Overview of ITU's History

For a century and a half since 1865, the International Telecommunication Union (ITU) has been at the centre of advances in communications -- from telegraphy through to the modern world of satellites, mobile phones and the Internet.

The story of ITU is one of international cooperation, among governments, private companies and other stakeholders. The continuing mission is to achieve the best practical solutions for integrating new technologies as they develop, and to spread their benefits to all.

From telegraph to telephone

For thousands of years, the quickest method of sending complex messages over long distances was with a courier on horseback. At the end of the 18th century, Claude Chappe inaugurated a network of visual semaphore stations across France. Then came the electrical revolution. Experiments were conducted in sending electric signals along wires, and in 1839, the world's first commercial telegraph service opened in London with a system created by Charles Wheatstone. In the United States, Samuel Morse used the new Morse code to send his first telegraph message in 1844. Already in 1843, a precursor of the fax machine for transmitting images had been patented in the United Kingdom by Alexander Bain.

Telegraph wires soon linked major towns in many countries. A submarine telegraph wire (coated in protective gutta percha) was laid between Britain and France in 1850, and a regular service inaugurated the following year. In 1858, the first transatlantic telegraph cable was laid. But there was a problem. Where lines crossed national borders, messages had to be stopped and translated into the particular system of the next jurisdiction. To simplify matters, regional agreements began to be forged, and in Europe, representatives of 20 States gathered in Paris at an International Telegraph Conference to find ways to overcome barriers and make services more efficient. They would create a framework to standardize telegraphy equipment, set uniform operating instructions, and lay down common international tariff and accounting rules.

On 17 May 1865, the first International Telegraph Convention was signed in Paris by its twenty founding members, and the International Telegraph Union (the first incarnation of ITU) was established to supervise subsequent amendments to the agreement. That significant date – 17 May – eventually became World Telecommunication and Information Society Day.

Only a decade later, the next leap forward in communications occurred with the patenting of the telephone in 1876. At the International Telegraph Conference held in Berlin in 1885, ITU began to draw up international legislation governing telephony. An article added to the Telegraph Regulations specified five minutes as a unit of charge, and the length of a call was limited to ten minutes if there were other requests to use the telephone line.

> **ITU based in Switzerland**
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> The 1868 International Telegraph Conference, in Vienna, decided that ITU would operate from its own bureau in Berne, Switzerland. It began with just three members of staff.
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> In 1948, the headquarters of ITU were moved from Berne to Geneva.

Telephones meant you could actually speak to another person over long distances, as well as sending Morse code telegraphs. But what if a wire could not reach them, for instance, on a ship? In 1880 at the Royal Society in London, David Edward Hughes demonstrated what was later to be recognized as wireless signaling. Practical experiments began to be made in the 1890s by such inventors as Nikola Tesla, Jagadish Chandra Bose, Alexander Stepanovich Popov and Guglielmo Marconi. Radio, known as "wireless telegraphy," was born.

Radio

Gradually, the range of radio signaling increased, and Marconi made a one-way transatlantic transmission in 1901. The first experimental transmission of the human voice was achieved in 1900 by Aubrey Fessenden, who also made the world's first broadcast of voice and music in 1906.

However, problems occurred with international connections, as they had done in early telegraphy. The issue was highlighted in 1902, when Prince Henry of Prussia, returning across the Atlantic from a visit to the United States, attempted to send a courtesy message from his ship to US President Theodore Roosevelt. The message was refused by the US shore station because the ship's radio equipment was of a different type and nationality from that onshore. As a result of the incident, the German Government called a Preliminary Radio Conference in Berlin in 1903 with the aim of establishing international regulations for radiotelegraph communications.

This preparatory event was followed in Berlin in 1906 by the first International Radiotelegraph Conference, attended by representatives of 29 nations. It decided that the Bureau of ITU would act as the conference's central administrator, and the Radiotelegraph Section of the Bureau began operation on 1 May 1907.

The 1906 conference produced the International Radiotelegraph Convention with an annex containing the first regulations in this field. These were expanded and revised by numerous subsequent conferences, and became known as the Radio Regulations. Today, given the multitude of wireless services, the regulations include more than 1000 pages of information on how the limited resource of radio-frequency spectrum – as well as satellite orbits -- must be shared and used internationally.

The conference also established "SOS" as the international maritime distress call – one of the first steps in the vital field of emergency communications. But the sinking of the ocean liner *Titanic* in 1912 showed the need for further improvements. Just a few months after the tragedy, the 1912 International Radiotelegraph Conference, held in London, agreed on a common wavelength for ships' radio distress signals. Also, every ship was instructed to maintain radio silence at regular intervals, when operators should listen for distress calls.

ITU continued its technical work throughout World War I, but no international meetings took place until the 1925 International Telegraph Conference in Paris. It officially incorporated into ITU the International Long-distance Telephone Consultative Committee (CCIF), and created the International Telegraph Consultative Committee (CCIT). Two years later, the Radiotelegraph Conference, held in Washington in 1927, established the International Radio Consultative Committee (CCIR). Together, the three committees were made responsible for coordinating technical studies and drawing up international standards in all these fields of telecommunications. The CCIF and CCIT were merged in 1956 to form the International Telephone and Telegraph Consultative Committee (CCITT).

Through the 1920s the use of radio grew rapidly, including for popular broadcasting. To improve the efficiency and quality of operation, the 1927 Washington conference allocated frequency bands to the various radio services (fixed, maritime and aeronautical mobile, broadcasting, amateur, and experimental).

Television

John Logie Baird gave the first public demonstration of television, in London in 1925. A decade later, his mechanical device was superseded by the electronic television systems of Vladimir Zworykin and Philo T. Farnsworth, developed in the United States using cathode ray tubes originally created by Karl Ferdinand Braun some 40 years earlier.

Regular, low-resolution, television broadcasts began in the late 1920s, with improvements in the early 1930s. But it was after World War II that the new medium began to take off. ITU's first technical standards for television were released in 1949. In the following decades, more than 150 technical standards were published to make it possible for high-quality images to be delivered across the world. ITU standards now cover all kinds of sound and vision broadcasting, including today's multimedia and data transmissions to a plethora of devices.

ITU's important role in setting the foundations for international broadcasting was recognized by the US National Academy of Television Arts & Sciences (NATAS) in 1983 and 2012, which gave Emmy Awards to the Union. In 2008, ITU received a Primetime Emmy Award from the Academy of Television Arts & Sciences (ATAS).

Space and satellites

The Space Age began on 4 October 1957 with the launch by the Soviet Union of the world's first artificial satellite, Sputnik-1. Not long after, satellites became used for telecommunications. The passive Echo-1 was launched in 1960 by the United States, followed in 1962 by Telstar-1 (a joint French-UK-US project), the first active, direct relay communications satellite. On 23 July that year it enabled people on both sides of the Atlantic to watch a live television programme at the same time.

The motion of these satellites had to be tracked as they crossed the sky; a more efficient and economical idea was that of the geostationary communications satellite, first proposed by writer Arthur C. Clarke in 1945. In 1964, following experiments with geosynchronous satellites, the first geostationary satellite (Syncom-3) was launched.

Like radio-frequency spectrum, the geostationary orbit around Earth is a

limited natural resource; both need to be shared fairly and in a way that avoids interference. In 1963, ITU held an Extraordinary Administrative Conference for space communications, which allocated frequencies to the various services. Later conferences made further allocations and put in place regulations governing satellites' use of orbital slots.

As well as linking broadcasting and wired telephone systems, and providing navigation services, satellites are also used in mobile communications. Satellite phones, for example, can be vital in emergencies, or for areas without access to alternative networks. And in 1992, ITU made spectrum allocations for the first time to serve the needs of Global Mobile Personal Communications by Satellite (GMPCS).

ITU also looks to the needs of radio-astronomers and other space scientists, who conduct such important work as weather prediction and monitoring the Earth's environment and climate. Climate change is a major theme of ITU's work, as are emergency communications such as satellite-based disaster warning systems.

The Internet

Devices to help people calculate – such as the abacus – have existed for thousands of years. The history of computers as we know them today stretches back to the early 19th century, when Charles Babbage in London designed a "Difference Engine" in 1822 and later an "Analytical Engine." Modern computing can trace its origins to the theoretical and practical work of figures such as Alan Turing in the United Kingdom before and during World War II, along with developments in Germany, the United States and elsewhere. Another vital advance was the development of the transistor in the 1940s. But it was when computers were linked together that the Internet revolution began to truly change our world.

It started in 1969 with a packet-switched network of computers – ARPANET – in the US Defense Department. This carried the first email, sent in 1971. Then, in 1989, an important advance was made at the European Organization for Nuclear Research (or CERN), close to Geneva. British scientist Tim Berners-Lee, working with Belgian Robert Cailliau, proposed a distributed hypertext system that became known as the World Wide Web. The necessary software was developed in 1990, and crucially, the system was used not only within CERN, but also made freely available to all.

The Internet that carries the World Wide Web comprises many types of equipment and telecommunication infrastructure, which must operate together seamlessly. The worldwide expansion of the Internet owes much to technical standards from ITU, from the early days of modems through to today's broadband. Hardly anyone would be able to use this powerful resource without ITU-brokered and approved global standards for the critical transport layers and access technologies. And the future is continually under consideration, including such issues as the transition to IPv6 to overcome the urgent need for Internet Protocol addresses, especially given the burgeoning "Internet of Things."

The Internet is now used by more than a third of the global population. Its huge social and economic importance means that debate must also take place on matters of policy**.** ITU has a long history as a venue for discussing how best to ensure that the Internet works for all. The World Summit on the Information Society gave ITU the mandate to spearhead this effort, bringing all interested parties together. In addition, the Union's membership has mandated ITU's work on such topics as cybersecurity; protection of children online; promoting multilingualism on the Internet; protecting consumer rights and privacy; international Internet connectivity, and fostering investment in the necessary infrastructure.

Mobile connectivity

Arguably, the technology that has done most to connect people in modern times is the mobile phone – and ITU has been at the heart of its spectacular progress. In 1973, Martin Cooper, of Motorola in the United States, made the first demonstration call with a handheld cell phone. Commercial networks were opened in Japan in 1979 and in Nordic countries in 1981. These early systems used analogue technology. They were superseded with the launch in Finland of digital second-generation (2G) mobile services in 1991, then third-generation (3G) in Japan in 2001.

ITU agreed radio-frequency spectrum allocations for 2G mobile telephony at the World Radiocommunication Conference in 1993. But as technologies progressed, various mobile phone systems existed in a fragmented market. After more than ten years of work under the leadership of ITU, an historic decision was taken at the conference held in 2000: the unanimous approval of technical specifications for third-generation systems under the name IMT-2000. For the first time, full interoperability of mobile systems could be achieved, and the foundation was laid for new, high-speed wireless devices capable of handling voice, data and connection to the Internet. In 2012, the ITU Radiocommunication Assembly agreed specifications for IMT-Advanced – a global platform on which to build the next generation of interactive mobile services.

According to ITU figures, there were 6.8 billion mobile phone subscriptions in 2013 – almost the same number as the world population. And more and more, people are choosing smartphones and other mobile devices that link them to the Internet.

ITU Statistics

The collection and dissemination of information on the growth of information and communication technologies (ICT) has been part of ITU's mission from the start.

It now collects statistics covering 200 economies and over 100 indicators.

Development to bridge the digital divide

Mobile phones and Internet access are powerful tools in supporting advances in developing countries. But ITU statistics put into sharp focus the digital divide that continues between countries, and within national borders among various social groups.

The need to support the expansion of telecommunications has long been recognized. In 1952, ITU became an official participating organization in the UN Expanded Programme of Technical Assistance. The aim was to recruit and send experts to developing countries to help in various technological fields, as well as to support the training of local personnel. In 1959, ITU took over the management of its technical assistance schemes for telecommunications, with a department for that purpose created the following year.

The UN Expanded Programme of Technical Assistance was merged with the UN Special Fund, forming today's United Nations Development Programme, or UNDP, which began operation in 1966. ITU's collaboration with UNDP increased markedly from that period. Alongside the objectives of improving technical, administrative and human resources in developing countries, the goal was to promote the expansion of networks in Africa, Asia and Latin America (as well as regional networks there and in the Asia-Pacific and the Middle East). From the 1970s, projects such as the Pan-African Telecommunications Network (PANAFTEL) and the Middle East and Mediterranean telecommunication master plan (MEDARABTEL) were implemented.

An important step forward was taken in 1982, when the ITU Plenipotentiary Conference held in Nairobi set up the Independent Commission for World-Wide Telecommunications Development. It began work in 1983 under the chairmanship of Donald Maitland and submitted its report in 1985. Officially titled *The Missing Link*, and also known as the *Maitland Report*, the report showed how access to telecommunications correlates with economic growth – but also drew international attention to the huge imbalance in such access between developed and developing countries.

In response to the ground-breaking report, ITU held its first World Telecommunication Development Conference in 1985, in Arusha, Tanzania. In 1989, the ITU Plenipotentiary Conference in Nice recognized the importance of placing technical assistance to developing countries on the same footing as its traditional activities of standardization and spectrum management. To this end, it established the Centre for Telecommunication Development (later incorporated into ITU's Telecommunication Development Bureau in 1991).

Bridging the digital divide was confirmed as a priority for ITU at the Marrakesh Plenipotentiary Conference in 2002, which also authorized ITU to take a leading role in the preparations and follow-up of the World Summit on the Information Society (WSIS).

WSIS was the first ever gathering of global leaders to address how best to create a safe and truly inclusive information society. The summit was held in two phases: in 2003 in Geneva and in 2005 in Tunis. Participants came from 175 countries, including some 50 Heads of State and Government and vice-presidents. Its outcome documents, including the Geneva Plan of Action and the Tunis Agenda for the Information Society, address such issues as the use of information technologies for development; cybersecurity; affordable access to communications; infrastructure; capacity building, and cultural diversity.

> ## New ITU Structure
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> Against a background of increasing globalization and the liberalization of telecommunication markets, the 1989 Plenipotentiary Conference, held in Nice, decided that ITU's structure and working methods needed to be reviewed.
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> As a result, an Additional Plenipotentiary Conference, in Geneva in 1992, streamlined ITU into three Sectors: Telecommunication Standardization (ITU-T), Radiocommunication (ITU-R), and Telecommunication Development (ITU-D).

The summit also resulted in the multi-stakeholder WSIS Forum, held annually since 2009 to review progress in achieving the summit's goals. As another follow-up to WSIS, the Connect the World series of regional conferences was launched by ITU to mobilize technical, financial and human resources for telecommunication development. The first event was the Connect Africa Summit, hosted by Rwanda in 2007.

ITU holds regular seminars and training events, and since 2000 it has organized the annual Global Symposium for Regulators. This provides a unique meeting place for regulators and policy-makers from both developed and developing countries. Efforts to encourage greater participation by developing countries in creating and adopting technical standards are focused on ITU's Bridging the Standardization Gap programme, established in 2008.

Global meeting place

In addition to its regular conferences, ITU hosts events where stakeholders in the public and private sectors discuss not only technical matters, but also wider issues. As an industry showcase and high-level forum, ITU Telecom World began in 1971 in Geneva. Since then it has been held regularly, at venues around the world, bringing together the most influential representatives of government and industry to network, share knowledge and seek solutions to global challenges.

In 1994, the Kyoto Plenipotentiary Conference established the World Telecommunication Policy Forum (WTPF), a high-level meeting which encourages the free exchange of ideas and information on emerging policy issues arising from the changing telecommunication environment. The first WTPF was held in Geneva in 1996 on the theme of global mobile personal communications by satellite. Later forums took place in 1998, 2001, 2009 and 2013. The fifth WTPF took place in Geneva in 2013 and considered international Internet-related public policy matters.

Serving the modern world

Vast changes have taken place in the world of telecommunications and information technologies – not only since the foundation of ITU, but increasingly over recent decades. In 1988, the separate International Telegraph Regulations and Telephone Regulations were revised and combined to form the International Telecommunication Regulations (ITRs). By the 21st century, however, these were no longer in keeping with modern developments, so in 2012, ITU convened in Dubai a World Conference on International Telecommunications (WCIT-12) with the goal of revising the ITRs to suit the new age.

The ITRs are an international treaty, and much detailed – sometimes difficult – debate took place at the conference. After two intensive weeks of negotiations, a majority of delegates from around the globe agreed on revised ITRs that will help pave the way to the hyper-connected world of the future.

That future is being built on broadband. In 2010, ITU, together with UNESCO, formed the Broadband Commission for Digital Development, in response to UN Secretary-General Ban Ki-Moon's call to step up efforts to meet the Millennium Development Goals. The Commission believes that expanding broadband access to the Internet is key to accelerating economic and social progress everywhere, and it defines practical ways in which countries — at all stages of development — can achieve this, in cooperation with the private sector.

ITU has continued to reach out to all who share its goal of connecting the world. Young people are a key audience. Events are organized to encourage their participation in deciding the future for telecommunications, such as the BYND 2015 Global Youth Summit. Held in Costa Rica in 2013, this focused on using these technologies to help further the development agenda "beyond 2015," the target date for the Millennium Development Goals.

Improving opportunities for women and girls is another area of action for ITU. In 2010, it established "Girls in ICT Day" (celebrated every year on the fourth Thursday in April) with an associated web portal launched in 2012. The aim is to inspire girls to consider a future in technology, helping not only themselves, but also their communities.

ITU is also active in promoting better accessibility to the information society for people with disabilities. This need is promoted in the development of standards, for instance, so that technologies can be easily used by everyone. In 2013, at the UN High Level Meeting on Disability and Development, ITU was among the expert organizations launching a global consultation report on the beneficial impact of ICT in this field.

Looking forward

The ITU membership includes hundreds of private-sector organizations, as well as 193 States. In 2011, a new category of Academia was introduced for membership by research institutions. Beyond this, many other individuals and organizations are welcomed to contribute their views at events such as the WSIS Forum. And everyone can learn more about ITU's history and its work by visiting the interactive exhibition ICT Discovery, which opened to the public at the Union's headquarters in Geneva in 2012.

The world is becoming ever more reliant on telecommunication technologies, in every aspect of our lives. ITU's role in supporting the smooth integration, expansion and sharing of each advance is more vital than ever before. ITU will continue to match its priorities and working methods to respond to the rapid changes in the global environment, as it has done for a century and a half.