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Other information publications on the ITU:

- Book — From semaphore to satellite, 1793-1965 (1965)
- Booklet No. 1 — 1865-1965, a hundred years of international co-operation (1967)
- Booklet No. 2 — ITU and space radiocommunication (1968)
- Booklet No. 3 — Eighth Report by the International Telecommunication Union on telecommunication and the peaceful uses of outer space (1969)
- Booklet No. 4 — Symposium "Space and Radiocommunication", Paris (1969)
- Booklet No. 5 — World Telecommunication Day—17 May 1969 (1969)
- Booklet No. 6 — Ninth Report by the International Telecommunication Union on telecommunication and the peaceful uses of outer space (1970)
- Booklet No. 7 — World Telecommunication Day—17 May 1970 (1971)
- Booklet No. 8 — Tenth Report by the International Telecommunication Union on telecommunication and the peaceful uses of outer space (1971)
- Booklet No. 9 — Speeches made at the inaugural meeting of the second World Administrative Radio Conference for Space Telecommunications on 7 June 1971 (1971)
- Booklet No. 10 — Eleventh Report by the International Telecommunication Union on telecommunication and the peaceful uses of outer space (1972)
- Booklet No. 11 — Twelfth Report by the International Telecommunication Union on telecommunication and the peaceful uses of outer space (1973)
- Booklet No. 12 — Inauguration of the ITU tower (1973)
- Booklet No. 13 — PANAFTTEL—The pan-African telecommunication network (1974)
- Booklet No. 14 — Symposium "Space and Radiocommunication", 1973, Paris (1974)
- Booklet No. 15 — Thirteenth Report by the International telecommunication Union on telecommunication and the peaceful uses of outer space (1974)



What is ITU?



INTERNATIONAL TELECOMMUNICATION UNION

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SUMMARY

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I. HISTORY OF THE ITU

Flanking the United Nations, now in the 30th year of its battle for the future, are its specialized agencies. Each of them an international organization in its own right, they deal, as their collective name implies, with specialized branches of human need and endeavour. Most of them came into being in their present form following the creation of the United Nations itself. Others however go back to earlier generations. Oldest of all, and the first to reach 100 years, is the International Telecommunication Union (ITU).

This might seem strange. Nothing, surely, could be more modern than telecommunications, with telex and television, with radio helping us to reach out into space and the prospect of our telephone calls travelling along beams of light. And yet perhaps this juxtaposition of old and new is not so strange. For what after all is “telecommunication”?

Human societies, as they developed and began to master the concept of distance, worked out a number of ingenious ways for communicating over the vast areas which separated them. Mostly, messengers of one kind or another were used. But there were also methods involving direct sight and sound—drums in the jungle, beacons along the coast, smoke signals on the horizon. These methods, picturesque today, were strictly practical solutions devised by man’s imagination for overcoming the obstacles that distance placed in the way of his basic need to communicate. They were the first real telecommunications.

From the early dawn of civilization until a little over 100 years ago man did not get much further than the written message, the drum, the beacon and the smoke signal in his efforts to communicate at long distance. One of the last of these devices was an “optical telegraph” or semaphore invented by Claude Chappe, a Frenchman, at the end of the 18th century. Signal towers with movable arms were set on hill-tops a few kilometres apart. Messages spelt out by different positions of the arms were read by telescope from one tower to another and passed on. The system worked quite fast on clear days but was useless at night or in fog.

With the development of electricity in the first half of the 19th century, man’s capacity for practical achievement was suddenly enlarged a hundred-fold. Nowhere was this seen more dramatically than in the invention of the electric telegraph.

Amongst the pioneers of the electric telegraph was Samuel Finley Breese Morse who exhibited a model of his apparatus at the University of New York in 1835 and took out a patent in 1837. On 6 January 1838, by using electric current, he managed to transmit the signs of the alphabet he had invented, and which bears his name, along a wire 5 km long. On 24 May 1844 the first public link using Morse apparatus was inaugurated between Washington and Baltimore.

The electric telegraph was made available to the general public in Europe about 1848. At first the lines stopped short at national frontiers and the telegrams were taken by hand from one locality to another across the border for further transmission. But the popularity of this useful and marvellous means of communication was such that States soon felt the need to regulate, by inter-governmental agreements, the use of particular types of conductors and apparatus, the application of uniform operating instructions, the collection of charges and the mutual settlement of accounts.

1. The Regional Unions

The governments had to face difficulties that would be overcome in a trice today. To give only one example, when Prussia, in 1848, decided to link its capital with places on the borders of the kingdom it had to conclude no less than 15 conventions with the German States to obtain the rights of passage necessary for the construction of its lines, and these conventions were only effective within Germany itself. The convention on “The establishment and use of electro-magnetic telegraphs for the exchange of State despatches”, signed on 3 October 1849 by Prussia and Austria, was the first agreement

on the subject with any claim to be international. Similar conventions were subsequently concluded between Prussia and Saxony (17 October 1849) and between Austria and Bavaria (21 January 1850). From this embryo of international telegraphy developed the Austro-German Telegraphic Union, founded in Dresden on 25 July 1850, to which Prussia, Austria, Bavaria and Saxony acceded. Württemberg joined on 1 April 1851 by signing an agreement with Bavaria, followed by the Netherlands and Hanover, who concluded separate conventions with Prussia (1 July 1852). The Grand Duchy of Baden entered the Union by a convention concluded with Württemberg on 22-25 February 1854 and Mecklenburg-Schwerin by an agreement with Prussia on 1 April 1854. Some of the contracting States of the Austro-German Telegraphic Union concluded conventions with foreign countries: for example, Prussia with Belgium (16 May 1850); and on 4 October 1852 in Paris, Belgium, France and Prussia signed a basic convention which was expanded on 22 September 1854 and replaced on 29 June 1855 by the Berlin Convention. In 1854 also, Prussia and Russia signed a separate convention, while Austria, on 26 April 1852, had regulated telegraphic correspondence with Switzerland, and on 28 September 1853 and 3 October 1856 with Sardinia, at Turin.

But this development was not confined to relations between the States of Central and Eastern Europe; similar trends were apparent in the Western part of the continent. France and Belgium had reached an arrangement in 1851 on telegraph links between their two countries; an identical convention was signed on 23 December 1852 in Berne between Switzerland and France. Others followed, between France and Belgium on 10 May 1853, between Sardinia and Switzerland in Berne on 25 June 1853, between the Grand Duchy of Baden, France and Switzerland on 8 August 1853, and between Switzerland and Spain on 24 November 1854. All these conventions were inspired by the Paris agreements of 4 October 1852 between Belgium, France and Prussia. On 29 December 1855, the Telegraphic Union of Western Europe was founded in Paris, to which Holland and Portugal acceded in 1856. In that same year conventions were also signed between France, Sweden and Norway.

The two Unions, Austro-German, and West European, as is evident from the various conventions, worked so closely together that it seemed the obvious thing to the West European Union Conference held in May 1857 at Turin that the two should merge. Accordingly, on 17 August 1857, the Swiss Federal Council wrote on behalf of the West European Union to the

Austro-German Union Conference at Stuttgart inviting it to send a representative to a conference to be held in Berne in the autumn of 1858, so that they could examine together the question of the creation of a single union comprising all the States of the continent. The Stuttgart Conference turned down the invitation but asked the Swiss Federal Council to prepare a convention common to all the States of Europe based on provisions chosen by the conference. Meanwhile Prussia, Belgium and France concluded a convention (with service instructions annexed) in Brussels on 30 June 1858, the main provisions of which were inserted in the convention concluded at Berne on 1 September 1858 by the States of the West European Union. Since Prussia was a party to the Brussels Convention, almost all of which was reproduced in the Berne Convention, there was nothing to prevent the States of the Austro-German Union from acceding to it. Virtually complete uniformity had thus been achieved in the regulation of the international telegraph service.

The bonds were formally cemented when, by agreement with Switzerland, Austria, the Grand Duchy of Baden, and Württemberg declared the accession of the Austro-German Union to the Berne Convention on 1 May 1859. However, the Austro-German Union continued its activities on the basis of the Brussels agreement. It extended its relations in 1859 with the Papal States, the Duchy of Modena, Norway, Parma, Sweden and Tuscany, with the International and Electric Telegraph Company, the Submarine Telegraph Company and the Company of telegraph lines for the Mediterranean islands, and in 1860 with Turkey, including the Danube principalities. The importance of the Austro-German Union gradually declined with the breaking up of the Germanic Confederation after the battle of Sadowa in 1866, and it was dissolved on 1 July 1872 after the constitution of the German Empire.

2. Founding of the ITU

To go back a little way, we see that in 1864 there were two international conventions, those concluded in Brussels and Berne in 1858. The progress of science, the extension of lines and the complexity of telegraph relations made it more and more obvious that the provisions of these two conventions were no longer in tune with the requirements and conditions of the time. Accordingly France, desiring to profit from experience and realizing the advantages of complete telegraphic uniformity for international relations, proposed that not only the signatory States to the previous conventions but

all the powers of Europe meet at a conference to negotiate a general treaty. Great Britain was not invited because its telegraph service was at that time in the hands of private companies.

2.1 Paris Conference, 1865

The Conference met in Paris on 1 March 1865 and lasted until 17 May 1865, on which day the first international Telegraph Convention was signed; it was to be foundation of the International Telegraph Union. This memorable document was signed by the French Emperor, the Swiss Minister, and representatives from Austria (Hungary), the Grand Duchy of Baden, Bavaria, Belgium, Denmark, Greece, Hamburg, Hanover, Italy, Netherlands, Portugal, Prussia, Russia, Saxony, Spain, Sweden and Norway, Turkey, and Württemberg. These 20 States were the founders of the Union. Mecklenburg acceded to the convention before the end of the year.

2.2 The first International Telegraph Convention

Although drawn up on a distinctly federal basis, the first International Telegraph Convention was already imbued with a community spirit which in course of time was to develop into a resolute disposition towards common action. In no other statute of an international organization of comparable scope was this intention so positively expressed.

The common provisions of the two preceding Telegraph Unions were incorporated in the new treaty which grouped into a single unit almost all of the European States. The Paris Conference recognized the Morse instrument as the international telegraph apparatus; all languages used in the contracting States were admitted for telegraphic correspondence; the acceptance of coded messages was left to the discretion of administrations but such messages had in any case to be registered; special service telegrams were also accepted, such as reply-paid and multiple address telegrams, telegrams to be delivered by express and by courier, to be handed to the addressee in person, or to be forwarded within the country, and finally semaphore telegrams. The Convention stipulated that administrations should as far as possible interconnect economic centres with heavy traffic by direct lines set up according to given standards; it placed all lines under the protection of the contracting States and regulated the fixing of terminal and transit charges.

The Paris Conference decided that the provisions of the Convention should be reviewed and supplemented at periodical meetings.

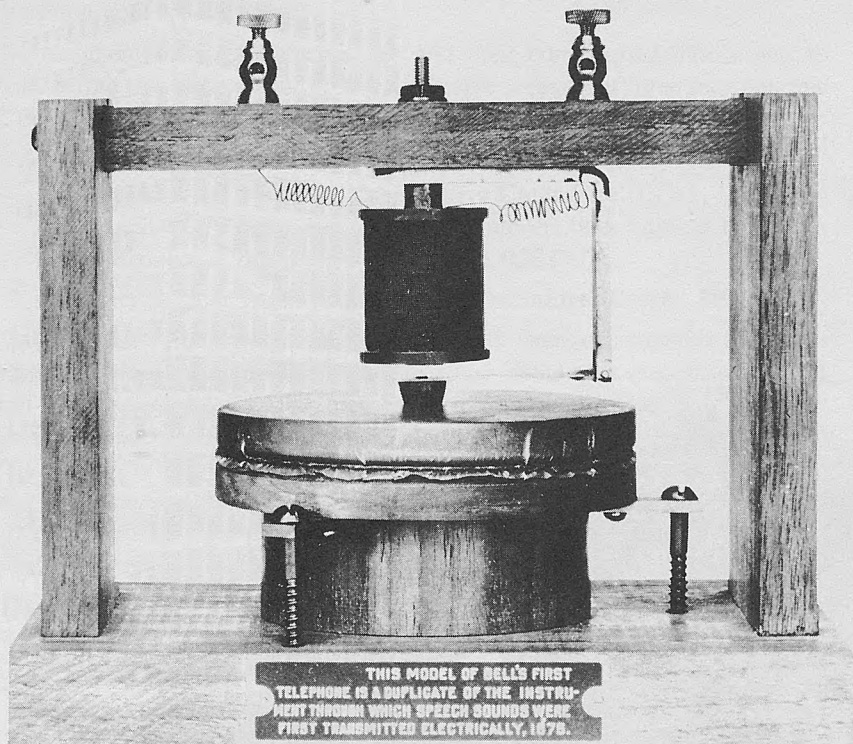
3. The history of the ITU – a mirror of the history of telecommunications

This historic Conference was followed in 1868 by one in Vienna which took a decision of almost equal importance for the history of international organizations. It set up a headquarters with a Secretariat. The headquarters, established in Berne as the Bureau of the Union, was under the control of the Swiss Government until 1947 and started off with a staff of three, two Swiss and a Belgian. Modest though this beginning may have been, it established the principle for the future that intergovernmental organizations need a home and servants.

Throughout the rest of the 19th century the Union pushed purposefully ahead, holding a succession of larger and larger conferences in the romantic setting of capitals of a Europe that has long ceased to be. It revised and redrafted the international Telegraph Regulations, sternly forbade telegrams contrary to public order or decency, tirelessly wrestled with legal and financial problems, wondered whether the widespread use of private codes might not be imposing too great a strain on ordinary telegraphists. In 1885 it also began legislating internationally for the telephone which had been launched by Alexander Graham Bell in 1876.

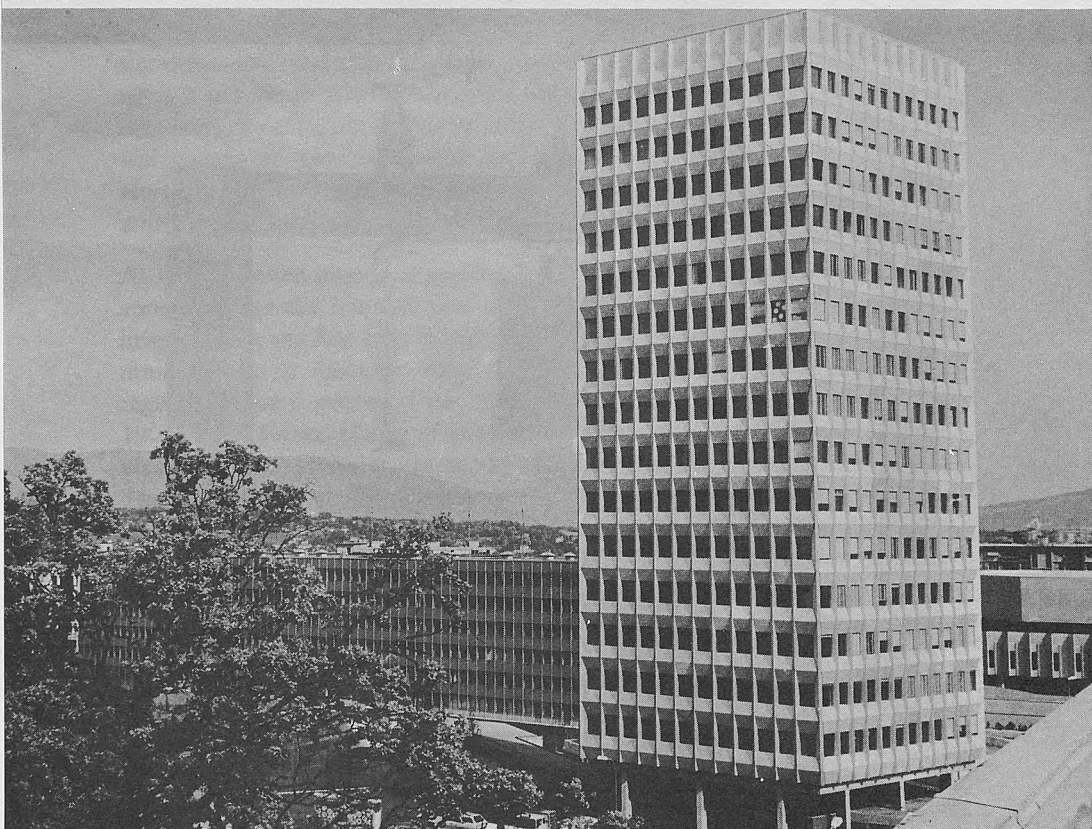
A few years later, in 1895 and 1896, the first successful wireless transmissions, crowning decades of research and experiment, brought about what is still the greatest revolution in the history of telecommunications. The invention of radio, one of the proudest conquests that science can point to, will always be associated with such names as James Maxwell, Heinrich Hertz, Oliver Lodge, Alexander Popov, Guglielmo Marconi, Lee de Forest and Edourd Branly.

At first regarded purely as a radically advanced form of telegraphy, radio spread across the international scene even more rapidly than the parent invention, for the first time bringing ships at sea within the reach of telecommunications. It became clear with equal rapidity that international regulations were needed. One major problem was highlighted as early as 1902, when Prince Henry of Prussia, returning across the Atlantic from a visit to the United States, attempted to send a courtesy message to President Theodore Roosevelt, only to have it refused because the radio equipment on the ship was of a different type and nationality from that at the shore station. Partly as a result of this incident, the German Government called a Preliminary Radio Conference in Berlin in 1903 which prepared the way for the Berlin Radio Conference of 1906. The 1906 Conference drew up the





*
 Danemark Bavière Norvège Wurtemberg Belgique Portugal Secrétaire Suisse Bade Turquie Prusse Italie Grèce Secrétaire Espag
Agathon Effendi *Chauvin* *Minetti* *Manos* *Dubre* *Agathon*
 Pays Bas Bavière Hanover France Belgique France Suède Espagne Russie Autriche



first international Radio Regulations, incorporating the principle that ship and coastal radio stations must accept messages from each other, and adopting the SOS distress signal.

The problems of ensuring effective radio communications at sea were far from solved, as was shown dramatically in 1912 when the desperate operator of the sinking *Titanic* was unable to communicate with a ship within rescue distance simply because its operator had gone off duty for the night. But a start had nevertheless been made toward solving them.

The First World War greatly stimulated the development of radio and then in the early 1920s a new kind of radio service began—broadcasting. All this gave rise to a new problem—how to share out the radio frequencies over which transmissions travel so as to avoid the otherwise inevitable interference between stations. Since the use of radio constantly grows, it is a problem which has to go on being solved all the time, and now today, 50 years and many conferences later, the international responsibility for radio frequencies remains one of the Union's heaviest and most vital jobs. The first move was made at the Washington Radio Conference of 1927 which allocated bands of frequencies to all of the different radio services, including maritime and broadcasting.

Development of modern techniques and their complicated nature was to lead during this same period to the successive creation of three International Consultative Committees (CCIs):

- the International Telephone Consultative Committee (CCIF, 1924);
- the International Telegraph Consultative Committee (CCIT, 1925), the CCIF and CCIT being merged in 1956 into the International Telegraph and Telephone Consultative Committee (CCITT);
- the International Radio Consultative Committee (CCIR, 1927).

At Madrid in 1932 the organization decided to change its name to the International Telecommunication Union, to cover all its new responsibilities. In fact with the advent of radio a new era of telecommunications was dawning. Television and radiodetection (radar) both made their appearance in 1930. The Second World War speeded up technical progress still more. During the war broadcasting brought the fact home to everyone that radio waves were no respecters of frontiers. It was not difficult therefore to see that much wider international agreements would have to be drawn up for radio.

Thus two ITU Conferences met in Atlantic City in 1947 with the aims of developing and modernizing the Union. Under the agreement with the United Nations, the ITU became a specialized agency and its headquarters were transferred from Berne to the traditionally international atmosphere of Geneva. Furthermore, an "International Frequency Registration Board (IFRB)" was created.

Five years later another ITU Plenipotentiary Conference, held in Buenos Aires, completed the reorganization of the Union, and laid down the groundwork for the ultimate amalgamation of the CCIT and CCIF (telegraphy and telephony), but the CCITT had to wait until 1956 to come into being in its present form.

Back in Europe, in Geneva, the ITU Plenipotentiary Conference met in 1959 to revise the Buenos Aires Convention, and to finalize the process of integrating the ITU into the United Nations family by assimilating the Union into the Common System of service conditions, salaries, pensions, etc.

The Plenipotentiary Conference which was held in Montreux (Switzerland) in 1965 marked the Centenary of the Union and another milestone in its history. It took special measures with regard to technical co-operation and introduced important changes in the structure of the Union.

The advent of the space age presented the ITU with a new challenge, since man's exploration of outer space depends on telecommunications. The Member countries of the Union decided to take the necessary steps to meet these new demands. Thus as early as 1963 the first Conference on Space Communications was convened in Geneva. This was followed by the 2nd Space Conference in 1971, also in Geneva. The delegates at these conferences were continuing the work of advancing the frontiers of international telecommunications which their predecessors began in 1865.

Finally, the Plenipotentiaries of the Member countries of the Union met from 14 September to 26 October 1973 in Málaga-Torremolinos (Spain) to review the Convention established at Montreux in 1965. The purpose of the decisions taken was to adapt the Union's action to the spectacular developments in telecommunications that had occurred during the eight years since the Montreux Conference. The new International Telecommunication Convention, an intergovernmental treaty governing international telecommunications, came into force on 1 January 1975.

II. THE INTERNATIONAL TELECOMMUNICATION UNION TODAY

The International Telecommunication Union (ITU) is an intergovernmental organization which on 1 January 1975 had more than 140 Member countries.

The basic text governing the activities of the Union at the present time is the "International Telecommunication Convention (Malaga-Torremolinos, 1973)".

The Union has had its headquarters in Geneva since 1948.

1. Purposes of the Union

1.1 The purposes of the Union are:

- a) to maintain and extend international co-operation for the improvement and rational use of telecommunications of all kinds;
- b) to promote the development of technical facilities and their most efficient operation with a view to improving the efficiency of telecommunication services, increasing their usefulness and making them, so far as possible, generally available to the public;
- c) to harmonize the actions of nations in the attainment of those ends.

1.2 To this end, the Union shall in particular:

- a) effect allocation of the radio frequency spectrum and registration of radio frequency assignments in order to avoid harmful interference between radio stations of different countries;

- b) co-ordinate efforts to eliminate harmful interference between radio stations of different countries and to improve the use made of the radio frequency spectrum;
- c) co-ordinate efforts with a view to harmonizing the development of telecommunications facilities, notably those using space techniques, with a view to full advantage being taken of their possibilities;
- d) foster collaboration among its Members with a view to the establishment of rates at levels as low as possible consistent with an efficient service and taking into account the necessity for maintaining independent financial administration of telecommunication on a sound basis;
- e) foster the creation, development and improvement of telecommunication equipment and networks in developing countries by every means at its disposal, especially its participation in the appropriate programmes of the United Nations;
- f) promote the adoption of measures for ensuring the safety of life through the co-operation of telecommunication services;
- g) undertake studies, make regulations, adopt resolutions, formulate recommendations and opinions, and collect and publish information concerning telecommunication matters.

2. Structure of the Union

The Union comprises the following organs:

1. The Plenipotentiary Conference, which is the supreme organ of the Union;
2. administrative conferences;
3. the Administrative Council;
4. the permanent organs of the Union, which are:
 - a) the General Secretariat;
 - b) the International Frequency Registration Board (IFRB);
 - c) the International Radio Consultative Committee (CCIR);
 - d) the International Telegraph and Telephone Consultative Committee (CCITT).

2.1 Plenipotentiary Conference

The Plenipotentiary Conference, the supreme organ of the Union, is responsible for laying down the basic policy of the organization. It revises the Convention, elects the 36 Members of the Administrative Council, the Secretary-General, the Deputy Secretary-General and the five members of the IFRB. It is composed of delegations representing the Members of the Union and normally meets once every five years.

2.2 Administrative Conferences

ITU administrative conferences are generally convened to consider specific telecommunication matters. They are of two types:

- world administrative conferences,
- regional administrative conferences.

2.2.1 World administrative conferences are competent, in particular, to undertake partial or complete revision of the Administrative Regulations, i.e.:

- the Telegraph Regulations;
- the Telephone Regulations;
- the Radio Regulations and Additional Radio Regulations.

The purpose of these regulations is to ensure the efficient international operation of telecommunication services.

2.2.2 Regional administrative conferences can only discuss specific telecommunication matters of a regional nature. The decisions of such conferences must in all circumstances be in conformity with the provisions of the Administrative Regulations.

3. Administrative Council

The Administrative Council of the ITU is made up of 36 Members of the Union elected by the Plenipotentiary Conference with due regard to the need for equitable representation of all parts of the world. It meets annually and is responsible for taking all steps to facilitate the implementation by the Members of the Union of the provisions of the Convention, the Administrative Regulations, the decisions of the Plenipotentiary Conference, and, where appropriate, the decisions of other conferences and meetings of the Union.

It ensures the efficient co-ordination of the work of the Union, particularly from the administrative and financial points of view.

4. The permanent organs of the ITU

The Union operates through four permanent organs comprising some 600 staff members.

4.1 General Secretariat

The General Secretariat is directed by a Secretary-General, assisted by one Deputy Secretary-General.

The Secretary-General is responsible to the Administrative Council for the whole of the administrative and financial side of the Union's work. With the advice and assistance of a "Co-ordination Committee", he co-ordinates the activities of the permanent organs. The Co-ordination Committee, which is presided over by the Secretary-General, consists of the Deputy Secretary-General, the Directors of the International Consultative Committees and the Chairman of the International Frequency Registration Board.

The Secretary-General acts as the legal representative of the Union.

The General Secretariat is responsible for the administration of the Union, the publication of administrative regulations and other ITU documents, and the implementation of technical co-operation programmes within the framework of the United Nations Development Programme (UNDP).

4.2 International Frequency Registration Board (IFRB)

The essential duties of the International Frequency Registration Board are:

- a) to effect an orderly recording of frequency assignments made by the different countries so as to establish, in accordance with the procedure provided for in the Radio Regulations and in accordance with any decisions which may be taken by competent conferences of the Union, the date, purpose and technical characteristics of each of these assignments, with a view to ensuring formal international recognition thereof;
- b) to effect, in the same conditions and for the same purpose, an orderly recording of the positions assigned by countries to geostationary satellites;
- c) to furnish advice to Members with a view to the operation of the maximum practicable number of radio channels in those portions of the spectrum where harmful interference may occur, and with a view to the equitable, effective and economical use of the geostationary satellite orbit;

- d) to perform any additional duties, concerned with the assignment and utilization of frequencies and with the utilization of the geostationary satellite orbit, in accordance with the procedures provided for in the Radio Regulations, and as prescribed by a competent conference of the Union, or by the Administrative Council with the consent of a majority of the Members of the Union, in preparation for or in pursuance of the decisions of such a conference;
- e) to maintain such essential records as may be related to the performance of its duties.

The International Frequency Registration Board is composed of five independent members designated by the Plenipotentiary Conference in such a way as to ensure equitable representation of the various parts of the world.

Each year the members of the Board elect a Chairman and a Vice-Chairman from their own numbers. They are assisted by a Specialized Secretariat.

4.3 International Consultative Committees (CCIs)

The duties of the two “International Consultative Committees” of the ITU are:

- to study and issue recommendations on technical and operating questions relating to radiocommunications (International Radio Consultative Committee—CCIR);
- to study and issue recommendations on technical, operating and tariff questions relating to telegraphy and telephony (International Telegraph and Telephone Consultative Committee—CCITT).

Each CCI is under a Director, who is assisted by a Specialized Secretariat.

Participation in the work of the CCIs is open to all Members of the Union as well as to private telecommunication operating agencies, scientific and industrial organizations and international organizations which satisfy certain conditions.

Each of the Consultative Committees holds a Plenary Assembly every few years. The Plenary Assembly draws up a list of technical subjects (Questions) relating to telecommunications, the study of which should lead

to improvements in radio communications or in the telegraph and telephone service, particularly in international relations. These questions are then referred to a number of Study Groups composed of experts from different countries.

The Study Groups draw up recommendations, which are submitted to the next Plenary Assembly. If the Assembly adopts these recommendations, they are published in what are known as the CCI "Books" which are disseminated by the Union. These Books also contain a list of the questions under study, study programmes, reports and opinions adopted by the Plenary Assembly of each CCI (CCIR: seven volumes for the Plenary Assembly, New Delhi 1970; CCITT: nine volumes for the Plenary Assembly, Geneva 1972).

In pursuance of joint decisions taken by the Plenary Assemblies of the two CCIs, a World Plan Committee and a number of Regional Plan Committees (for Africa, Latin America, Asia and Oceania, Europe and the Mediterranean Basin) have also been set up. These Committees prepare a General Plan for the international telecommunication network to help in planning international telecommunication service. They refer questions to the International Consultative Committees, the study of which is of particular interest to developing countries and which are within the terms of reference of the Committees. The Plan Committees are joint CCITT/CCIR Committees administered by the CCITT.

In addition, five "Special Autonomous Working Parties" were set up to deal with questions of a documentary nature of particular concern to the developing countries. These Working Parties have published the following handbooks:

- "National automatic networks"
- "Local telephone networks"
- "Economic and technical aspects of the choice of transmission systems"
- "Primary sources of energy"
- "Economic studies at the national level in the field of telecommunications".

III. REGULATIONS OF STANDARDIZATION OF INTERNATIONAL TELECOMMUNICATIONS

The time is the 1840s. The scene: a jointly-used telegraph station in Strasbourg, at the frontier of France and the Grand-Duchy of Baden. A French employee receives a telegram transmitted at the speed of light from Paris. He carefully writes out the message, by hand, and passes it across a table to his German colleague, who translates it into German and sends it on its way, by telegraph. It takes more time for the message to cross the frontier than it does to transmit it electrically over hundreds of kilometres. And this is only one frontier crossing ...

It is not difficult to imagine the inevitable and vast confusion entailed in sending a telegram over great distances, crossing the borders of several countries, if it were not for strict regulations brought about by international co-operation.

The first treaty designed to link the telegraph system of two States was signed on 3 October 1849, between Prussia and Austria. Government messages were given first priority, messages concerning railway stations came second, and public correspondence last. Each Government reserved the right to suspend telegraphic service in its own country, and the cost of the message, paid by the sender, was the sum of the existing rates in the two countries.

This was the beginning of the regulation of telecommunications beyond national frontiers, but genuinely international regulations cannot be said to have existed until the ITU came into being as a result of the signature on

17 May 1865 of the first International Telegraph Convention, which established uniform regulations and charges for the telegraph service of the signatory countries.

The operation of telecommunications throughout the world is now governed by the following basic documents, which are published by the ITU:

- International Telecommunication Convention, a sort of constitution of the Union, which specifies the internal organization of the ITU and sets forth general principles governing telecommunication. It is drawn up at plenipotentiary conferences of the Member countries of the Union;
- international regulations which supplement the Convention and are framed at administrative conferences convened by the ITU. These regulations contain detailed provisions applying to telecommunications;
- “recommendations” of the International Consultative Committees of the ITU (International Radio Consultative Committee—CCIR; International Telegraph and Telephone Consultative Committee—CCITT) which are produced by telecommunication experts and provide guidance on the best operational methods and techniques to use.

1. Regulations

There are three sets of regulations:

- the Telephone Regulations
- the Telegraph Regulations
- the Radio Regulations with the Additional Radio Regulations.

Before taking a closer look at these regulations, a word of explanation is necessary for the benefit of the unapprised reader, who might be surprised to find that the Radio Regulations are so much thicker than the Telephone and Telegraph Regulations. The reason for this is simple: the Telephone Regulations, for example, are applied in each country by an administration (often combining the post, telegraph and telephone services) or by one or more companies operating under licence and more or less strict governmental supervision.

For the purpose of co-ordinating the activities of such bodies, whose fundamental concerns are much the same in all countries, the flexible

* See page 23: “Standardization and studies in the field of telecommunication”.

procedure afforded by the recommendations of the CCIs* is more suitable than the issuing of regulations when it is necessary to keep pace with the constant advances in technique. For this reason the existing Telegraph Regulations and Telephone Regulations drawn up by the World Administrative Telegraph and Telephone Conference, Geneva, April 1973, which came into force on 1 September 1974, retain only general provisions, all questions of detail (essential nonetheless for the efficient operation of international communications) being dealt with by CCITT recommendations.

The Radio Regulations, on the other hand, adopted in 1959 and revised subsequently at world conferences dealing with various services (1963—Space Radiocommunications; 1966—Aeronautical Radiocommunications; 1967—Maritime Radiocommunications; 1971—Space Telecommunications; 1974—Maritime Radiocommunications) are intended not only for the PTT Administrations and broadcasting organizations but for a multiplicity of public and private users, including such services as aviation, shipping, radionavigation and radio amateurs. Moreover, radio waves are propagated in accordance with physical laws which take no heed of man-made national boundaries. It is therefore not enough to frame rules to govern the international exchanges of traffic. Allowance has to be made for the fact that radio waves cannot help crossing frontiers and that stations may interfere with one another. It is quite possible, for example, for an emission in one country to interfere with an emission in another country, although neither was intended to be received outside the country of transmission. For all these reasons the Radio Regulations have to contain very detailed provisions.

1.1 The Telegraph Regulations

The Telegraph Regulations contain provisions which deal in particular with: the international network (with reference to the recommendations of the CCITT); the service provided by telegraph offices; charging systems, the composition of tariffs and the collection of charges; signalling codes; the preparation of telegrams and the counting of words; the routing, transmission and delivery of telegrams; telegrams relating to the safety of life; government telegrams; press telegrams and other special cases; the phototelegraph service; the telex service (mere reference to the recommendations of the CCITT).

1.2 The Telephone Regulations

The Telephone Regulations contain general provisions which deal in particular with the international network (with reference to the recommendations of the CCITT), methods of charging and international accounting.

These regulations also define various categories of calls and lay down priorities for the setting up of calls. The present tendency is to provide a demand or even automatic service, in which such priorities are irrelevant. However, these rules have to be retained for relations still requiring delay working.

1.3 The Radio Regulations, the Additional Radio Regulations

The purpose of the Radio Regulations is to enable communication to be established between stations and to prevent interference between stations.

One of the fundamental principles of the Radio Regulations stems precisely from the possibility of such interference: no radio station may be operated in a manner inconsistent with the regulations unless no harmful interference will result.

The various sections of the Radio Regulations deal with ways of avoiding harmful interference and provide for a proper apportionment of the radio spectrum in bands of frequencies which are allocated to specific services such as broadcasting, the aeronautical mobile service, radionavigation, the space service, radio amateurs, etc ...

This apportionment is supplemented by other provisions of a general nature or limited to a particular service. The aim is to make sure that stations which are capable of causing international harmful interference or which handle international traffic shall operate in such a way that the probability of interference is kept to a minimum.

One of the corner-stones of the international regulations governing radiocommunication is the Master International Frequency Register, in which the characteristics of some 440 000 frequency assignments are recorded. This Register is kept up to date by the International Frequency Registration Board (IFRB), one of the four permanent organs of the ITU. Any new or modified assignment has to be notified to the IFRB by the national administration which has the station concerned under its jurisdiction.

There are all sorts of other provisions relating to harmful interference but, as indicated above, such provisions are not the only *raison d'être* of the Radio Regulations, which are fundamentally concerned with making it possible for stations to communicate with one another. This is a vital requirement, for example, in the maritime mobile service and in the aeronautical mobile service. Wherever they come from, ships and aircraft must be able to communicate with the stations located in the ports or airports of their destination.

This can only be done if stations located in a large number of different countries comply with common operating procedures and can handle traffic despite language differences.

For this purpose the Radio Regulations contain a series of conventional signals and essential codes. The best-known conventional signal is probably the SOS signal adopted in 1906, although there are many other code abbreviations which are used more often, e.g. the groups of letters and figures making up the international series of call-signs which are used to identify stations and their nationalities.

In addition to these operational questions, the Radio Regulations contain various other provisions, for example those relating to the qualifications required for station operators, the nature and contents of essential documents in the international service (e.g. International Frequency List, List of Ship Stations) published by the ITU.

The regulations at present in force, drawn up at Geneva in 1959, have been partially revised by conferences dealing with certain services, e.g. space services (Geneva, 1963), aeronautical services (Geneva, 1964 and 1966), maritime mobile services (Geneva, 1967), space services (Geneva, 1971) and maritime mobile services again in 1974.

The Additional Radio Regulations contain supplementary instructions for radiotelegraph and radiotelephone communication.

2. Standardization and studies in the field of telecommunication — Recommendations of the International Consultative Committees

Suppose that, during a storm on the high seas, a trawler is drifting helplessly. The situation becomes critical and the captain sounds the automatic alarm signal with which his vessel is equipped. A few miles away on another ship, a bell rings, having been activated by the distress signal. The alarm has been given, the call has been heard and now help is on its way. This situation

might seem quite ordinary nowadays, but it is in fact the result of lengthy studies and the working out of a way for standardizing distress systems so that those who send such signals can be heard and understood.

In less tragic, and fortunately more familiar, context a telephone subscriber in Europe nowadays only has to pick up his telephone to ask for a call to be put through to San Francisco or to dictate a telegram to be sent to, say, Bangkok.

This again is the result of a major effort in international co-operation.

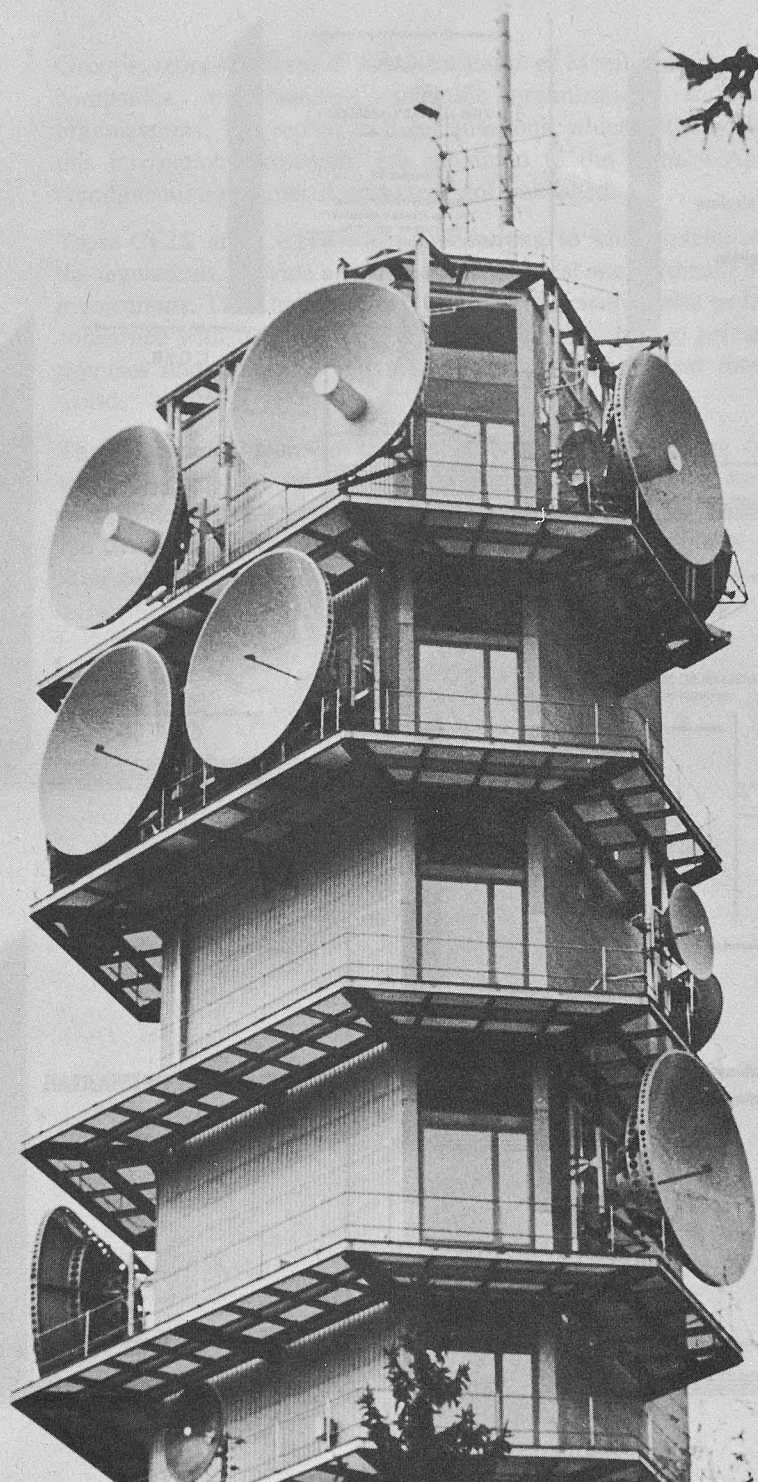
Telecommunications are not in fact possible without the existence of international agreements regulating a whole range of questions: in radio, the frequencies to be used; in telegraphy and telephony, line transmission characteristics, characteristics of equipment used on international links. Agreement also has to be reached on how to collect charges from the users of international lines and to distribute them equitably among the networks involved.

Whereas in the years following the setting up of the Union in 1865 these matters could be settled by international conferences, it became clear in the 1920s, with the growth of an increasingly complex and rapidly developing technology, that international agreements would have to be based on preliminary studies, tests and measurements. International conferences were no longer capable of dealing directly with such complex questions, which require constant co-ordination of studies. It was to provide this co-ordination that the International Consultative Committees (CCIs) were created.

There are at present two CCIs: the International Radio Consultative Committee (CCIR), and the International Telegraph and Telephone Consultative Committee (CCITT). As the name indicates, the CCIR is responsible for carrying out studies and issuing recommendations on technical and operational questions specifically related to radiocommunications. The CCITT carries out studies and issues recommendations on technical, operational and tariff questions concerning telegraphy and telephony.

The subjects dealt with thus cover a wide range—from cable sheaths to radioastronomy—and include data transmission, television and terminology.

The CCIs operate via Plenary Assemblies which meet roughly every three years, and Study Groups, which carry out investigations requested by the Assemblies—in the form of “questions”—in the intervals between Plenary Assemblies. International experts participate in the work of these Study



COMITÉ CONSULTIVO INTERNACIONAL
DE TELEGRÁFICO Y TELEFÓNICO
(C.C.I.T.T.)

COMITÉ CONSULTIVO INTERNACIONAL
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(C.C.I.R.)

Aspectos económicos y técnicos de la elección de sistemas de transmisión

*

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XIIth PLENARY ASSEMBLY

NEW DELHI, 1970

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INFORMATION CONCERNING
THE XIIIth PLENARY ASSEMBLY
STRUCTURE OF THE C.C.I.R.
LISTS OF TEXTS ADOPTED BY THE C.C.I.R.



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C.C.I.R.

HANDBOOK ON HIGH-FREQUENCY DIRECTIONAL ANTENNAE

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COMITÉ CONSULTIVO INTERNACIONAL TELEGRÁFICO
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Groups: representatives of administrations of Member countries, operating companies, manufacturers, scientific organizations and international organizations. The replies to these questions, which embody the results of this international research, are submitted to the Plenary Assemblies as recommendations and, if accepted, are published.

These CCIR and CCITT recommendations, to which reference is made in the regulations, provide a basis for international standardization of telecommunications. They have a great influence on scientific and technical circles concerned with telecommunications, administrations and private operating agencies and designers and manufacturers of equipment throughout the world.

The CCIs have a major task to perform in the planning of the world telecommunication network and the regional networks and they also participate in the technical co-operation activities of the Union on behalf of the developing countries, in particular by preparing technical manuals for their benefit.

IV. THE INTERNATIONAL TELECOMMUNICATION UNION AND SPACE RADIOCOMMUNICATION

Since the launching of *Sputnik-1*, the first artificial earth satellite, on 4 October 1957, large numbers of spacecraft have been placed in orbit round the earth or sent into space. Manned spacecraft have also been launched, systems making use of satellites—for telecommunication, meteorology, surveying of the earth's resources, for example—have been brought into service and other projects have been implemented, e.g. the moon landing.

All these launchings, experiments and practical applications have one common feature: their use of radio waves to provide the sole link between the spacecraft and earth. Indeed, it is difficult to think of any other field in which radiocommunication is of such paramount importance: without radio links there is no means of knowing what is going on on board, no way of giving orders to the craft or receiving the results of the measurements it makes. Except in the case of passive satellites, a satellite reduced to silence by a breakdown is a mere pebble in space, nothing more. And conversely, a satellite that cannot be made to stop transmitting to order is a particularly serious nuisance, since it may be illegitimately taking up one or more frequencies and causing interference to other transmissions.

Transmissions from spacecraft can cover wide geographical areas, depending on the altitude and orbital periods involved.

An earth satellite placed in low orbit, for example, passes regularly over the same areas, depending on the tilt of its path. Placed in a synchronous equatorial orbit (and thus at an altitude of approximately 35 700 km), it

“sees” 40% of the surface of the globe throughout the 24 hours of the day. In these zones, therefore, the frequencies used by the space service must be allocated with great care if interference with other services is to be avoided.

The distance of spacecraft also has effects on their links with earth. The power sources available on board are comparatively limited and though earth stations can send out powerful signals space stations obviously cannot hence the signals they send are considerably weakened by the time they reach the earth. Receiving stations must therefore be specially protected against possible interference.

The propagation time of radio waves (300 000 km/s) is another factor that cannot be overlooked when it is a question of reaching distant satellites (or stars). If, for example, a synchronous relay satellite is used for speech transmissions, a delay of almost three-tenths of a second must be expected between the time a subscriber speaks and the time his correspondent hears him. In an earth-moon link, the delay is approximately 1.3 seconds. These transmission delays must be doubled for two-way communications. It will easily be seen that a technical factor of this kind cannot be ignored. However, these difficulties can be counteracted and minimized.

Lastly, the ever growing number of spacecraft being placed in orbit and the implementation of space programmes in many countries are increasing the requirements for new frequencies. International agreements must therefore be worked out if communications with outer space are not to become the next victims of radio spectrum congestion and interfere with service already in existence.

Early action by the ITU

As soon as the first satellites were launched, the International Telecommunication Union (ITU), the purpose of which, according to the International Telecommunication Convention, Article 4, para. 1 is “to maintain and extend international co-operation for the improvement and rational use of telecommunications of all kinds”, became officially involved in the problems of space communication.

At its IXth Plenary Assembly (Los Angeles, April 1959) the International Radio Consultative Committee (CCIR), a permanent organ of the Union, set up a special Study Group to examine the technical aspects of space communication.

In the same year, an Administrative Radio Conference convened in Geneva by the ITU to revise the Radio Regulations—the basic text for international radiocommunications—took the first decisions concerning the allocation of frequency bands for space research. In Resolution No. 36 it also recommended the convening of an Extraordinary Administrative Radio Conference (EARC) to allocate frequency bands for space radiocommunication purposes.

The four years which elapsed between the Conference held in Geneva in 1959 and the EARC in 1963 were used by the ITU to make thorough preparations for the latter through its permanent organs—the General Secretariat, the CCIR, the International Telegraph and Telephone Consultative Committee (CCITT) and the International Frequency Registration Board (IFRB).

The responsibilities of the ITU in the field of space radiocommunications were confirmed by the United Nations at the sixteenth and seventeenth sessions of its General Assembly (1961 and 1962). The United Nations Economic and Social Council (ECOSOC) also adopted a resolution at its thirty-sixth session in July 1963, drawing the attention of all Member States to the importance of the action taken by the International Telecommunication Union in the peaceful uses of outer space.

The 1963 Conference

The first EARC to allocate frequency bands for space radiocommunication purposes, better known as the Space Conference, opened in Geneva on 7 October 1963.

It took place at a time when the first communication satellite successes and the first launchings of manned space vehicles were making serious international co-operation more and more necessary.

On 8 November, the 400 delegates from 70 countries left Geneva after having completed the agenda. One of their main achievements was to have allocated a series of frequency bands either exclusively or on a shared basis to the various space services.

Some sections of the Radio Regulations were revised, particularly those concerning the assignment, use, notification and registration of frequencies, the identification of stations, and technical terms and definitions.

Important resolutions and recommendations were also adopted with an eye to future developments in the use of outer space. For example, considering that the number of flights by space vehicles or manned satellites was likely to increase, and

“that in such circumstances the search for and rescue of the occupants and recovery of the vehicles present problems very similar to those encountered by aircraft and ships in distress and emergency,

“that the frequency of 20 007 kc/s has been selected by the conference for search and rescue to augment those already designated in the Radio Regulations for distress, emergency and survival craft ...”

the conference adopted a resolution to the effect that the conventional distress signal of ships and aircraft (SOS in radiotelegraphy, MAYDAY in radiotelephony) should also, for the time being, apply to space vehicles.

The development of satellite systems, particularly for telecommunications, meteorology and navigation, was also dealt with in a resolution which specified that any ITU Member telecommunication administration (or group of administrations) which intended to establish an international satellite system should provide the IFRB with information giving a general description of the satellite system, to prevent harmful interference and to facilitate the management of the frequency spectrum. A recommendation was addressed to the CCIR inviting it to pursue its studies on the technical feasibility of broadcasting from satellites, and a resolution was adopted requesting the Administrative Council to consider ways of organizing international co-operation and providing technical assistance in the development of space communications.

Anticipating rapid progress in the conquest of outer space, the conference also requested that the Administrative Council of the ITU should:

“in the light of its annual review, and at a date which it will determine, recommend to administrations the convening of an Extraordinary Administrative Conference to work out further agreements for the international regulation of the use of radio frequency bands allocated for space radiocommunications by this present conference”.

Years of technical progress

Since then the CCI Study Groups have continued their work in the field of space radiocommunications. Here are just a few aspects of this work: direct

broadcasting (sound and television) by satellite; antennae for space systems; technical characteristics of communication satellite systems; sharing of radio-frequency bands for links between earth stations and spacecraft; technical characteristics of links between earth stations and spacecraft; technical characteristics of radionavigation satellite systems; frequency utilization above the ionosphere and on the far side of the moon; transmission delay; and integration of communication satellites into the world telecommunication network.

An International Working Party has been set up to study the utilization of the geostationary orbit for communication satellites. The meetings of this Working Party, which has a Chairman from the United Kingdom, have been attended by representatives of Australia, Canada, France, Federal Republic of Germany, Japan, People's Republic of Poland, Union of Soviet Socialist Republics and the United States. The practical advantages of this orbit, the fact that it will doubtlessly be heavily used in future and the consequent need for co-ordinating its utilization were fully realized. A study programme has likewise been adopted regarding the use of frequencies above 10 GHz.

The Radio Conference for the Aeronautical Mobile Service, convened by the Union in Geneva in 1964 and 1966, recommended that the administrations of countries Members of the ITU, bearing in mind the economic and operational factors involved, should consider the possibility of meeting the requirements of the aeronautical mobile service on the major world air routes by the use of space radiocommunication techniques.

Similarly, the World Administrative Radio Conference for the Maritime Mobile Service, convened in Geneva by the ITU in 1967, requested administrations to determine the foreseeable operational requirements of the maritime mobile service which could be met by the use of satellite communication techniques.

Furthermore, within the framework of technical co-operation with developing countries, the ITU, acting as executing agency for a United Nations Development Programme (UNDP) project, participated with the Indian Government in constructing at Ahmedabad (800 km north of Bombay) a research and training centre for the use of satellite communications and in carrying out an educational television by satellite project. In this latter field the Union has also taken part in similar projects for other countries. It has also promoted the organization of seminars.

The second Conference on Space Radiocommunications (1971)

Space communication techniques have made great strides since the Space Radiocommunications Conference was held in 1963. What were then mere plans have now become reality.

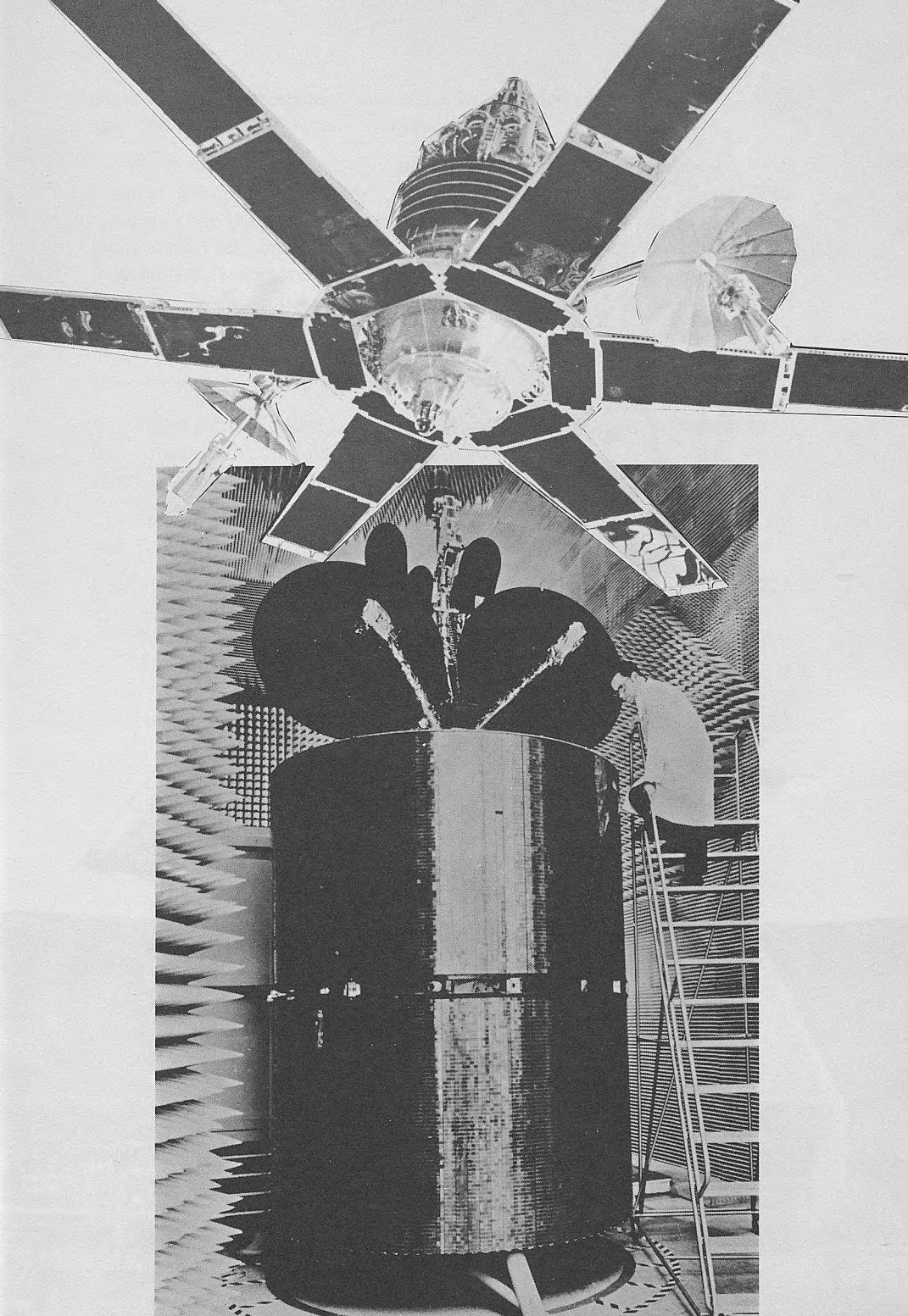
We have only to think, for example, of the use of satellites in telecommunications, sound and television broadcasting, meteorology, air and sea navigation, earth resources, the interplanetary probes for the study of the planets Venus and Mars and the landing of men on the moon, none of which would have been possible without radio links. As a result of these developments it became necessary to bring the international regulations on space radiocommunications into line with the advances made in technology, bearing in mind that all the services employing radiocommunications are using a resource which is for the benefit of all and the property of none, namely, radio waves which know no frontiers or distinctions between the various services (space, broadcasting, meteorology, for example) and which must therefore be shared with due regard to the needs of each of them.

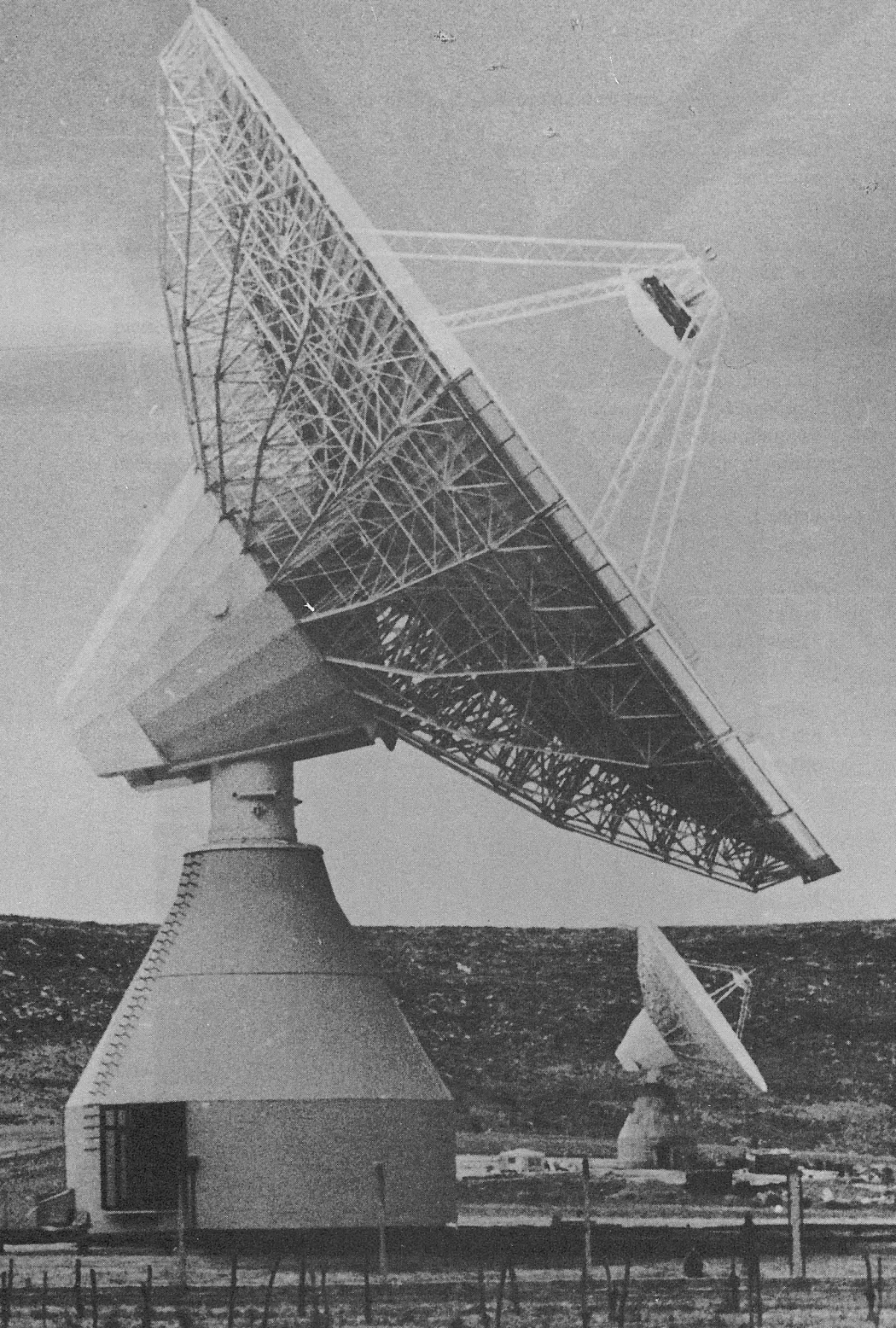
For this reason, the countries Members of the Union decided to hold the second Space Conference (officially known as the "World Administrative Radio Conference for Space Telecommunications") in Geneva for six weeks from 7 June 1971.

A preparatory meeting, attended by 445 representatives from 39 countries, was held in Geneva from 3 February to 3 March 1971. The purpose of the meeting was to assemble the very latest technical data required for the Space Conference on such matters as:

- the communication-satellite service
- the broadcasting-satellite service
- the use of satellites in the aeronautical and maritime mobile services and in the radiodetermination service associated with them
- the space research service
- the meteorological-satellite service
- the radioastronomy service.

The studies on these various subjects covered the technical aspects of space communications such as the sharing of the radio-frequency spectrum, transmitter powers, the siting of earth stations so as to avoid interference, and plans for use of the geostationary satellite orbit.





Eight hundred representatives of some 101 countries Members of the Union attended the second Space Conference.

In this connection, it may be mentioned that world administrative conferences are convened by the Union at the request of its Members. Their main purpose is to revise completely or partially the regulations governing international telecommunication operations (Radio Regulations, Telegraph Regulations, Telephone Regulations). These regulations are in effect annexes to the International Telecommunication Convention drawn up by the plenipotentiaries of the countries Members of the Union and ratified by those countries. The regulations adopted by world administrative conferences therefore have the force of international treaties.

The object of the Space Conference was to consider, revise, and supplement the administrative and technical provisions of the Radio Regulations which affect space radiocommunications.

The summary record of the work of the conference was published in the October 1971 issue of the *Telecommunication Journal*.

Lastly, a world administrative radio conference is to be held early in 1977, to draw up a plan for the broadcasting-satellite service.

This dramatic growth has been accompanied by a rapid increase in the use of international telecommunications. Technical advances in recent years have made the concept of a global telecommunication network a practical possibility. The need has thus arisen for plans setting out terminal and routing requirements, giving estimates of the growth of international traffic and describing ways and means of handling and routing it. Thanks to the CCITT, the ITU has the machinery required to meet this need. It should be remembered, however, that the Union does not itself operate international links, this being the responsibility of administrations and private companies. This has given rise to the creation of the Plan Committees (World Plan Committee and Regional Plan Committees).^{*}

^{*} Joint Committees of the International Telegraph and Telephone Consultative Committee (CCITT) and the International Radio Consultative Committee (CCIR), administered by the CCITT.

V. PLANNING FOR A WORLD TELEPHONE NETWORK

Role of the Plan Committees

In 1954 there were 90 million telephones in the world. In 1973 there were over 300 million. At the present rate of increase, the figure should be well above 1000 million by the year 2000.

This dramatic growth has been accompanied by a rapid increase in the use of international telecommunications. Technical advances in recent years have made the concept of a global telecommunication network a practical possibility. The need has thus arisen for plans setting out circuit and routing requirements, giving estimates of the growth of international traffic and describing ways and means of handling and routing it. Thanks to the CCITT, the ITU has the machinery required to meet this need. It should be remembered, however, that the Union does not itself operate international links, this being the responsibility of administrations and private companies. This has given rise to the creation of the Plan Committees (World Plan Committee and Regional Plan Committees).*

* Joint Committees of the International Telegraph and Telephone Consultative Committee (CCITT) and the International Radio Consultative Committee (CCIR), administered by the CCITT.

There are four Regional Committees at present for:

- Africa,
- Latin America,
- Asia and Oceania,
- Europe and the Mediterranean Basin.

There is no Regional Committee for North America. The administrations and recognized private operating agencies in this region co-ordinate their regional activity by means of bilateral agreements; they play an active part in the work of the World Plan Committee which concerns interregional relations.

The World Plan Committee is responsible, either directly or indirectly through its Regional Committees, for:

- 1) establishing a general plan for development of the international telecommunication network to assist administrations and recognized private operating agencies in concluding agreements designed to organize and improve international services between their respective countries; and
- 2) examining the technical, operating and tariff questions raised either directly or indirectly in the various regions of the world by the application of the different stages of the plan, making an inventory of questions of interest to developing countries and setting such questions for study by the competent Consultative Committee or in co-operation with the two Consultative Committees, if necessary.

The World Plan Committee met in 1963 (Rome), 1967 (Mexico City) and 1971 (Venice) and will hold its next meeting in Geneva in 1975.

General plan for development of the international telecommunication network

The Plan Committee has drawn up an interconnection plan on a world-wide scale. It is based on information supplied by the telecommunication administrations of the ITU Member countries on the volume of international traffic registered in 1970 and their estimates for such traffic in 1974 and 1978.

The telecommunication medium with which the Plan Committee is most concerned is telephony, which constitutes the essential basis for world-wide telecommunications since, in modern networks, telegraph and telex traffic is

routed over circuits that are derived from telephone circuits by division of the frequency bands (1 telephone circuit = 12, 18 or 24 telegraph or telex channels).

The traffic between various areas of the world recorded or forecast in 1970, 1974 and 1978 is as follows (number of circuits):

	1970	1974	1978
Europe—North America	1555	3548	7397
North America—South-East Asia— Far East—Oceania	497	1043	2159
Near East—Middle East—Europe	213	790	1338
Europe—Japan	48	150	276
Europe—Australia	53	387	892
North America—Japan	164	385	736
North America—Australia	127	241	556
Africa—North America	32	119	252
Africa—Europe	652	1907	3357
Europe—Latin America	142	621	1162
North America—Latin America	1792	3679	7707

For fuller information, see article by Mr. Malek-Asghar, *Telecommunication Journal*, May 1972.

The above-mentioned forecasts do not include circuit requirements for sound and television programme transmissions.

The interregional (intercontinental) connections were planned chiefly in terms of submarine cables and satellites.

The Plan Committee has noted that communication satellite connections can be used to complement conventional telecommunication media on relations of high traffic density and offer the prospect of stable communications where nothing comparable existed before. The study of regional plans indicates that satellite connections themselves cannot remedy the deficiencies in national or international telecommunication development plans. They cannot meet the technical and economic demands made of them without a well-planned terrestrial network.

Implementation of the interregional plan (Venice, 1971) and the dates on which it will go into effect in the various parts of the world are matters which are up to individual countries. The interregional plan (Venice, 1971) is itself supplemented by a numbering plan and a routing plan for automatic and semi-automatic telephony throughout the world.

Numbering plan

The cornerstone of the future world-wide automatic and semi-automatic telephone service is the numbering plan. Once installed it will be difficult to change and the agreed plan is designed to take care of estimated telephone development beyond the year 2000. The plan was prepared by a study group of the CCITT and will be implemented gradually as administrations decide to introduce automatic or semi-automatic operating.

The plan allots a telephone number to all ITU Member countries, which are grouped into the following large geographical zones:

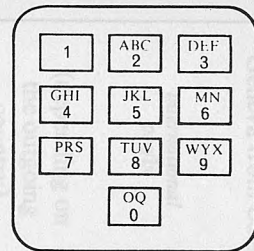
- 1 = North America
- 2 = Africa
- 3-4 = Europe
- 5 = South and Central America
- 6 = South Pacific
- 7 = USSR
- 8 = Far East
- 9 = Middle East and South-East Asia

The first digit of each country's number is the number of its zone. Thus, for example, Argentina has the number 54, and Venezuela 58. The USSR is the only country which has a unique single-digit number, while the single-digit number 1 will be used by all the countries in North America which are included in its integrated numbering plan. The European world numbering zone is unusual, since it has a very large requirement for two-digit country numbers which can only be satisfied by assigning it numbers 3 and 4. Typical country numbers are 20 for Egypt, 33 for France, 44 for the United Kingdom, 61 for Australia, 81 for Japan, 91 for India, 233 for Ghana, 595 for Paraguay and 964 for Iraq.

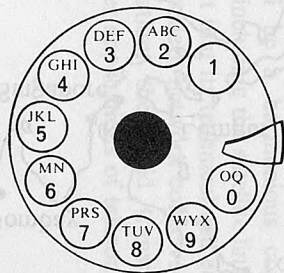
A subscriber wishing to dial a complete world telephone number will have to dial 12 digits plus the number of digits of international prefix, which make up the following four parts of the number:

- 1) the international prefix which connects him to his own country's international exchange (in principle 1 or 2);
- 2) the country code he wishes to dial (1, 2 or 3 digits);
- 3) the trunk code within that country;
- 4) the number of the individual subscriber he is calling (this, together with the trunk number, will have a maximum of from 8 to 10 digits).

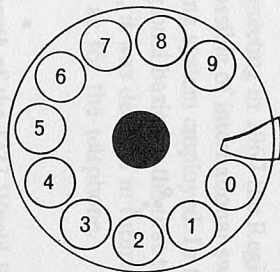
VARIOUS TELEPHONE DIALS



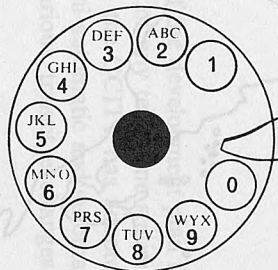
Telephone keyset



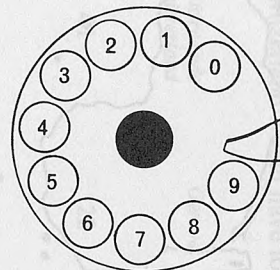
Algeria



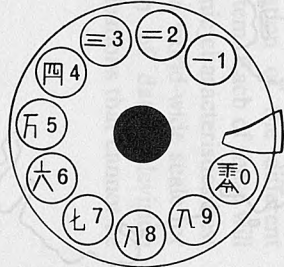
New Zealand



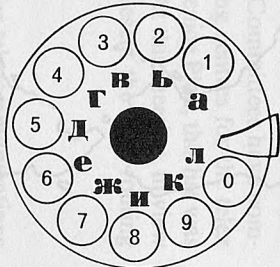
Canada



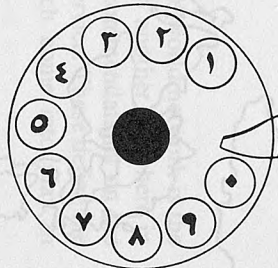
Sweden



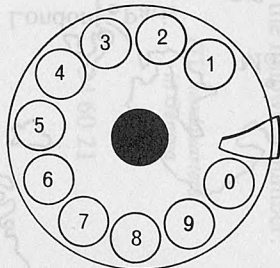
Singapore — Hongkong



USSR

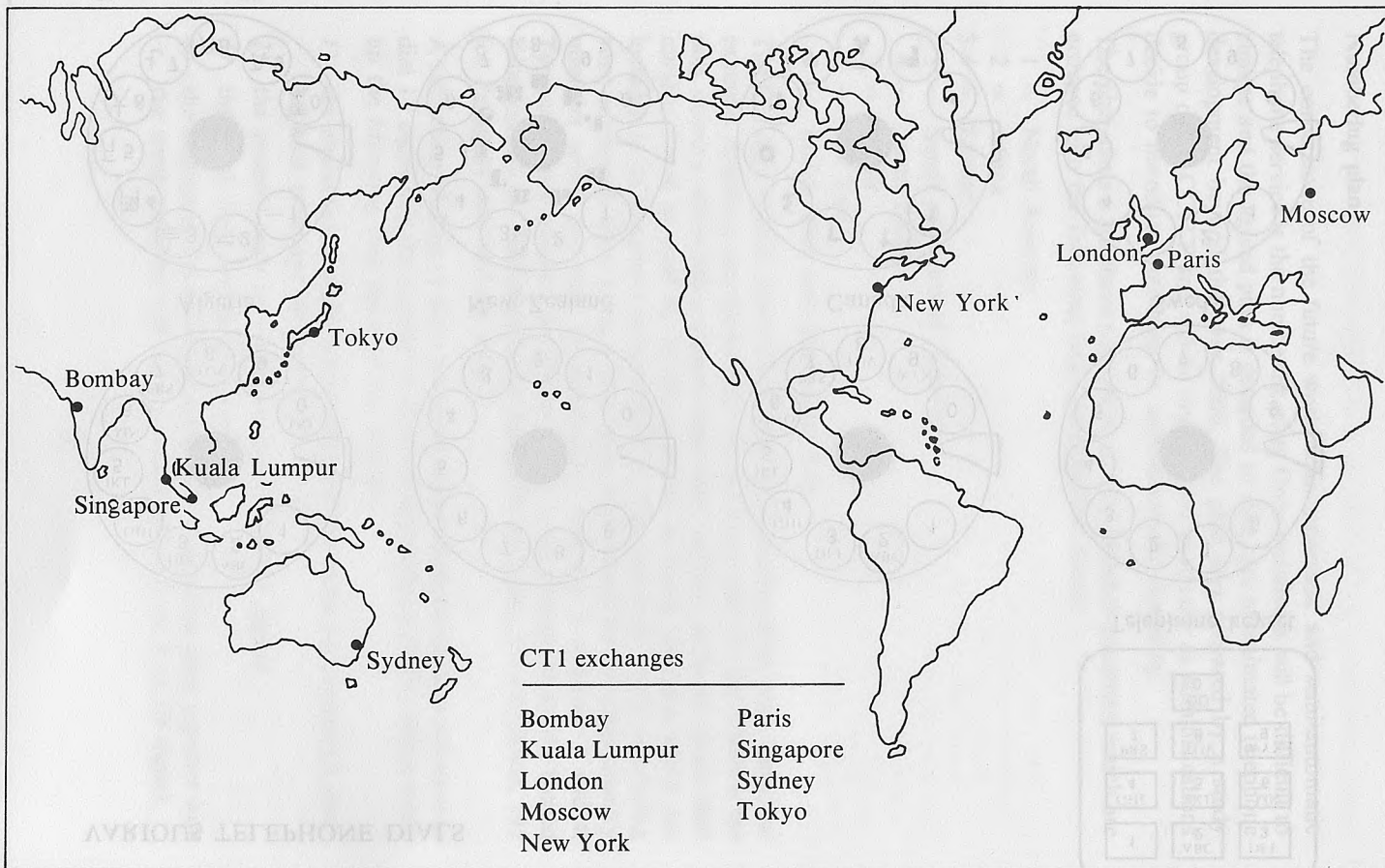


Middle East



Argentina

LOCATION OF FIRST CATEGORY (CT1) INTERNATIONAL TRANSIT EXCHANGES



Thus, to take an example, anyone wishing to call ITU Headquarters in Geneva from outside Switzerland would have to dial the following number:

<i>international prefix</i>	<i>country code Switzerland</i>	<i>Geneva</i>	<i>ITU headquarters in Geneva</i>
(depending on the outgoing country)	41	22	34 60 21

Routing plan

1. Telephone routing

One of the objectives of the development plan for the world network is the satisfactory connection of any telephone station with another anywhere in the world. To this end, the CCITT has adopted recommendations on the routing plan for the semi-automatic and automatic service. These define the part played by the various transit exchanges which come into play in routing a call.

2. Telex routing

Since the Mexico City meeting in 1967 the Regional Committees have compiled as full a list as possible of international switching centres for the telex service with the signalling system employed. In the Venice Plan, this list was compiled on an interregional basis for the first time. At this meeting, in view of the growth in traffic, it was decided in future to present the telex routing plan in the same way as for the telephone.

Conclusion

One of the positive aspects of the ITU World Plan for telecommunications is that it gives reason to hope that future national and international telecommunication plans will be a harmonious combination of the different transmission systems, including the satellite links system. Each of these will be chosen to the extent that its technical and economic characteristics best meet the needs of a modern network conceived on a world-wide scale for fully automatic operation, the rapid transmission of data, television transmissions and other applications of telecommunications that cannot be foreseen.

VI. DISTRIBUTION AND RATIONAL USE OF RADIO FREQUENCIES

The work of the International Frequency Registration Board (IFRB)*

If you wish to talk by radio from, say, Geneva to New York, the energy and modulation of your voice is converted by the telephone microphone into a variable electric current. This variable current is then passed to what we call a radio transmitter which sets up a vibration, or wave, in the medium surrounding the earth and the speech current produced by the voice is carried, so to speak, on the back of this wave. At New York, the wave is intercepted by a radio receiver which converts back the energy in the radio wave to an electrical current which, when passed on to the telephone receiver of one's correspondent, reproduces one's voice as an audible signal.

Now the radio wave which carries the voice is a vibration at a certain rate or, as we call it, a certain *frequency* which might be, say, 1 million vibrations (or cycles) per second. Hence we say that the radio circuit between Geneva and New York operates on a certain "frequency". There are two important points:

* The International Frequency Registration Board (IFRB) is one of the four permanent organs of the International Telecommunication Union (ITU). The three others are the General Secretariat, the International Radio Consultative Committee (CCIR) and the International Telegraph and Telephone Consultative Committee (CCITT). The ITU is the United Nations specialized agency for telecommunications. It was founded in 1865 and has more than 140 Member countries. Its headquarters are at Geneva.

1. If someone else wants to talk at the same time from, say, London to Canada, using a radio transmitter in London and a radio receiver in Montreal, the London transmitter *cannot* use the same frequency as the Geneva transmitter, otherwise the receiver in New York will not separate out the two signals—the two conversations will be superimposed on each other and the result will be unintelligible. The London transmitter therefore has to use a different “frequency” from that on which the Geneva transmitter is operating. The most familiar example of the use of different frequencies for different services is when you turn the tuning dial of your broadcasting receiver (which alters the frequency which is being received): you find the various stations coming in one adjacent to the other, each on its own frequency.

2. Due to natural phenomena (associated with daylight and darkness, season of the year, and solar activity) there is only a limited number of frequencies which are suitable for long-distance communication such as, for example, between Europe and America. Fortunately, different ranges of frequencies can be used for different purposes; for example, a quite different range of frequencies can be used for providing a relatively short-range local or national broadcasting service from the range of frequencies which must be used for long-distance international telegraph and telephone communications. But in each case there is a definite limit to the number of frequencies available; and unless the use of these frequencies is carefully organized there will be severe, or even hopeless, interference between one broadcasting and television programme and another or between one international public service circuit and another.

It follows, therefore, that it is no use whatever for any country, large or small, to buy radio equipment (which may be very expensive, at times costing many thousands of dollars) to provide a broadcasting, or a television service or long-distance public telegraphy or telephony services, unless frequencies can be found on which these equipments can operate satisfactorily without interference from other radio services.

Before the Second World War, any country could take into use, within certain limits, any frequency it required for any particular service, and all that was necessary was for the country concerned to notify its use of the frequency for the information of other countries.

After the war, however, the situation in regard to the use of the radio spectrum became more complicated, due in the first instance to the enormous increase in the use of the radio spectrum by all the countries of the world as

Attribution aux services		
Région 1	Région 2	Région 3
1429-1525 FIXE MOBILE sauf mobile aéronautique	1429-1435 FIXE MOBILE	1429-1525 FIXE MOBILE
	1435-1525 MOBILE <i>Fixe</i>	
1525-1535 EXPLOITATION SPATIALE (Télémessure) 350 A FIXE 350 B <i>Exploration de la Terre par satellite</i>	1525-1535 EXPLOITATION SPATIALE (Télémessure) 350 A <i>Exploration de la Terre par satellite</i> Fixe Mobile 350 D	1525-1535 EXPLOITATION SPATIALE (Télémessure) 350 A FIXE 350 B <i>Exploration de la Terre par satellite</i> Mobile

MOBILE MARITIME PAR SATELLITE
352 352 D 352 E

ILE AERONAUT
ILE MARITIME
3521

552

LISTE INTERNATIONALE DES FRÉQUENCES

Comité international d'enregistrement des fréquences (I.F.R.B.)

Publication officielle

VOLUME II

Échelle logarithmique des puissances en décibels par rapport à 1 watt (dBm) 4 000 à 10 000 MHz

1^{er} Année 1973

INTERNATIONAL FREQUENCY LIST

International Frequency Registration Board (I.F.R.B.)

Publication officielle

VOLUME II

Échelle logarithmique des puissances en décibels par rapport à 1 watt (dBm) 4 000 à 10 000 MHz

LISTA INTERN
Junta Intern
Comunidades de las ad
МЕЖДУНАР
Международ

LISTE INTERNATIONALE DES FRÉQUENCES
 Révisé par le
Comité international d'attribution des fréquences (I.F.R.B.)
 (Séparation des bandes)
VOLUME I
 Liste alphabétique des assignations de fréquences comprises entre 30 kHz et 4 160 kHz
 1^{re} Édition 1973

INTERNATIONAL FREQUENCY LIST
 Revised by the
International Frequency Registration Board (I.F.R.B.)
 (7th Edition)
VOLUME I
 Particulars of frequency assignments between 30 kHz and 4 160 kHz
 1 February 1973

LISTA INTERNACIONAL DE FRECUENCIAS
 elaborada por la
Junta Internacional de Registro de Frecuencias (I.F.R.B.)
 (Séptima edición)
VOLUMEN I
 Características de las asignaciones de frecuencia entre 10 y 4063 kHz
 1.º de febrero de 1973

МЕЖДУНАРОДНЫЙ СПИСОК ЧАСТОТ
Международный комитет регистрации частот (МСРЧ)
Том I
Данный международный справочник в настоящее время 30 раз в 4-х томах
1-й выпуск 1972

國際頻率表
國際頻率登記委員會編訂
(第七版)
卷一
10千週至4063千週間頻率指配之要點
二月一日，一九七二年

LISTE INTERNATIONALE DES FREQUENCES
Comité International d'acceptation des Fréquences (C.I.F.R.)
Cible de l'Union Internationale des Radiodiffusions
VOLUME IV, Part 1
Date de l'acceptation : 1969
Date de l'impression : 1970
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LISTE INTERNATIONALE DES FREQUENCES
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International Frequency Registration Board (I.F.R.B.)
VOLUME IV, Part 1
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Date of printing : 1970
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Partitura 1

1. Edición

LISTA INTERNACIONAL DE FRECUENCIAS

International Frequency List
(International Frequency List)

Junta Internacional de Registros de Frecuencias (I.F.R.S.)

International Frequency List (I.F.R.S.)

VOLUMEN 1, parte 2)

Características de las asignaciones de bandas en las bandas comprendidas
entre 26 y 30 MHz, analizando las extensiones de indicaciones
1. de febrero de 1973.

МЕЖДУНАРОДНЫЙ СПИСОК ЧАСТОТ

Международный список регистраций частот (МРСР)

International Frequency List (I.F.R.S.)

TOME 1, partie 2)

Caractéristiques des affectations de bandes dans les bandes comprises
entre 26 et 30 MHz, analysant les extensions de indications
1. de février de 1973.

МЕЖДУНАРОДНЫЙ СПИСОК ЧАСТОТ

МЕЖДУНАРОДНАЯ АДМИНИСТРАЦИЯ РЕГИСТРАЦИИ ЧАСТОТ (МАРП)

ТОМ 4. ЧАСТЬ 21

Содержит: 1. Сведения о частотах в диапазоне от 30 МГц до 300 МГц.
2. Введенные в 1952

國際頻率表
國際頻率登記委員會訂
(第七版)
卷五
28兆週至30兆週各頻率之頻率分配點
廣播電台除外
一月一日一九七二年

國際頻率表
國際頻率登記委員會編訂
(第七版)
卷五甲
28兆週及50兆週間各頻率之頻率分配表
廣播電台除外
一月一日 一九七二年



a consequence of the development of their communications. The situation was quite chaotic and, for example, civil aircraft could not fly with safety because the necessary ground-air communications could not be provided, and broadcasting services were ineffective because of interference from other similar services. Faced with this situation, the ITU Atlantic City Radio Conference held in 1947 established the International Frequency Registration Board (IFRB) and charged it:

- a) to maintain a register of all radio frequencies used for all purposes throughout the world, and
- b) to ensure that no new frequency should be taken into use by any country if the use of this frequency would cause interference to radio services which were already in operation.

The Board consists of five members, all of whom must be technically qualified in the radio field, and who are elected as individuals by the Plenipotentiary Conference in a manner to provide wide geographical distribution. The Board acts as a corporate body in which the individual members serve not as representatives of their respective countries or of a region, but as “custodians of an international public trust”. It elects its Chairman, who serves for a period of one year. The Board is served by a Specialized Secretariat.

The essential duties of the IFRB are laid down in Article 13 of the Convention and are, briefly:

- a) to effect an orderly recording of frequency assignments made by the different countries in accordance with the procedures prescribed in the Radio Regulations; and
- b) to furnish advice to Members with a view to the operation of the maximum practicable number of radio channels in those portions of the spectrum where harmful interference may occur, and with a view to the equitable, effective and economical use of the geostationary satellite orbit.

If we expand a little on the duties, we can say that the IFRB's main task is to decide whether radio frequencies which countries assign to their radio stations are in accordance with the Convention and the Radio Regulations and whether the projected use of the frequencies concerned will, or will not, cause harmful interference to other radio stations which are already in service. Thus the Board, basing itself on purely technical considerations, deter-

mines the right of a given administration to use a given frequency for a specific purpose, as well as the duties assumed thereby by that administration vis-à-vis other administrations.

The Board maintains the “Master International Frequency Register” in which are entered, with all the requisite observations of a legal nature, data relative to frequency usage by all the stations of the various types of services throughout the world. The Master Register takes the form of printed cards which reproduce visually the data recorded on a magnetic tape. The information recorded on this tape is produced and published periodically for the benefit of the Members of the Union in the “International Frequency List” (an enormous book divided into five main parts, one of which—that which relates to frequencies above 50 MHz—comprises three sub-divisions). The List contains the particulars of about 440 000 different frequency assignments, which occupy about 930 000 lines of information.

In addition the Board collects and analyses the data received from monitoring stations spread throughout the world with particulars of observations on the transmissions made by radio stations and which, in a summarized form, is distributed to all administrations. The Board also compiles and publishes four Seasonal Schedules per year of high frequency broadcasting operations and assists administrations in finding suitable frequencies for their high frequency broadcasting services.

In relation to the special assistance to be given to administrations the Board has the responsibility of conducting studies and making recommendations to administrations in cases where suitable frequencies, free of interference, are needed by countries to assure the regular operation of their services. Also the Board deals with those cases of harmful interference which occur in practice and recommends suitable solutions to the problem.

Another important function of the Board is to carry out the technical preparation for radio conferences, assembling the necessary technical and operational data which may be required by the conferences for frequency planning or other purposes related to the use of the radio spectrum.

The IFRB also holds seminars to which telecommunications officials from administrations, and in particular those from the developing countries, are invited. In the course of these seminars a series of lectures is given by the members of the Board, by the staff of its Specialized Secretariat and by

lecturers from administrations. These lectures are followed by discussions. Participants at the seminars receive guidance in the management and the use of the radio frequency spectrum involving technical and operational subjects.





VII. THE ITU AND TECHNICAL CO-OPERATION*

The signatories of the United Nations Charter in San Francisco in 1945 felt that a durable system of international peace and security could not be achieved unless effective measures were taken to solve the major economic and social problems with which the nations of the world were faced.

The problem of economic development, in particular, has become one of the main concerns of the General Assembly and of the Economic and Social Council (ECOSOC) and led to the establishment of far-reaching international programmes of technical co-operation in the developing countries, namely the Expanded Programme of Technical Assistance (EPTA) in 1949 and the Special Fund in 1959.

By resolution 2029 (XX) of 22 November 1965, the General Assembly of the United Nations decided to consolidate the Expanded Programme of Technical Assistance and the Special Fund into a "United Nations Development Programme (UNDP)" with effect from 1 January 1966.

One of the great virtues of telecommunication for mankind is the role it plays in economic and social development. The more one reflects on such development in the less favoured countries, the more obvious it becomes that it is inseparable from telecommunications; everything seems to depend on the capacity for exchanging information and ideas. In a world where dis-

* See the report on ITU technical co-operation activities (1960-1972) in the *Telecommunication Journal*, August 1973.

tance no longer seems to count, the people of all countries need more and more to be able to depend upon the efficiency of the telecommunication networks. Indeed, it will be readily understood that much commercial traffic is bound to be lost so long as customers know that they may have to wait hours only to be told that because of technical difficulties the connections cannot be made. In many countries network capacity is not growing fast enough to meet the requirements of users both inside and outside these countries. In this century of progress, in which economic and social advancement is inconceivable without an adequate telecommunication network, it can be noted that the growth in gross national product follows a curve very similar to that of the increase in the number of telephone stations. In a race against time, more equipment and, above all, more technicians are needed to meet the imperative need for a smoothly-operating world-wide telecommunication network.

For more than a hundred years the ITU has served as the medium through which its Member countries can co-operate in the development of telecommunications: its work in the fields of international regulation, planning, co-ordination and standardization are the very basis of this constant co-operation.

It is mainly through the three technical organs of the Union that this co-operation is effected. They are the International Frequency Registration Board (IFRB), the International Radio Consultative Committee (CCIR), and the International Telegraph and Telephone Consultative Committee (CCITT).

The ITU also plays an active part in the execution of telecommunication projects within the framework of the UNDP.

A Technical Co-operation Department has been set up for this purpose within the General Secretariat (the other permanent organ of the ITU) to administer this assistance which is provided on request.

Activities of the Technical Co-operation Department in 1972

In 1972, the Union's activities in the field of technical co-operation were characterized by accelerated growth both in volume of aid rendered and in the rate at which this aid was delivered.

The Union rendered assistance in improving the infrastructure of recipient countries and remedying any deficiencies in their institutions and knowledge of telecommunications. This was achieved by means of the following three types of project:

1) Promotion of the development of regional telecommunication networks

1972 was marked by the following concrete achievements:

- completion of the field survey work for the pan-African telecommunication network,
- continuation of the implementation of the inter-American telecommunication network,
- putting into service of new earth stations for satellite communications in the Latin American region,
- completion of the Asian telecommunication survey-feasibility studies,
- inception of preliminary work on the development of a regional telecommunication plan covering many of the countries in the Western Pacific.

2) Strengthening of telecommunication technical and administrative services in developing countries

This type of activity was closely connected with the improvement and modernization of telecommunication facilities in many developing countries.

3) Development of human resources required for telecommunication

As far as practicable, a training element has been included in all of the Union's technical co-operation projects. At the moment the administrations of over 47 developing countries are receiving or have received assistance in establishing national training institutions.

The Union has also organized one seminar in Asia: in-service training has been carried out by many of the Union's experts and a considerable fellowship programme has the same aim in view.

Experts

In 1972, 309 experts were under contract with the Union; this figure covers all programmes and all categories of experts.

Fellowships

In 1972 the Union dealt with a total of 616 fellowships for the different programmes. This figure includes the various fellowships granted by the

Union for participation in seminars, or in meetings of specialists connected with the pre-investment surveys, for missions to Union headquarters and for the vocational training of fellows in training centres in developing countries.

During the year under report the host countries again made an extraordinary effort to arrange study programmes for the Union's fellows. However, since 1971 some of the host countries have not been in a position to accept all of the fellows proposed by the Union owing to saturation of their training facilities.

Procurement of equipment

During 1972 equipment to a value of 1 442 728 US dollars was ordered for 41 projects, which represents a 5.4% increase over the total for 1971.

The value of equipment delivered in 1972 for the various projects was 1 615 645 dollars against 1 630 367 dollars in 1971.

Use of sub-contractors

In the course of 1972 the Union continued its utilization of sub-contractor services along the lines of the UNDP recommendations and on the basis of the limited, but positive, experience in 1969, 1970 and 1971.

Seminars

In 1972, as part of its regional activities under the UNDP, the Union organized one seminar in Malaysia (Kuala Lumpur) the theme of which was "Planning and development of telecommunications networks outside of large cities and the maintenance of telecommunications services". This seminar was attended by nationals from 18 countries.

TECHNICAL CO-OPERATION — STATISTICAL DATA

(\$ = United States dollars)

1. Assistance provided (including all programmes and types of assistance)

	1971	1972
— experts on mission	255	309
— fellows undergoing training abroad (excluding group training)	268	359
— group training (short-term awards to participants in seminars and specialist meetings)	192	108
— equipment delivered (\$)	1 630 367	1 615 645
— total cost of assistance (\$)	7 714 261	8 971 377

2. The Union's participation in the UNDP

	1971	1972
— number of countries which received assistance through country projects	74	94
— number of important large-scale projects for which ITU was executing agency	28	38
— number of new important large-scale projects approved by UNDP during the year	5	10
— number of important large-scale projects completed during the year	—	9
— number of experts on mission (including OPAS officers and regional experts):	225	264
— OPAS officers	10	9
— regional experts	13	10
— number of fellowships (excluding group training):		
— awarded	283	230
— fellows undergoing training abroad	261	327
— number of ITU/UNDP seminars held	3	1
— group training (short-term awards to participants in seminars and specialist meetings):		
— IFRB	—	9
— ITU/UNDP seminars	117	31
— seminar under Technical Assistance in kind	—	11
— specialist meetings	75	57

— equipment ordered (\$)	1 782 089	1 170 785
— number of general service category staff assigned to ITU/UNDP projects	49	64
— total expenditures (\$)	6 992 677	7 959 526

3. Related aid programmes

	1971	1972
<i>3.1 Funds of the United Nations for the Development of West Irian (FUNDWI) (see Additional information on activities in 1972)</i>		
— number of experts on mission	4	4
— number of fellows undergoing training	—	2
— equipments ordered (\$)	168 549	262 511
— total expenditures (\$) under FUNDWI	349 293	376 967
<i>3.2 United Nations Relief Operation Dacca Bangladesh (UNROD)</i>		
— number of experts on mission	—	2
— number of fellows undergoing training	—	1
— total expenditure (\$) under UNROD	—	17 466
<i>3.3 Funds-in-Trust (FIT)</i>		
— number of experts (including OPAS/FIT officers) on mission	14	21
— OPAS/FIT officers on mission	6	6

— fellowships:		
— awarded	15	1
— fellows undergoing training abroad	—	14
— equipment ordered (\$)	—	9 432
— number of general service category staff assigned to FIT projects	—	4
— total expenditures (\$) under FIT	268 955	368 254
<i>3.4 Associate experts</i>		
— number of associate experts on mission	9	16
— total expenditures (\$) under associate experts	53 730	168 492
<i>3.5 Volunteers associated with ITU projects</i>		
— on a bilateral basis	8	11
— United Nations Volunteer programme	—	4

4. Number of projects sub-contracted

	1971	1972
— number of projects sub-contracted	6	6

Additional information

1) In 1971 the figures on fellowships under point 1 include 7 fellowships under an IDB/ITU project; total expenditure 18 321 US dollars, included under total cost of assistance under point 1.

2) In 1971 the Union was associated with the United Nations Educational, Scientific and Cultural Organization (UNESCO) in the implementation of an important large-scale project in Latin America (total ex-

penditure 31 285 US dollars, included under total cost of assistance under point 1).

3) As from July 1972, expenditures against the FUNDWI project are shown under point 2, the project having been incorporated in the UNDP's normal activities. However, the number of experts and fellows are indicated only once under FUNDWI.

4) In 1972, the figures on fellowships under point 1 include 15 fellowships under an IDB/ITU project; total expenditure 43 441 US dollars included under total cost of assistance under point 1.

5) In 1972, the Union was associated with UNESCO in the implementation of an important large-scale project in Latin America (total expenditure 37 231 US dollars, included under total cost of assistance under point 1).

THE INTERNATIONAL TELECOMMUNICATION UNION

**WHAT IT IS...
WHAT IT DOES...**

**HOW
IT WORKS**





The International Telecommunication Union (ITU) is the United Nations specialized agency dealing with telecommunications

WHAT IS TELECOM- MUNICATION?

"Têle", which comes from ancient Greek, means "far off", so that "telecommunication" simply means "long-distance communication". The ITU Convention (which is the Organization's Charter) defines it as "any transmission, emission or reception of signs, signals, writing, images and sounds or intelligence of any nature by wire, radio, optical or other electromagnetic systems"—in other words, telegraph, telephone and radio and all their applications such as telex and television.

WHAT IS THE NEED FOR THE ITU?

Telecommunications span the world. Yet, although they easily traverse vast distances and physical obstacles, they often have difficulty when it comes to crossing the man-made frontiers between nations.

This was clear right from the beginning, more than 100 years ago, when people first started sending telegrams from one country to another (the telegrams had to be handed across at the frontier). Some kind of international agreement was necessary.

In 1876 the telephone was invented, and then, towards the close of the 19th century, radio. These new communication media also became international. They also required international organization.

To-day, more and more people merely lift a telephone receiver and call another country or turn a knob and listen to a foreign radio programme. Without the ITU the call would be impossible and the programme inaudible.

With the possibilities of communication via satellites, international agreement is more important than ever.

WHAT DOES THE ITU CONSIST OF?

The ITU is an organization, a Union, of Member countries. At present there are 144 Members (see organization chart).

The Union's headquarters are in Geneva, on the Place des Nations. In this building are to be found the four permanent organs:

General Secretariat

International Frequency Registration Board (IFRB)

International Radio Consultative Committee (CCIR)

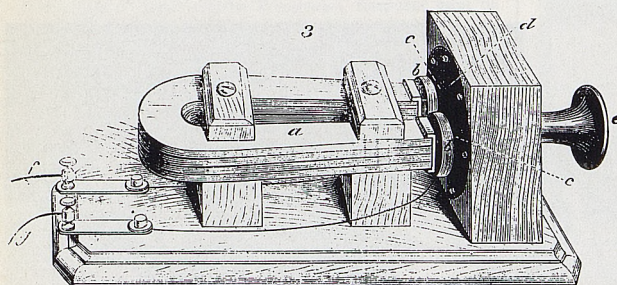
International Telegraph and Telephone Consultative Committee (CCITT)

The Secretary-General is Mr. Mohamed E. Mili.

The headquarters address is: International Telecommunication Union, Place des Nations, CH-1211 Genève 20 (Switzerland). Telephone: Geneva (022) 34 60 21. Telegraphic address: BURINTERNA GENÈVE. Telex: 23000/23000a uit ch.

the history of the ITU

- 1837** First electric telegraph.
- 1849** The telegraph first used internationally.
- 1865** **Paris, 17 May. Foundation of the International Telegraph Union by twenty States with the adoption of the first Convention. First Telegraph Regulations.**
- 1868** Vienna Conference. Bureau of the Union set up in Berne.
- 1871-2** Rome Conference.
- 1875** Saint Petersburg Conference. New Convention which lasted until 1932.
- 1876** Invention of the telephone by Alexander Graham Bell.
- 1885** Berlin Administrative Conference makes first ITU provisions for international telephony.
- 1895-6** First wireless transmissions.
- 1903** Berlin. Preliminary Radio Conference of nine States.
- 1906** Berlin. First international Radio Conference with 27 States. Convention and Radio Regulations drawn up. Adoption of SOS signal.
- 1912** "Titanic" disaster. London Radio Conference. Improved Radio Regulations.
- 1924** Paris. Creation of CCIF (International Telephone Consultative Committee).
- 1925** Paris. Creation of CCIT (International Telegraph Consultative Committee).



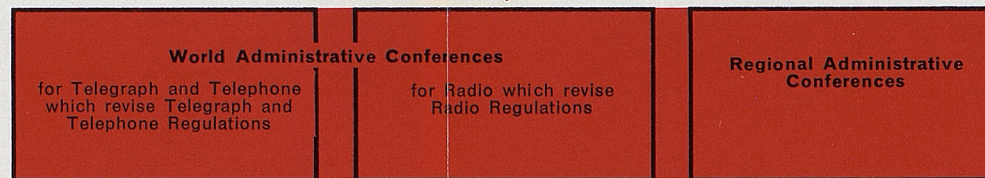
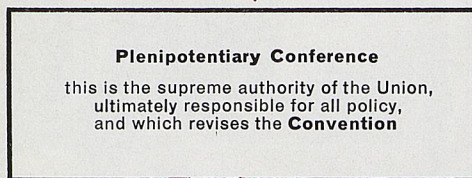
- 1927** Washington Radio Conference with eighty States. Establishment of CCIR (International Radio Consultative Committee). First allocation of radio frequencies to the various radio services.
- 1932** **Madrid Conferences. Organization's title changed to International Telecommunication Union. First single International Telecommunication Convention. New Radio, Telegraph and Telephone Regulations.**
- 1938** Cairo Administrative Radio, and Telegraph and Telephone Conferences.
- 1947** **Atlantic City Plenipotentiary and Radio Conferences. Creation of International Frequency Registration Board (IFRB). New International Frequency List. Creation of the Administrative Council. Agreement with the United Nations approved.**
- 1948** Seat of the Union transferred to Geneva.
- 1952** Buenos Aires Plenipotentiary Conference.
- 1956** Geneva. CCIF and CCIT merged into new CCITT (International Telegraph and Telephone Consultative Committee).
- 1958** Geneva Telegraph and Telephone Conference.
- 1959** Geneva Plenipotentiary and Radio Conferences.
- 1962** New headquarters building opened in Geneva.
- 1963** African VHF/UHF Broadcasting Conference; First World Space Radiocommunication Conference, Geneva.
- 1964** Aeronautical Radio Conference (1st Session), Geneva.
- 1965** **Centenary of the Union. Commemorative ceremony in Paris on 17 May. Montreux Plenipotentiary Conference.**
- 1966** Aeronautical Radio Conference (2nd Session); African LF/MF Broadcasting Conference, Geneva.
- 1967** Maritime Radio Conference, Geneva.
- 1971** Second World Space Telecommunication Conference, Geneva.
- 1973** Torremolinos Plenipotentiary Conference.
- 1974** Maritime Mobile Radio Conference, Geneva; LF/MF Broadcasting Conference for Regions 1 and 3 (1st session), Geneva.
- 1975** LF/MF Broadcasting Conference (2nd session), Geneva.

THE MEMBER COUNTRIES OF THE UNION
(144 MEMBERS AS OF 31 MARCH 1975):

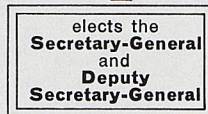
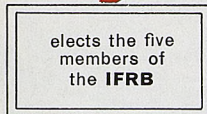
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Malagasy Republic - Malawi - Malaysia - Maldives (Republic of) - Mali (Republic of) - Malta (Republic of) - Mauritania (Islamic Republic of) - Mauritius - Mexico - Monaco - Mongolian People's Republic - Morocco (Kingdom of) - Nauru (Republic of) - Nepal - Netherlands (Kingdom of the) - New Zealand - Nicaragua - Niger (Republic of the) - Nigeria (Federal Republic of) - Norway - Oman (Sultanate of) - Pakistan - Panama (Republic of) - Papua New Guinea - Paraguay (Republic of) - Peru - Philippines (Republic of the) - Poland (People's Republic of) - Portugal - Qatar (State of) - Roumania (Socialist Republic of) - Rwanda (Republic of) - Saudi Arabia (Kingdom of) - Senegal (Republic of the) - Sierra Leone - Singapore (Republic of) - Somali Democratic Republic - South Africa (Republic of) - Spain - Sri Lanka (Ceylon) (Republic of) - Sudan (Democratic Republic of the) - Swaziland (Kingdom of) - Sweden - Switzerland (Confederation of) - Syrian Arab Republic - Tanzania (United Republic of) - Thailand - Togolese Republic - Tonga (Kingdom of) - Trinidad and Tobago - Tunisia - Turkey - Uganda (Republic of) - Ukrainian Soviet Socialist Republic - Union of Soviet Socialist Republics - United Arab Emirates - United Kingdom of Great Britain and Northern Ireland - United States of America - Upper Volta (Republic of) - Uruguay (Oriental Republic of) - Vatican City State - Venezuela (Republic of) - Viet-Nam (Republic of) - Yemen Arab Republic - Yemen (People's Democratic Republic of) - Yugoslavia (Socialist Federal Republic of) - Zaire (Republic of) - Zambia (Republic of).

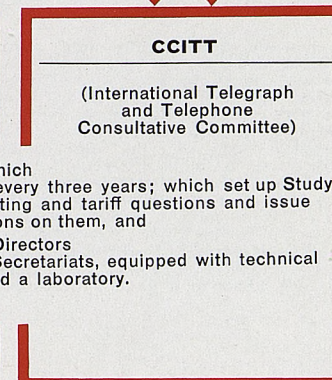
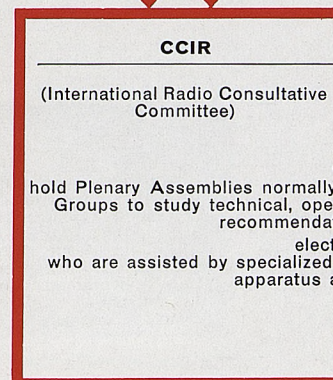
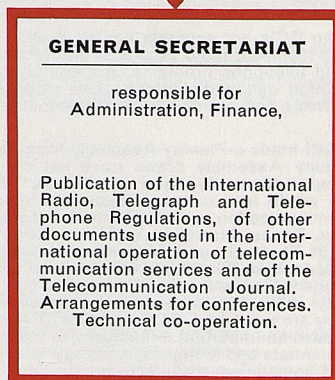
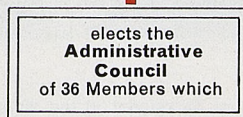
meet every 5 years or so at a participate in



participate (along with recognized private operating agencies whose participation is approved by the Member country which recognizes them) in the work of the



... who directs the makes financial and administrative arrangements for



- meets in annual session, when it acts for the Plenipotentiary Conference between the latter's meetings;
- supervises the administrative functions and co-ordinates the activities of the four permanent organs at ITU headquarters in Geneva.

what does the ITU do ?

The purposes of the Union as defined in the Convention are:

- to maintain and extend international co-operation for the improvement and rational use of telecommunication of all kinds;
- to promote the development of technical facilities and their most efficient operation with a view to improving the efficiency of telecommunication services, increasing their usefulness and making them, so far as possible, generally available to the public;
- to harmonize the actions of nations in the attainment of those common ends.

The ITU works to fulfil these basic purposes in three main ways:

1. international conferences and meetings,
2. publication of information,
3. technical co-operation.

international conferences and meetings

plenipotentiary conferences

The Members of the Union meet, at intervals of normally not less than five years, at a Plenipotentiary Conference. This is the supreme authority of the ITU itself, and lays down general policy. It reviews the Union's work since the last conference and revises the Convention if it considers this necessary. It also establishes the basis for the organization's budget and sets a limit on expenditure until the next conference. Finally, it elects the Members of the Union who are to serve on the Administrative Council, the Secretary-General and the Deputy Secretary-General, as well as the members of the International Frequency Registration Board (IFRB), who hold office until the following conference. The last Plenipotentiary Conference took place in Malaga-Torremolinos (Spain) in 1973.

administrative conferences

There are two kinds of administrative conferences held by the Members of the Union: world administrative conferences and regional administrative conferences. The agenda of a world administrative conference may include: the partial revision of the Administrative Regulations (Telegraph Regulations, Telephone Regulations, Radio Regulations, Additional Radio Regulations), the documents which govern the international operation of the three modes of communication, exceptionally, the complete revision of one or more of these Regulations, and any other question of a world-wide character within the competence of the conference. The agenda of a regional administrative conference may provide only for specific telecommunication questions of a regional nature, including instructions to the International Frequency Registration Board (IFRB) regarding its activities in respect of the region concerned, provided such instructions do not conflict with the interests of other regions. Furthermore, the decisions of such a conference must in all circumstances be in conformity with the provisions of the Administrative Regulations.

administrative council

The Administrative Council is composed of 36 Members of the Union elected by the Plenipotentiary Conference. It normally meets for about a month once a year at Union headquarters in Geneva and at these formal sessions acts for the Plenipotentiary Conference between the latter's meetings. It supervises the administrative functions and co-ordinates the activities of the four permanent organs at ITU headquarters and examines and approves the annual budget.



The General Secretariat is responsible for all the administrative arrangements for these conferences.

meetings of the international frequency registration board (IFRB)

The IFRB consists of five independent radio experts, all from different regions of the world, elected by Plenipotentiary Conferences and working full-time at the Union's headquarters in Geneva. They elect a Chairman and a Vice-Chairman for each year from among their own number.

The Board's main task is to decide whether radio frequencies which countries assign to their radio stations (and which they have notified to the Board) are in accordance with the Convention and the Radio Regulations and will not cause harmful interference to other stations. If the Board's finding in a particular case is favourable, the frequency is recorded in the huge Master International Frequency Register kept by the IFRB and thus obtains formal international recognition and protection. An average of more than 1200 frequency assignment notices, covering new assignments or changes to existing assignments, arrive at the IFRB each week.

Among the other major tasks of the IFRB are: participation at the request of governments in the obligatory inter-governmental co-ordination of the use of frequencies involving space techniques prior to their notification for recording in the Master Register, the orderly recording of the positions assigned by countries to geostationary satellites with a view to ensuring formal international recognition thereof and the technical preparation of radio conferences with a view to reducing their duration.

the plenary assemblies and study group meetings of the international consultative committees—the international radio consultative committee (CCIR) and the international telegraph and telephone consultative committee (CCITT)

The two CCIs are separate bodies dealing respectively with technical radio problems and technical telegraph and telephone problems. All Member countries of the Union can participate in their work, and also certain private companies operating telecommunication services.

Each CCI holds a Plenary Assembly every few years. The Plenary Assembly draws up a list of technical telecommunication subjects or "Questions", the study of which would lead to improvements in international radio communication or international telegraphy and telephony. These Questions are then entrusted to a number of Study Groups, composed of experts from different countries. The Study Groups draw up Recommendations which are submitted to the next Plenary Assembly. If the Assembly adopts the Recommendations, they are published. CCIR and CCITT Recommendations have an important influence with telecommunication scientists and technicians, operating administrations and companies, manufacturers and designers of equipment throughout the world.

publication of information

The General Secretariat assembles international telecommunication data which are published for the benefit of telecommunication engineers and operating authorities. There are Lists of radio stations and telegraph offices throughout the world, statistics, maps, charts and tables. There is a monthly Telecommunication Journal.



The General Secretariat, at the request of the Plenipotentiary Conference, also organizes telecommunication exhibitions, which are intended "to keep Members of the Union informed of the latest advances in telecommunication techniques" (International Telecommunication Convention, Malaga-Torremolinos 1973, Opinion No. 3).

The data recorded in the IFRB's Master International Frequency Register are published from time to time in International Frequency Lists. The IFRB also prepares for publication a monthly Summary of Monitoring Information showing the precision with which radio stations keep to their assigned frequency, their strength of reception and observed times of operation.

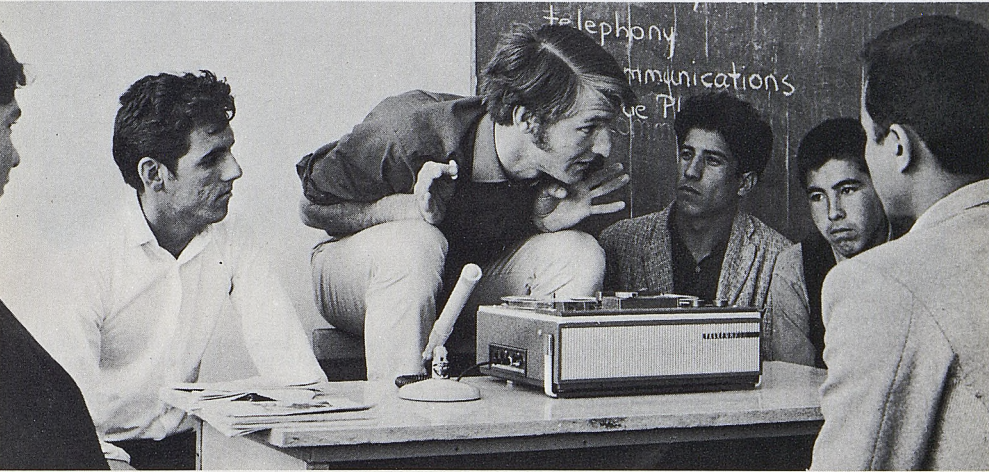
The two CCIs act as centralizing agencies for the technical information connected with their Study Group Programmes, and much of this is published along with their Recommendations.

technical co-operation

The Technical Co-operation Department of the General Secretariat administers, mainly within the framework of the United Nations Development Programme (UNDP), a programme through which telecommunications experts are sent to various countries throughout the world to advise on the operation of telegraph, telephone and radio systems or to help train technicians of the future. In addition, there are many students and fellows studying telecommunications under this programme in countries other than their own. Pre-investment surveys for modern international telecommunication networks have been made or are in progress in Latin America, Africa (Panafel), Asia and the Middle East.

The IFRB provides technical advice to Members of the Union to enable them to operate effectively as many radio channels as possible in the overcrowded parts of the radio spectrum where there is liable to be harmful interference between stations. In addition, the IFRB investigates cases of harmful interference reported to it and makes recommendations to the countries concerned on how best to solve their particular problem.

With regard to the International Consultative Committees, special mention should be made of the "Special Autonomous Working Parties" (GAS), set up to consider documentary questions of particular interest to the developing countries, and of the Plan Committees (World Committee and Regional Committees for Africa, Latin America, Asia and Oceania, and Europe and the Mediterranean Basin). The Plan Committees have drawn up a General Plan for the Development of the International Telecommunication Network to facilitate the planning of the international telecommunication services.



At its meeting in Mexico in 1967, the World Plan Committee, continuing the work accomplished at the Rome meeting held in 1963, reviewed the world network interconnexion plan and incorporated satellite links. The World Plan Committee met again in October 1971 in Venice and in 1975 in Geneva. Thus the technical bases are being laid which in future will enable subscribers, for example, to set up their own calls automatically to any part of the world simply by dialling.

outer space

Man's invasion of outer space is an exploit in which telecommunications are indispensable. The ITU is thus faced with vast new responsibilities which were formally recognized in the Resolution on the Peaceful Uses of Outer Space unanimously adopted by the United Nations General Assembly on 20 December 1961. (The Union, through its various organs, is carrying out considerable work in this sphere.)

In October and November 1963 the Union held in Geneva the first World Space Radiocommunication Conference, during which radio frequency bands were allocated for space communication purposes.

In June and July 1971 the second World Administrative Radio Conference for Space Telecommunications took place also in Geneva and in 1977 a World Administrative Conference on Satellite Broadcasting will be held.



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