of signature. The instrument of acceptance was deposited with the Secretary-General on 5 May 2009.

Protocol revising certain parts of the Regional Agreement for the European Broadcasting Area (Stockholm, 1961) (RRC-06-Rev.ST61)

The Government of the **Republic of Slovenia** has ratified the above-mentioned Protocol. The instrument of ratification became effective on 3 April 2009.

New Sector Members

Telecommunication Standardization Sector

Cinterion GmbH (Berlin, Germany) and *Microsoft Canada (Ottawa, Canada)* have been admitted to take part in the work of this Sector.

Telecommunication Development Sector

Central Science Research Telecommunication Institute (ZNIIS) (Moscow, Russian Federation); Corporation for National Research Initiatives (Reston, Virginia, United States); Tactikom (Geneva, Switzerland); Etihad Atheeb Telecom (EATC) (Riyadh, Kingdom of Saudi Arabia); Foris Telecom Ltd (Rishon Le-Zion, State of Israel), and *ONATEL SA (Ouagadougou, Burkina Faso)* have been admitted to take part in the work of this Sector.

New Associates

Radiocommunication Sector

Belarsat LLC (Minsk, Belarus) has been admitted to take part in the work of Study Group 4.

Telecommunication Standardization Sector

Clearwire, Inc (Herndon, Virginia, United States) has been admitted to take part in the work of Study Group 5.

Brilliant Telecommunications, Inc (Campbell, California, United States) has been admitted to take part in the work of Study Group 15.

Yaana Technologies, LLC (Milpitas, California, United States) has been admitted to take part in the work of Study Group 17.

Change of status

SPiDCOM Technologies (Bourg la Reine, France), formerly an Associate, is now a Sector Member of ITU–T.

Change of denomination

The official denomination for Bolivia is now **Bolivia (Plurinational State of)**, instead of "Bolivia (Republic of)".

Turkey's Telecommunications Authority has been renamed *Information and Communication Technologies Authority (ICTA)*.

TM International Berhad, a Sector Member of ITU–D, has changed its name to *Axiata Group Berhad (Kuala Lumpur, Malaysia)*.

Official Visits

During June and July 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, ministers, and other important guests.

Haruna Iddrisu,
Minister of Communications,
Ghana

Magdalena Gaj,
Undersecretary of State in the
Ministry of Infrastructure, Poland

Philippe Njoni,
Minister of Transport, Posts and
Telecommunications of Burundi

Mothae Anthony Maruping,
Ambassador of Lesotho

Gustavo Vega, President of the National Council of Superior Education, Ecuador (left), and Mauricio Montalvo, Ambassador of Ecuador (right)

Yahya Salim Al-Wahaibi, Ambassador Of Oman

Sava° Alpay, Director General of the Statistical, Economic and Social Research and Training Centre for Islamic Countries (SESRIC), an organ of the Organisation of the Islamic Conference

Justice Sathya Hettige, President of the Court of Appeal of Sri Lanka

From Azerbaijan, Deputy Minister of Foreign Affairs Mahmud Mammad-Kuliyev (left); Minister of Communications and Information Technologies Ali M. Abbasov (centre), and Elchin Amirbayov, Ambassador of Azerbaijan (right)

Sha Zukang, United Nations Under-Secretary-General for Economic and Social Affairs

On behalf of Dr Touré, ITU Deputy Secretary-General Houlin Zhao (left) welcomed Monsignor Silvano Tomasi, Permanent Observer for the Holy See

Mr Zhao also welcomed Ecuador's Superintendent of Telecomunications Fabian Jaramillo Palacios

All photos are by V. Martin/ITU

Emergency telecommunications

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Send an e-mail message to emergencytelecom-deployments@itu.int

Send a fax message to +41 22 730 5484

The International Telecommunication Union (ITU) and its partners deploy satellite terminals and other emergency telecommunication equipment to affected countries within the first 24 to 48 hours of a disaster to help restore vital communication links. The equipment is critical in:

➜ coordinating rescue and relief operations;

➜ setting up telemedicine links between hospitals and medics in the field;

➜ providing call centres where disaster victims can contact their loved ones.

ITU pays for the delivery of the equipment, and for its use. The calls are free. ITU also offers training.

More information is available at www.itu.int/itu-d/emergencytelecoms

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