Telefónica
since 1924

History of Telefónica's international network

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Telefónica's activity at the international level has been linked to the availability of technology capable of enabling its development. The technical means in the first decades of Telefónica's operation were practically non-existent.

In the early 1960s, the international media were:

- Systems supported by cross-border peer cables with France (San Sebastian – Behovia and to Perpignan) and Portugal (Badajoz – Elvas)
- Shortwave links to New York, Havana, Mexico, Santiago and Buenos Aires.
- Tropospheric link Palma-Algiers

Therefore, at that time (1924-late 60s) it is not possible to speak of an International Network properly speaking, our dependence mainly on France is manifest and through that country is where most of the international traffic is carried with growth at the pace decided by that operator.

Thus, the activity of what we could call an International Network began in the second half of the 1960s. At that time, the environment was one of international isolation in Spain.

At that time, and it is key to understanding the development of the International Network in the last third of the 20th century, Telefónica follows a series of fundamental principles that will mark its leadership in this field:

- Embrace early the technologies that are going to begin to arrive in the field of satellites and submarine cables. Telefónica is one of the first to incorporate these new technologies into its network and we will see cases of this
- Always be in a position to Offer. It is quickly realized that the difficulty is to increase our capacity since there was a real demand for international services that would absorb all that capacity. Many of PTTs (State Public Enterprises) considered that network expansions should take place when the needs were evident and urgent. On the contrary, Telefónica argued that the creation of capable, flexible and quality telecommunications channels was essential for economic, social, tourism, commercial, ... in the conviction that there were large volumes of hidden traffic that was not being carried out due to lack of resources and that would emerge at a dizzying rate as soon as it could be processed.

Experience showed conclusively that Telefónica's criteria were correct.

- Flexibility and agility in decision-making where Telefónica, as a private company, behaved differently from the Operators in the environment, which are PTTs (State Public Enterprises responsible for the Post, Telegraph and Telephones) with greater rigidities.

They tell the anecdote of the way of acting of President Barrera de Irimo who traveled to London to obtain the use of two international UK-USA telephone circuits in a newly built pair cable. All the countries were interested in obtaining circuits in this cable of very limited capacity, as we will see later. When asked when he planned to pay for these circuits because there was a lot of demand, he put a check on the table for the value of the acquisition that he had brought with him and brought the aforementioned capacity to Telefónica.

- Understand the strategic positioning that the Spanish language and a common culture gave us in reference to the Latin American continent.

With these principles, which are basic to understand the development of the International Network, key aspects in its evolution are presented below. These principles are what allowed Telefónica to gain a privileged position and the respect of the world's major operators.

Based on these, the main lines of Telefónica's actions were marked, which were guided by its status as a private company in a context of relations with PTT Ministries in most cases, which reinforced good relations with similar companies in the USA, Italy and other countries.

The guidelines were:

- Expand interconnections with bordering countries and, through submarine cables, with the United Kingdom, Italy, the United States, etc., creating artificial borders
- Integrate into all international projects, from the planning phase
- Introduce all new technologies into the service and actively participate in their development.
- To promote the submarine-satellite cable duality in the support of the network and as a diversification for security purposes and to achieve the potential of both supports.
- Develop communications with Latin America through satellites and submarine cables (BRACAN, COLUMBUS,..) with the aim of turning Spain into a bridge between continents: Europe, America and the countries of the Indian Ocean.

These lines of action made Telefónica one of the pioneering companies in the development of new transnational projects in submarine cables and satellites (Spain had access to the Atlantic and the Indian Ocean), in INTELSAT, EUTELSAT (European satellites) and INMARSAT (maritime satellites) as well as later in HISPASAT.

The potential of this network made it possible to ensure excellent coverage of global events such as the Middle East Peace Conference in Madrid in 1991 and the Olympic Games in Barcelona and the Universal Exposition in Seville in 1992. From then on, Spain had a privileged place and has continued to host major events.

Perhaps before continuing, the reader should be put in a situation by the quality of some of the graphics and photographs that are included. The sources of these are not digital and have been extracted from books, magazines, documents, videos of the moment. We believe that their value justifies their lower quality. Also, and just as an anecdote, until well into the 20th century in Spain the French language was taught in schools, with little relevance in general for the study of languages, which was clearly a handicap in this part of the development of our networks. Finally, we will try as much as possible to follow a chronological approximation.

From the internal point of view in Telefónica, the focus is on strengthening the International Service, with Mr. Luis Terol Miller as Director who has a great experience in Institutional Relations, and in which the Telecommunications Engineer Vicente San

Miguel García creates and directs a group with very clear ideas about the development of service and the support network.

This Service had to function as a homogeneous block in which, in a coordinated manner, the necessary actions would be taken to achieve the strategic objective of having the necessary autonomy for the development of the international services that our Society demanded, without limitations imposed by a total dependence on other countries, such as France, the United Kingdom or the United States.

This area had to cover everything from the planning of the services to be offered and the technical means necessary for it, according to rigorous technical standards to guarantee the provision of quality and quantity of the services, as well as, and this is new, to have a staff prepared to work in an environment of essential and continuous interrelation with the Operators that are on the other side of the network. essential for the provision of services between terminals in any country in the world.

It was a "new culture" of necessary collaboration and understanding with third parties, in both technical and service decision-making, which required the mastery of languages, mainly English, which became the lingua franca for this understanding between Operators from different countries, and whose knowledge in our country was quite deficient at that time. And this understanding in English was necessary both for the technical, commercial, financial or accounting aspects of the day-to-day operation and for active participation in all the International Organizations (CCITT, Intelsat, CEPT, etc.) that dealt with the development of telecommunications worldwide.

Finally, ITT's role in positioning Telefónica early in the Satellites and Submarine Cables initiatives was key. In the memory of some of them, the first trips abroad to carry out factory inspections of submarine cable and satellite equipment in Southampton (UK) and Raleigh (North Carolina – USA) manufactured by STC and ITT.

The first major technological milestone that decisively influenced our International Network was the constitution in 1963 of an initial group of technicians composed of professionals from Telefónica and Standard Eléctrica, coordinated and directed by the International Service, who would follow a two-month training course at the ITT Federal Laboratories in Nutley (USA).

In 1964, this team piloted the installation in the town of Griñón (Madrid) of an experimental earth station consisting of a 9-metre diameter antenna and its associated equipment integrated into a conventional transportable container.

Griñón-1

Its purpose, by connecting to the TELSTAR 2 satellite, launched into space in May 1963, was to enable the establishment of transmission tests and connection with other correspondents. This satellite revolved in a non-synchronous orbit around the Earth and could be operated only when it was visible over the sky of Griñón. That is, it was seen to appear on one side of the horizon and disappear on the other side several times a day (20 minutes each time).

Following this first milestone, the first commercial geostationary satellite was placed into orbit in 1965. It was the Early Bird, which within the International Telecommunication Satellite Organization (INTELSAT) was called INTELSAT I. This satellite, like all geostationary satellites, described a quasi-circular orbit, contained in the Earth's equatorial plane, with an angular velocity identical to the rotation of the Earth, so that from the Earth's surface the satellite remained fixed at a point in space, which allowed the continuous provision of services. This orbit is called geostationary and is located approximately 36,000 km from the Earth's surface. For any other point on the Earth's surface that is located at a latitude north or south of the equator, the distance to the earth station's satellite increases to more than 40,000 km.

Although it seems incredible, the first commercial satellite service was provided by Telefónica to NASA in February 1967, through the ground station of Maspalomas (Gran Canaria) in order to connect a NASA temporary station located near Maspalomas with the control centers of Houston (USA).

This Manned Space Flight Tracking Station was a fundamental part of the Apollo program and ceased its activity at the end of the mission of the last Apollo rocket on December 17, 1972.

The capacity of the link consisted of six telephone and two telegraph circuits integrated into a primary group.

At that time, the first relevant action was the incorporation of Telefónica into INTELSAT, which served as a complementary one, as we will see later, to bring National TV to the Canary Islands.

In the initial phase, it is the Spanish State that participates in the Board of Governors, with Telefónica playing the role of advisor to the Embassy. Subsequently, Telefónica was chosen by the Spanish State to join live as a Signatory to the Operating Agreement, which was responsible for all aspects related to the practical use of the INTELSAT satellite system.

In its constitution, Spain came to have a direct presence thanks to the support of Portugal, which supported us with its 0.4% stake, which, together with Telefónica's 1.1%, achieves the threshold of 1.5% to have a position in the management of the Agency (the percentages are related to the use of the system). Subsequently, the increase in the weight of use (which in one year went from 1.1% to 3%: practically multiplied by 3!) gave Spain a relevant position within the Organization where it was always on the Board of Governors, an executive body.

At this point, INTELSAT can therefore be referred to as humanity's greatest adventure in the field of satellite communications. It was born on August 20, 1964 in Washington DC, where it was headquartered under the auspices of the United Nations General Assembly. The Provisional Agreement for its creation as an International Treaty is signed. This agreement was signed by 11 countries, including Spain.

Since then, and until its privatization in 2001, Telefónica has actively contributed to the growth of INTELSAT, has participated permanently in the governing bodies – it even chaired the Technical Committee and the Board of Governors – and has made the necessary investments for the manufacture, launch and operation of its fleet of satellites. At the same time, it has created the necessary Earth Station Infrastructure to route satellite traffic to the various destinations.

The Company's stations in Buitrago del Lozoya (Madrid), the first Satellite Communications Centre (CCS), which began operations in 1968, are well known. The first antenna of 29 meters in diameter allowed the establishment of direct links with countries located in the Atlantic area. Two years later, in 1970, a second 30-meter antenna was installed to cover the Indian Ocean area.

CCS Buitrago

Buitrago I

Given the experience obtained in Satellites, the International team collaborated with the extension of services to the Canary Islands. With the installation in 1971 in the town of Agüimes (Gran Canaria) of a new CCS whose main objective was to cover the international traffic needs of the Canary Islands, to have restoration capacity for the

PENCAN submarine cables (PENínsula-CANarias) and to facilitate the sending of the peninsular television signal of RTVE live for distribution in the Islands.

Agüimes I

Initially, the news and some other singular events were broadcast through this medium. In 1974 the necessary satellite capacity (transponder medium) was rented to complete the daily and permanent sending of the television signal from the Peninsula to the Canary Islands.

To situate the reader, until that moment if there was a big event, it was seen in the Canary Islands the next day, when the RTVE tapes arrived on the corresponding Iberia plane. This happened, for example, with the first live images of the arrival of man on the moon in 1969.

By the way, Telefónica played a very active role in the live transmission of the arrival of man on the moon in 1969 since NASA included it as a basic node in its monitoring of the entire operation (there were three in the world, and Telefónica was the first of them after the launch). The data and images were transmitted from the space capsule to the various NASA facilities established around the world, which in turn delivered them to the corresponding national operators for transfer, via satellite, to the US control centers.

The Maspalomas earth station that took part in the Apollo project from February 1967 was made up of two antennas thirteen metres in diameter, a control building and an autonomous power plant, equipped with four powerful generators. Once the mission was over, NASA sent a congratulations to Telefónica for the work done.

Therefore, in the aforementioned space of time, the International Satellite Network is clearly developed, which allows Telefónica to offer the American countries to route their traffic in transit to countries in the Middle and Far West. Likewise, a decisive step is taken in incorporating the Canary Islands into the Communications Network of the rest of the country.

Submarine cables are advancing, communications with the United States and Canada were established through rented circuits, as in the case of the TAT-3 submarine cable, or under the IRU (Irrevocable Right of Use) regime, as in TAT-2 and TAT-4. These cables were moored in third countries, with the consequent increase in the cost of the transits to be carried out

It is worth mentioning the TAT-5/MAT-1 system (Transatlantic No. 5 – Mediterranean No. 1), which was a worldwide endorsement for Telefónica as it placed the security of the Western world in its hands at the height of the Cold War. The participation as promoters of four entities on the American side, AT&T, ITT, RCA and WUI, and three on the European side, Telefónica, Italcable and CPRM, from Spain, Italy and Portugal respectively, together with the participation of 30 other operators through IRU, including BT, FT and DBP, attests to this. All the major operators on both sides of the Atlantic participate in one way or another.

It is the first system of this size to be moored in Spain and was put into service in 1971 with a capacity of 720 circuits in the Conil-Green Hill section and 640 in the Estepona-Roma section. The terrestrial link between Conil and Estepona was made with a radio link as well as between Conil and Sesimbra in Portugal, with anti-atomic protection at all cable terminal stations.

Associated with this project, the Spanish network was also improved with the installation of coaxial cables between Conil and Madrid-Alcántara, with extension to Buitrago and from there to the north of Spain-French border, to facilitate the restoration of traffic in the event of a breakdown and transit in the best quality conditions for those circuits that extended beyond our borders.

Compliance with the promised dates and quality required a considerable effort by Telefónica and recognition by the almost forty participating entities.

In Europe, the focus is on and has a special relationship with two countries: the UK and Italy. This decisive action makes us much less dependent on France and allows us to have much greater flexibility in the routing of traffic.

With the UK in 1970, the Bilbao-Goonhilly cable was inaugurated with 480 circuits that was filled to saturation at the beginning of 1975, so that same year the second Bilbao-Goonhilly cable came into service, with capacity for 2,380 telephone circuits. These cables provide communications between Spain and Great Britain and, with transit in this country, with Holland, Belgium, Germany, Ireland and Scandinavia.

With Italy in 1969, the Barcelona-Pisa cable was inaugurated with 480 circuits that in five years were saturated, and in 1974 the Barcelona-Rome cable was inaugurated with 1,380 circuits.

These cables provide a new route to Italy and countries further east.

A cable that opens relations with another part of the world is the SAT-1, 360 circuits, initially designed between South Africa and Portugal, Telefónica was asked for the possibility of mooring in the Canary Islands for technical reasons. Telefónica did not miss the opportunity and the cable entered service in 1969.

Another area of action was North Africa, and so in 1975 the Palma de Mallorca – Algiers cable was put into service with a capacity of 480 circuits that allows us to manage traffic with Arab countries.

Also to complete this period, the BRACAN-1 (BRAsil-CANarias) developed between Telefónica and the Brazilian operator Embratel in 1973 that connects Recife and Las Palmas with a capacity of 160 circuits should be highlighted.

As we mentioned before for satellites, the International team also supports the technical deployment of the first cables linking the Peninsula with the Canary Islands. Thus, the PENCAN (PENínsula-CANarias) began their journey with the PENCAN-1 that at the beginning of the 60s linked San Fernando (Cádiz) with Santa Cruz de Tenerife with a capacity of 160 telephone circuits of 3 kcycles, which is how kHz was referred to at that time.

All submarine cables in this period are coaxial cables, some examples are shown in the attached photo. From the leftmost one, which is a reinforced cable used in the areas near the mooring station, you can see different samples of the time.

As a summary of this period that covers the late 60s and the first half of the 70s, for the first time there is a capillary International Network supported by Satellite Infrastructures and Submarine Cables, with Telefónica occupying a leading position in the world of Telecommunications Operators.

During the following years of the 70s and the 80s, the capillarity of the International Network was increasingly extended, and thus at the end of the 80s Telefónica had the connections that can be seen in the attached graph.

PAISES CON LOS QUE ESPAÑA DISPONE DE CIRCULOS TELEFONICOS DIRECTOS

Por cable coaxial, enlace de microondas o cable submarino

Alemania, Rep. Federal	Libano (M)
Andorra	Libia
Argelia	Luxemburgo
Austria	Marruecos
Bèlgica	México
Brasil	Noruega
Bulgaria (M)	Polonia
Canadá	Portugal
Dinamarca	Puerto Rico (M)
Dominicana, República	Reino Unido
Egipto	Rumania
Estados Unidos	Senegal
Finlandia	Siria (M)
Francia	Sudáfrica
Grecia	Suecia
Holanda	Suiza
Hungría	Túnez
Irlanda	Turquía (M)
Israel	U. R. S. S. (M)
Italia	Venezuela
Japón	Yugoslavia

Por satélite

Arabia Saudita	Indonesia
Argentina	Irán
Australia	Iraq
Bolivia	Israel
Brasil	Japón
Camerún	Jordania (M)
Canadá	Kuwait
Colombia	México
Corea del Sur	Nicaragua
Costa de Marfil	Nigeria
Costa Rica	Pakistán
Cuba	Panamá (M)
Chile	Paraguay
China R. P. (M)	Perú
Dominicana, República	Puerto Rico (M)
Ecuador	Singapoore
El Salvador	Sudán
Emiratos A. U.	Siria (M)
Estados Unidos	Sudáfrica, Rep.
Filipinas	Tailandia
Guatemala	Taiwan
Haiti	Uruguay (M)
Honduras	Venezuela
India (M)	

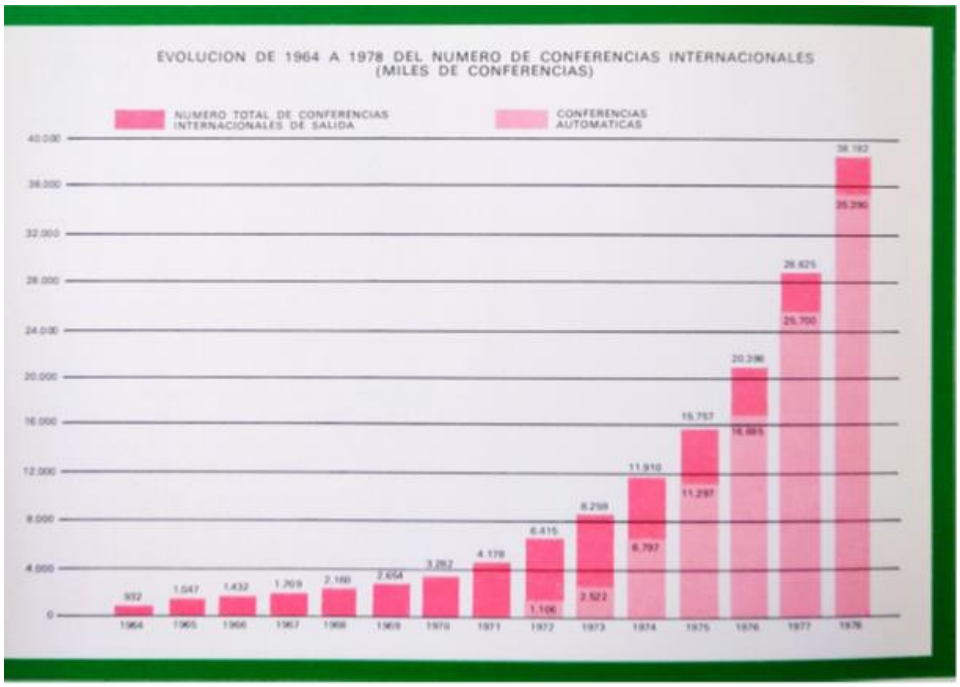
Por onda corta

Guinea Ecuatorial (M)	Mauritania (M)

A través de Sudáfrica se obtienen, además, Africa del Sudoeste, Botswana, Lesotho, Rhodesia y Swazilandia.

Los circuitos de los países seguidos de (M) se operan aún manualmente. Para el resto de los países la operación es automática o semiautomática, por lo que cualquiera de ellos puede alcanzarse en tránsito automático vía Madrid.

It can be observed the great complementarity that exists between Submarine Cables and Satellites as backbone elements of the International Network. The evolution of international telephone traffic from 1964 to 1978 is also attached. This chart serves to confirm that the principles and guidelines set forth at the beginning of this booklet were faithfully corroborated by the reality of the claim. From 1964 to 1971 traffic had multiplied by 4.5 and between 1971 and 1978 it had doubled by 9.



The focus continues to be on Latin America and in 1977 the COLUMBUS I submarine cable entered service with a capacity of 1840 telephone circuits linking Spain and Venezuela.

The intercontinental circuits from BRACAN I and Columbus I are extended to the Iberian Peninsula by means of the PENCAN I PENCAN II and PENCAN III cables with capacities of 160, 1840 and 5520 circuits respectively. Circuits have also been extended to North America via the TAT-5 cable, and to Japan via the Buitrago II satellite station.

Relations with Italy and the United Kingdom continue to develop. For example, in 1979 the route with Italy was completed with the Barcelona-Genoa cable with a capacity of 4,140 circuits. New routes are opened with direct cables to Northern Europe. Relations with Arab countries with submarine cables to Morocco (Conil-Casablanca) and Algeria (Palma-Algiers) are also continuing to develop. Of course, special attention is paid to Latin America with cables such as the ARCAN (Argentina-Canary Islands) and extensions of the COLUMBUS cable to the countries of the Gulf of Mexico and the Caribbean.

It is worth noting a few lines about the Meridian submarine cable. With a telephone conversation between the ministers of Belgium and Spain, the Meridian submarine cable was inaugurated, the longest buried cable in the world at that time, 807 kms, which involved a major engineering effort in cable communications.

The capacity is 2,580 circuits and involved an investment of 4,960 million pesetas for Telefónica.

Until its commissioning, telephone traffic with the countries of northern Europe was carried out via Italy, France and the United Kingdom, which implied the realization of land transits of considerable cost and length, while at the same time making communications with northern Europe dependent on the policy of constitution of arteries followed by France. Italy and the United Kingdom.

In 1979 Spain, Germany, Belgium and the Netherlands undertook to carry out a thorough redesign of the route. A genuine geological investigation of the Channel area was carried out in order to bury the cable in the seabed in order to avoid as much as possible technical breakdowns due to trawling. The cable was ascertained to be technically feasible using the most sophisticated technical means available, and steps were then taken to reach an agreement in principle between the potential interested parties. It was signed in 1981.

In the same year, the Agreement for the Construction and Maintenance of the "Meridian" submarine cable was signed in Madrid between the Telecommunications Administrations of Federal Germany, Belgium, Holland and Spain.

The Meridian submarine cable not only covered the needs of terminal traffic between these countries, but also facilitated the routing of Spanish traffic with other countries such as Denmark, Norway, Sweden, Finland, East Germany, Poland, USSR, etc., and allowed the constitution of international circuits between countries in Central America, South America and North Africa.

The Meridian has a length of 1,341 km, of which 807 km are buried in the seabed of the English Channel.

ENTERRAMIENTO DEL CABLE

El enterramiento de cable había sido un éxito, que fue desarrollado por **Bell System** y utilizado especialmente utilizando un sistema de arado, desde 1968.

Enterramiento del cable.

Arado para enterramiento del cable.

5

The proliferation of submarine cables in recent years makes it necessary to consider their maintenance in the event of interruptions due to breakdowns or cuts in their laying. From Network's point of view, we always worked with restoration schemes either on other submarine cables or by satellite, but the repair times were long. This is when the ACMA – Atlantic Submarine Cable Maintenance Agreement – was created.

On 1 July 1979, the ACMA came into force, covering submarine cables between latitudes 60° North and 23° South of the Atlantic Ocean and submarine cables laid in the western Mediterranean Sea.

Initially, a total of 43 submarine cables were within its area and there were 5 cable ships that were responsible for maintenance and 16 companies that signed the aforementioned agreement.

ATLANTIC CABLE REPAIR AND MAINTENANCE AGREEMENT

This first day cover commemorates the first anniversary of the second Atlantic Cable Repair and Maintenance Agreement (ACMA) which came into effect on 1 July 1979.

It was signed by 16 parties representing both telecommunications and ship operating entities from 14 countries bordering the Atlantic Ocean.

The Agreement provides, on a comprehensive and co-ordinated basis, repair and maintenance facilities for all submarine telephone cables in the Atlantic between latitudes 60 degrees N and 23 degrees S and for a number of submarine telephone cables in the eastern part of the Mediterranean. In all 43 cables and 5 cable ships are involved.

The signatories are:-

American Telephone and Telegraph Co.
British Post Office
Cable and Wireless Limited, London
Compagnie Marocaine de Telecommunications par cables sous-marins
Compania Anonima Nacional Telefonos de Venezuela
Companhia Portuguesa Radio Marconi SARL
Compania Telefonica Nacional de Espana
Empresa Brasileira de Telecomunicacoes SA
Great Northern Telegraph Co. Ltd., Denmark
Landsradio, Telecommunications Administration, Netherlands Antilles
La Societe de Telecommunications Internationales de Cote d'Ivoire
La Societe de Telecommunications Internationales du Senegal
Secretariat d'Etat aux Postes et Telecommunications, France
South Atlantic Cable Company (Proprietary) South Africa
Teleglobe Canada
Transoceanic Cable Ship Company Inc. USA

The cable ships (which are illustrated on the envelope) are:-

"ALERT" — British Post Office
"MARCEL BAYARD" — French PTT
"JOHN CABOT" — Teleglobe, Canada
"LONG LINES" — Transoceanic Cable Ship Co.
"MERCURY" — Cable and Wireless Ltd.

A.D. McCULLOUGH (AT & T)
Chairman
ACMA Management Committee.

With this, Telefónica ensured that its submarine cable network was protected against possible repairs or maintenance actions on the cables.

In addition, the use of the satellite continues to expand the network of earth stations in service.

The privileged relationship with NASA in relation to its spaceflights continues. The Robledo de Chavela tracking station (NASA), located 60 km from Madrid, and which is linked to the space capsule during the missions, passes the image from the latter to the Buitrago facilities, from where it is transmitted via satellite to the control and processing centers in Houston (USA).

Telefónica's collaboration with NASA in the United States and INTA (National Institute of Aerospace Technology) in Spain, which began in 1966, is not limited to the above. Through the ground stations of Maspalomas first, and Buitrago and Agüimes later, as well as various submarine and terrestrial cables, Telefónica provides telephone, telegraph, AVD, high-speed data transmission, broadband 48kHz, digital circuits for data transmission at 56 kbts/sec, which, being part of the complex global communications network NASCOM, have collaborated substantially in the realization of the various stages of the "Apollo" project. Thus, in 1975 Telefónica once again played an important role in the provision of the telecommunication facilities inherent in the joint "Apollo"-"Soyuz" project. The project consisted of the assembly in Earth orbit of an Apollo spacecraft with three American crew members with a Soyuz spacecraft with two Russian cosmonauts in July 1975.

This period also saw a decisive step in the automation of the international service. It had begun provisionally and applying fortunate solutions at the end of 1966 with the link between Barcelona and Palma with Perpignan, but when it became widespread it was from 1973 onwards.

The urban, national and transit centres suffered from a major constraint that prevented them from the rapid introduction of this service, consisting of the lack of sufficient capacity in their control bodies to store the maximum 14 digits that could make up the international numbering and to provide the 8 or 10 new digits required for the new service.

Two options were proposed to solve this problem. The first consisted of the expansion of the capacity of all the control units and charging equipment of the national network, with what this entailed in terms of both the cost of the equipment itself and induced by having to carry out the operation with the network in full service. The second option, which was adopted, consisted of establishing a parallel network specialized in the international service and for its exclusive use, with dedicated circuits and with the TIL International Train, as equipment of the highest hierarchy, capable of storing the international numbering, facilitating fares and understanding with the international exchange or exchanges on which it depended. This solution made it possible to carry out the installation without affecting the service, to carry out complete quality tests and to put it into service in the best safety and quality conditions.

This network structure forced dialing using a second tone of invitation to dial, slightly sharper than the first. In fact, when we picked up the handset, the urban exchange gave us a 400 Hz tone, which invited us to dial according to three options: A) the 6 or 7 digit number of the province we were in if it was a provincial call, B) the 9xy as a provincial code followed by the 6 or 7 digits of the provincial number and C) the 07, that routed the call to the International Train, which sent us a signal with a slightly higher pitch (600 Hz) that indicated that it was ready to receive the desired international numbering. Once this signal was received, the subscriber dialed the international numbering and waited for the requested number to be answered.

The automation process began with the Madrid-Portugal relationship on April 4, 1973, and continued with France on April 7, 1973; Malaga with the whole of Europe on September 7, 1973; Barcelona with Belgium and Holland on July 10, 1973 and so on until the end of the process with the integration of Polopos into the national automatic network.

An essential step was taken in April 1973 with the commissioning of the International Automatic Power Plant of Madrid – D. Ramón de la Cruz, which with its Pentaconta technology of ITT origin and manufactured by Standard Eléctrica, allowed with its CCITT links nº4, 5 and R2, Direct international connection to any country in the world. Associated with this Centre, which following the general trend was named with the city and the street where it was located, a new technology Operator Panel was installed, without cords, also designed and manufactured by Standard Eléctrica – ITT, known as CIL and which represented a great advance in the improvement of manual and semi-automatic traffic. the processing of which was considerably streamlined, in addition to the savings in personnel that it entailed.

As a complement, in the same building, and on its ground floor, another exchange dedicated to special subscribers of international service called CAIA, for international subscriber exchange, was installed, which, in addition to detailed pricing, provided a direct and top quality service to 3,000 "special" subscribers in Madrid.

In the second half of the same year, a centre similar in structure to the Madrid International Centre came into service in Barcelona, although of somewhat smaller dimensions, located on Sepúlveda Street and therefore called Barcelona Sepúlveda. Its incorporation into the network had to be done as a matter of urgency in order to restore the service throughout its area of influence, Catalonia, the Balearic Islands, Valencia and the entire Mediterranean coast up to Andalusia, seriously affected by the fire that broke out at the Barcelona-Catalonia power plant in July 1973 that completely destroyed all the urban service facilities. intercity and international that it hosted.

The objective in this regard was that the process of automating international traffic on its continental and intercontinental aspects, originated by Spanish subscribers, would be completed in the 1980-1981 biennium so that all subscribers would have access to the International Automatic Network.

This specialized parallel International Network architecture was maintained throughout the 20th century with a single-vendor – Ericsson strategy that made it possible to quickly face all the specific challenges of international traffic: diversity of international signals, numbering plans open in some countries, ...

Returning to submarine cables, Telefónica was already aware of the importance they had and would have in the future, despite the fact that at that time they were still coaxial cables, the use of fiber optics was already on the horizon, although it was not yet proven that repeaters could be used and therefore reach great distances.

In order to demonstrate this, Telefónica and AT&T signed an agreement in 1983 for the manufacture and installation of an experimental fiber optic cable with repeaters between the Canary Islands, which was called OPTICAN-1.

The experience was a complete success, it entered service in 1985, and thanks to it the feasibility of installing and repairing submarine fiber optic cables of any length was demonstrated and the installation of cables throughout the Atlantic began, such as the TAT-8 and others successive to transport the growing demand for traffic.

… And we got to the 90's.

Satellite specialises in distribution and contribution services for TV and Special Networks, and is becoming an increasingly niche technological solution in the face of the unstoppable development of Fibre Optic infrastructures. This is a good time to point out that Telefónica has installed and operated more than one hundred high-performance earth stations throughout the history of space communications. A good part of them have been grouped in Satellite Communications Centres and Teleports, but it has also deployed Transportable Earth Stations (to cover sporting events: cycling, motorcycling, ...) and single-user Earth Stations mainly in VSAT networks for Telefónica's Large Customers.

CCS Guadalajara

Guadalajara I

On the other hand, Spain's important geostrategic position, its close relationship with the countries of the American continent, the importance of communications with the Canary Islands and the need for special links that the Spanish army was demanding for its missions abroad, led the Spanish Administration to consider the development of its own satellite communications system. On April 7, 1983, the Council of Ministers approved the HISPASAT program and authorized the establishment of Hispasat S.A. for the operation and exploitation of the new satellite system. The first satellite, Hispasat 1a, was launched into orbit on 11 September 1992. The Company has an initial capital of 20,000 million pesetas subscribed by the following entities: Telefónica 25%, Retevisión 25%, Caja Postal 22.5%, INTA 15%, INI 10% and CDTI 2.5% in registered shares, the transfer of which requires authorization from the Council of Ministers. Telefónica's contribution went beyond the financial and was decisive in technical aspects, for example in the

establishment of the technical performance characteristics of the earth stations that were going to operate with this satellite system.

On the other hand, at the end of the 1980s, the TAT-8 had been put into service, the first submarine fibre optic cable with capacities previously unimaginable, 40,000 telephone circuits. In its planning, it was thought that it would be able to meet the demand in that section for a decade. The reality was that the cable was saturated 18 months after it was put into service!

As a result of Telefónica's position on the international scene, the second fibre optic cable between the US and Europe, the TAT-9/MAT2 system decides to include Spain as a mooring point in Europe and with Telefónica positioned as the fourth world operator in terms of Submarine Cables.

The investment required for this project was 490 million dollars, equivalent to about 60,000 million pesetas at that time, and the signing for its construction was carried out by Telefónica by its president Mr. Luis Solana.

The cable is designed for a capacity of 560 Mbps capable of supporting 80,000 telephone circuits and entered service in 1992. It also had the ability to reconfigure its traffic on demand for the first time globally.

In view of the importance that submarine cables were acquiring, in 1986 Telefónica made another important decision, to set up a company, which it called Telecomunicaciones Marinas S.A. (Temasa) dedicated to the construction and operation of cable vessels for the laying and repair of submarine cables.

With Temasa, Telefónica was independent when it came to deciding on these communication routes that were increasingly necessary. The initial decision was to build, in Astilleros de Vigo; a first cable ship, which was called B.C. Atlántida. The construction in 1988 of the cable ship "Atlántida" represented a milestone in the history of the Spanish naval industry and put Telefónica and Spain on the world map of countries that had this type of specialized vessels.

The operating base was maintained in Vigo, where Telefónica had the spare parts depots for the different submarine systems (different types of cables, repeaters and equalizers).

After the success of the B.C. Atlántida, which covered the service in the Atlantic, in 1993 the B.C. Teneo was built, to operate in the Mediterranean and finally, to cover the installation tasks, a cargo ship was acquired and transformed into an installation cable ship in 1998.

From 1995 until the end of the century, Telefónica's international cables were all consortia of multiple operators and the first cables with amplifiers began to be installed, replacing the regenerators of the first fibre optic systems such as TAT-9, Columbus 2, MAT-2, ALPAL, SAT-2, Barcelona-Marseille or UK-4, which were moored in Spain.

With the introduction of amplifiers, a new era began in submarine cables, as they allowed capacity increases after their installation through the use of wavelength multiplexing (DWDM) systems.

The new cables with amplifiers mooring in the countries where Telefónica operates include the Columbus 3, Rioja, Barcelona-Savona, SAT 3, Atlantis 2, Panamericano, ...

Thus, at the end of the 1990s, Telefónica managed, following the principles and guidelines set at the end of the 1960s, to develop a first-rate international network and services. An example is a map of submarine cables in service at that time...

Until the end of the 1990s, international data transmission services have involved a significant management and operational effort, but they represent limited needs in terms of network capacity (leased circuits, international database access service, etc.).

By the end of the century, the era dominated by Internet access was not without anecdotes:

It was a night in 1997 at the International Central in Alcobendas. A team of young engineers from Telefónica I+D and Telefónica's International Communications department look frightened at the management console of the two Cisco 7513 routers (because of the redundancy).

They have just made Telefónica de España's new IP Network visible and the processing capacity of the equipment is at 100%: "What has gone wrong?

After a few hours of anguish, the CPUs returned to normal: our new network was "learning" how to reach the entire world wide web!

We felt important, we had fulfilled the objective that our commercial area had set for us:

"We want to double Spain's Internet capacity with the United States"

It was the great news that our Director General, Guillermo Fernández Vidal, was going to announce at an important event of the Association of Internet Users.

We had put into service 4 E1s with the American operator MCI: a total of 8 Mbps.

Yes, you read that right, there is no typo. They are not Gigas or Teras. It's not the speed of client access, ... It was our country's capacity with the United States in 1997, just over twenty years ago: We had gone from 8 Mbps to 16 Mbps.

This happened when the Internet access of our computers in our homes was through a telephone modem that dialed through the Switched Telephone Network (those were the times of the Infovía service – 1995) tens of thousands of telephone modems that we deployed throughout Spain connected to our main public telephone exchanges (PSTN).

A few months later we had to expand again, and again, and again... The V.90 telephony modems (speeds up to 56 Kbps) were replaced by xDSL modems, the different upgrades of the Cable networks and the Fiber Optic coming to our homes and our businesses.... The Internet has arrived on mobile...

Today, the installed capacity with the USA is almost 100,000 times greater than at that time. Yes, you read that right again. From the end of 1997 to the present day, there has been an explosion of data of incredible magnitude."

Around 1995, investors and analysts began to think about an explosion of Internet traffic that would saturate existing networks, and as a consequence, would generate a worldwide demand for traffic that would not be able to be satisfied and that would lead to the so-called "Dotcom Boom" between approximately 1997 and 2001.

This "Boom" causes brutal overvaluations in the companies that manage Internet access services (mainly portals such as AOL, Yahoo, Lycos...) and the companies that are going to have to transport this traffic, cable companies and owners of fiber optic networks.

At the same time, and in response to the dot-com boom, Telefónica is trying to take advantage of this trend and enhance some of its assets, such as the Terra operation, which has become the most used portal in Spanish and therefore a benchmark in Latin America due to its presence in several countries in the region.

At the same time, talks are beginning with other companies interested in building a submarine cable around South America, and talks are well underway to reach an agreement with Global Crossing.

In 1999, a meeting was held in Miami between the Chairman of Telefónica, Juan Villalonga, and the CEOs of the South American operators and executives of Telefónica Internacional.

At this meeting, a dilemma arises, either Telefónica launches itself to build the cable around South America alone or chooses to build it with Global Crossing.

Almost unanimously, it was decided to build the cable alone based on the expected traffic growth forecasts in the countries where Telefónica was present.

Operators such as Telefónica de Argentina, CTC Chile, Telefónica del Perú, Telesp Brasil, CANTV Venezuela, PRTC de Puerto Rico, El Salvador... with their traffic they would give value and sustenance to the cable and all the value would remain in the

Telefónica group, so this construction would reinforce and expand our presence in the Region.

Once the decision was made to build the cable alone, EMERGIA was immediately created in 1999 as the corporate vehicle defined to carry out the project of construction and commercial exploitation of the cable around South America.

The goal is to take EMERGIA public and take advantage of the huge multiples that are being handled in similar operations. As an example, Global Crossing had a market capitalization value of $47 billion at the time.

Also in 1999, Tyco was contracted to build the cable, including the purchase by this company of Temasa, which had been operating since its incorporation with total operational and economic success.

This is the beginning of a race against time with Global Crossing to be the first cable around the Americas to go on the market.

The installation work of the SAM 1 cable was mainly carried out by the recently sold company of the Temasa group.

In the midst of the boom, Telefónica bought Lycos, an Internet portal with a large presence mainly in the North American market.

The submarine cable around the Americas, called SAM-1, entered service in April 2001, and it was not possible to say who won the race, as both cables began to provide service in partial sections.

The cable has a total length of about 20,000 km including the land crossings of Argentina/Chile and Guatemala. It has a total of 12 berths in the U.S., Puerto Rico, Brazil (4), Argentina, Chile (2), Peru, and Guatemala (2). The design capacity was 1.92 Tbit/s and it had 4 fiber pairs.

The land crossing between Argentina and Chile was made on Telefónica's existing fiber optic infrastructure in both countries, and in Guatemala a new infrastructure was built that crossed the country from coast to coast along multiple land routes to provide security for traffic coming from the Pacific.

The management of the cable is done from the Operations Center (NOC) located at the Lurín station (Peru) and the maintenance of the submerged plant is initially contracted to Tyco, builder of the system, with 2 ships dedicated exclusively, located in Montevideo and Curaçao.

Subsequently, it will be integrated into the Atlantic Maintenance Agreement (ACMA) already covered in this document, through which several cable operators share expenses and operations with share of quotas (proportional to the km of cable contributed to the Consortium) and strict operating rules in the event of coincidence of action requirements by several partners of the Consortium.

In 2001, the dotcom bubble burst, and all overvaluation strategies were reconsidered, as it was seen that the growth forecasts, although correct in the expected evolution and the products and services that were going to cause it, were not correct in the deadlines that

had been estimated. The evolution was slower in the middle classes of all markets, both because of the implementation of services to customers and because of the time in which it was estimated that the networks were going to be deployed around the world and therefore the foundations of the bubble failed, and the boom would be slower and more manageable.

Our competitor Global Crossing goes bankrupt and its shareholders sell the company with significant losses, which in the long run could be an inconvenience in our competition with them since Global Crossing had already made an adjustment in its accounts and the shareholders who assumed the losses had passed them on to the income statement.

Telefónica had a problem with the cable and its amortization, but avoided any accounting adjustment in the balance sheet due to the reasons that defined its construction, it had the traffic of many operators and did not depend on anyone to fill it and amortize it, although finally Emergia did not go public and Telefónica kept 100% of the ownership.

In 2003 Telefónica, based on Emergia, created TIWS (Telefónica International Wholesale Services) with the aim of being the wholesale operator of the Telefónica group and managing the entire business and international networks of the group.

In this way, the international wholesale businesses of local operators, Emergia and the international business with corporate clients are consolidated in TIWS. A single face is offered to all international operators, both for the generation of business and for the purchase of necessary services for the group.

The traditional voice traffic of the group's operators is grouped together, significantly increasing the size of the negotiated traffic, which is so important in wholesale businesses.

By way of example, in international voice traffic, the Telefónica Group went from being a group of more than 8 operators negotiating traffic separately, where the largest was Telefónica de España, which occupied the 14th position in the international world, to being, managing international traffic as a group, the sixth in the world and therefore a Tier1.

It opens up the possibility of offering wholesale commercial packages in the traditional voice business for terminations in group countries, becoming more competitive, while improving termination costs in third countries and developing the transit business given our purchasing capacity, even launching a completely new wholesale prepaid service, which allows small operators of dubious economic reliability to access the group's traffic.

The commercial management of the Group's international submarine cables continues, as well as the management of the different capacity agreements with other existing cables, which allows us to transfer to the market a more supported offer and therefore of greater value and robustness, a situation that continues to this day.

In addition, the rest of the international services are developed, such as messaging, corporate data networks, etc.

TIWS consolidates its position in the international wholesale market, with a relevant presence in the international forums of this business.

In the year 2006-2007, the Large Customers unit of Telefónica de España, met with TIWS because Inditex, one of its main clients, wanted to put out to tender the connection of all its stores both in Spain, where they were served by Telefónica de España, and abroad, where we did not have a presence.

The objective was for TIWS to provide the VPN connectivity service (Virtual Private Networks) to all Inditex stores around the world, accompanying the client in its plan to deploy stores in different countries such as Portugal, France, the United Kingdom, Turkey, Russia... and so on up to 14 countries with 1,000 stores in these first steps of INDITEX, but with the aim of reaching 6,000 stores.

After hard work between Telefónica de España and TIWS, the project was won, put into service, and maintained to the present day.

Along with this emblematic project and the result of the collaboration with Telefónica de España, the Ministry of Foreign Affairs (MAE) network was awarded, connecting all Spanish embassies.

Almost without time to enjoy these first successes, and still being in the next phases of store deployment, the possibility arises of participating in a tender for the outsourcing of DHL's European communications, i.e. fixed voice, mobile, and data (VPNs and Internet), expressly excluding Germany from the agreement.

All services had to be provided in end-to-end outsourcing mode, where Telefónica is responsible for both its own communications and through third parties, supply and maintenance of equipment, communications security, online management of registrations, cancellations and modifications, 7x24 service and billing including the detail of consumption per employee.

The agreement included 17 countries, and in order to be able to provide it, legal entities would have to be established in all countries by staffing them, establish and operate offices, obtain telecommunications operator licenses in all countries, except in Spain, France and the Czech Republic, which were already available, deploy nodes of our international network, with the corresponding interconnection agreements with national operators, reaching preferential agreements with the wholesale units of local telephone operators, transferring the 400 telecommunications contracts from DHL to Telefónica, developing an online service for processing registrations, cancellations and modifications, integrated with the provision and management systems, developing a billing system that would be able to automatically read the voice invoices of each country and generate the invoices to be delivered to DHL, The entire transition had to be completed in 1 year and the quality of service was subject to strong quality controls

In a meeting held in Madrid in September 2007, Julio Linares, CEO of the Group, with representatives of O2, Telefónica de España and TIWS, wondered if we were going to be able to provide the service, as we had never done it before.

The commercial offer was led by O2 UK, Telefónica was the winning offer in 2008, and later leading TIWS was achieved, opening new operational offices in 12 European cities and hiring 100 people, delivering in the different countries all the services involved and maintaining the customer for several years.

At this stage, an office was even opened in Hong Kong with two people, in the offices of China Unicom, a strategic partner of the Group, to attack the Asian market.

These two very important steps served to initiate an activity of access to large European accounts that, through the Global Solutions Unit, attacked this market with very important successes with both Spanish and foreign multinationals (Amadeus, BBVA, Banco Santander, Endesa, Cemex, Nokia, Mapfre, Banco Pichincha, Banco Itaú, SAB, Miller, Ferrovial, etc...)

While the Global customer units were sizing up and attacking the multinational market using international VPN services and the new capabilities developed in projects such as DHL, we continued to expand the wholesale services provided through our international networks for both the operators of the Telefónica group on both sides of the Atlantic, as well as for the rest of the wholesale operators. increasing our size and therefore our competitiveness.

Thus, it progressively went from having a network in 14 countries, 22 cities and 28 POPs (Points of Presence) in 2001 to 40 countries, 75 cities and 100 POPs in 2023.

Centralised management of international voice traffic made it possible to manage the transition brought about by voice over IP and new digital voice solutions, which resulted in traffic continuing to grow but with falling prices.

In 2009, Telefónica Global Roaming (TGRo) was created, based in Germany, with the aim of managing all the roaming needs of European operators, generating revenues derived from scale and optimizing the cost base. In 2011, TGRo joined TIWS and Latin American operators joined, making TGRo the Group's wholesale roaming unit. This accelerated the growth of the business, allowed the development of new services and facilitated the management of complex situations, such as the European regulation that eliminated roaming costs for customers or the drop in traffic, as a result of the 2020-2021 pandemic.

On July 1, 2011, backed by the great relevance acquired in international IP traffic management, TIWS became a member of the Global Forum of Security Incident Response Teams (FIRST).

FIRST aims to bring together incident response and security teams from every country in the world to ensure a safe internet for all, bringing together the most expert security and networking teams on the planet.

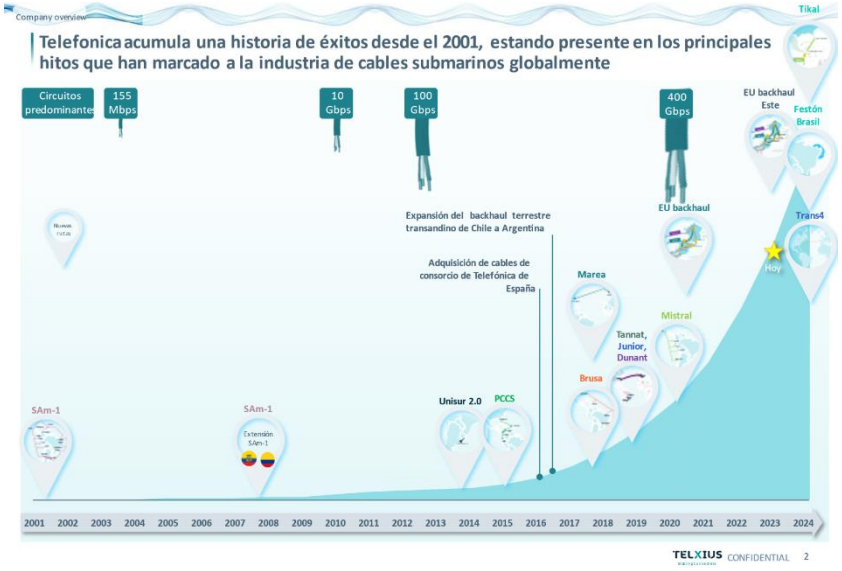
TIWS leads the security of international IP networks as a guarantee of service delivery and as a defense of your critical and strategic assets.

TIWS also developed the Group's satellite business from its inception, deploying cellular backhaul solutions, to connect mobile base stations in remote locations, such as corporate VSAT services. In 2016, Media Networks added to the satellite capabilities of TIWS, providing an additional boost to these activities, addressing deployments in Brazil, Ecuador, Peru, Colombia, Chile, Argentina, Germany and Spain, consolidating all the experience and specific technical capabilities of these technologies in a single unit.

The technical development makes it possible to increase the initial design capacity of the SAM-1, going from the initial 1.92 Tbs to the approximately 20 Tbt/s achieved in the

longest segment (Fortaleza-Puerto Rico), through the use of technologies initially designed for terrestrial networks by the manufacturers Nortel and Infinera, a method in which TIWS was a pioneer. giving rise to the open systems that are currently installed by submarine cable manufacturers, in which terminal equipment can be installed by suppliers other than those who manufacture the cable.

As a result, the use of typical wholesale IP transit and capacity services increased enormously, with double-digit traffic growth that can be seen in the attached graphs.



These increases resulted in an improvement in our ability to negotiate interconnections (peerings) with other carriers, making us TIER 1, so that the Telefónica Group becomes an international provider whose network is free of transit. It means that you can reach all Internet networks without the need to purchase IP transit.

Connected directly to the Internet backbone, they were able to offer higher speed connections and an extremely reliable network. Reliable because it has different connection points and alternative paths, it guarantees the flow of traffic in the event of simple network failures.

Although everything may seem rosy during these years of growth, the dependence on the traffic of the SAM-1 group became more and more critical, and despite the fact that our services were doubly redundant, since being a ring there is protection against a cut, and at the same time they are redundant within the same cable, the period has not been free of some anecdotes, such as that of 2011, when an earthquake at sea off Honduras produced submarine landslides that broke all the cables that passed through the region, including SAM-1.

This emergency situation did not mean any cut for the group's customers, it only represented a slight increase in delays in customers in Chile and Peru by lengthening the journey to reach the USA by a few thousand kilometers, now they should go through Brazil instead of directly through Central America.

The redundancy of the ring had saved us from a major outage, however, the repair of these infrastructures is usually delayed by several weeks, and during this period of time any other incident could jeopardize Internet access for an entire country.

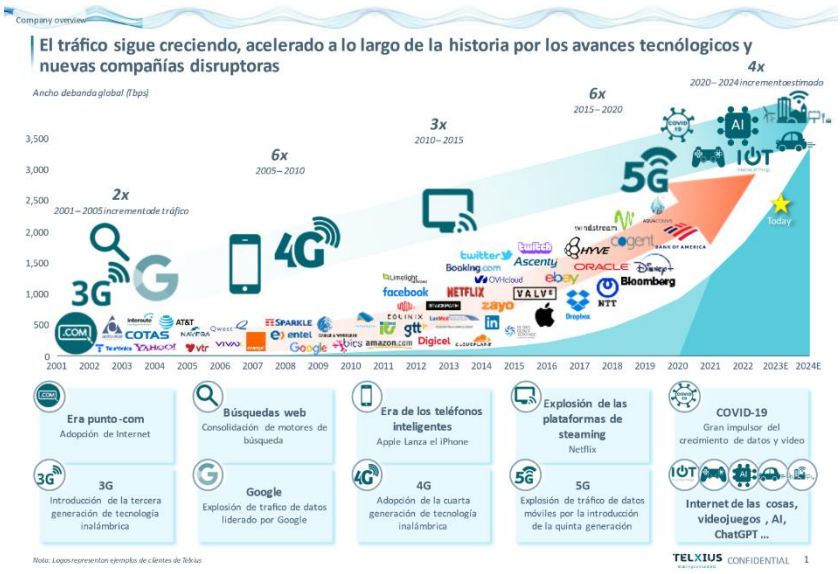
Only a few days after the earthquake, the cable is again sounding the alarm, it is failing in the area of Uruguay, just at the other end of the ring, a trawler, despite being prohibited from fishing where submarine cables run and being perfectly marked on its nautical charts the route of the cable, had hooked it and damaged it, but not cut, and fortunately it was still in service.

The alarm was indescribable, we immediately started negotiating interconnections with our competitors, but interconnections of this size are not always possible because our competitors did not have enough capacity equipped in their cables. We had to look for and invent paths along unimaginable routes and negotiate with competitors who did not hesitate to take advantage of the commercial advantage of the moment and make us pay dearly for the different alternatives, fortunately years later fate gave us the possibility of compensating ourselves because the problem was the opposite.

Another measure taken on that occasion was to hire the Uruguayan Navy to patrol 24 hours a day in the vicinity of the cable's route, thus avoiding any other incident with the damaged area of the cable.

Since the beginning of the century, the management of traditional traffic has represented an indisputable challenge for all operators in the world, not only due to the entry of new players into the market, but also due to the fall of certain traditional businesses such as international voice, and its replacement by data traffic that has risen exponentially for all the varieties of services offered. roaming in mobile operators and the hundreds of technological alternatives that both fixed and mobile operators have had to face in order to offer their customers what the markets demand at all times.

The evolution of the IP business and capacity has allowed the development of an intense, and always full of challenges, relationship with OTT companies (Google, Meta, AWS, Netflix, etc.), key agents in the exchange of content and therefore generators of most of the traffic that circulates today through international networks. This commercial relationship initially allowed revenue to be obtained from the peering business and, over the years, has allowed it to evolve into a relationship of partners in multiple submarine cable construction projects.



In addition, this evolution from traditional traffic to IP traffic has not been free of new digital risks, hitherto unknown to both the Internet community and the operators' business.

In March 2013, one of the largest volumetric attacks on IP traffic, causing denial of service, was recorded against a private company.

It is known in the internet community as the Spamhaus case.

The Spamhaus Project is an international organization, based in London and Geneva, founded in 1998 by Steve Linford to track servers that sent spam and related activities, almost all of them fraudulent.

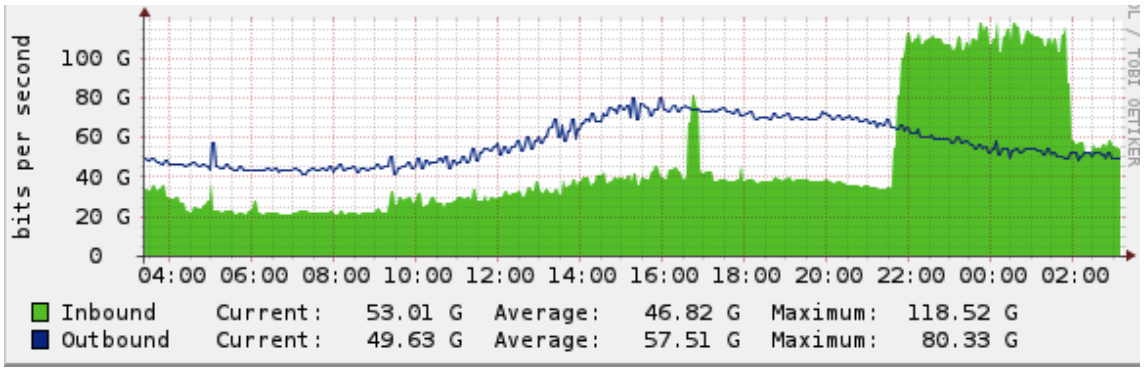
Many internet services have used and continue to use Spamhaus blacklists to significantly reduce the receipt of spam and phishing attempts.

Going back to March 2013, CyberBunker, an Internet provider with dubious practices in the Internet community, based in a former World War II bunker located in the Netherlands is identified as a source of spam mass emails, being immediately added to the Spamhaus blacklist used by email providers to remove this type of email.

Soon after, Spamhaus was the target of a distributed denial-of-service (DDoS) attack that exploited a long-known vulnerability in the Domain Name System that allows massive amounts of messages to originate on devices owned by others using IP address spoofing.

The attack was of a scale never seen before (peaking at 300 gigabits per second; an average large-scale attack could reach 50 Gbps, and the previous previously publicly reported largest attack was 100 Gbps) and was launched against Spamhaus' Domain Name System (DNS) servers.

In the graph you can see an example of the brutal growth of traffic seen from Telefónica's international network at that time:



Telefónica, through the analysis systems equipped in TIWS, was able to analyse the event, study it and propose solutions to avoid this type of attack that could put both the international network and the service to our customers at risk.

This milestone provided real awareness of the importance of digital security for our international network and for our customers.

Following this line of commitment to investments in security, the Security Operations Center (SOC) of Telefonica Global Solutions was created for customers and was inaugurated in 2015.

Since that first experience with Inditex, international business with Corporations has also continued to develop, with very close collaboration between the business units of local companies and multinationals. As a result of this collaboration, important contracts have been awarded, including the Aldi distribution chain, where more than 9 have been connected. 000 stores in Europe, with a software-based data network SDWAN technology and various advanced solutions.

The divergence between the different wholesale markets and the decrease in synergies between them, led the Telefónica Group in 2016 to take the decision to divide the TIWS business into three differentiated activities, one referring to the IP transit and Capacity businesses, including therefore the management of the international infrastructures involved. submarine cables, mooring stations, international IP network, peerings etc... This activity was articulated through a new Unit called Telxius Cable, the second activity was related to international solutions for Corporations and associated businesses and services articulated around the Global Solutions unit, and the third referred to voice traffic, roaming and satellite solutions, which continued as TIWS.

The separation and constitution of Telxius Cable into an independent company to merge it with Telxius Torres and thus create a conglomerate with the intention of initially going public and finally incorporating external strategic partners (KKR and Pontegadea), was a complex and extremely intense process.

The first major challenge for the newly created Telxius Cable was the negotiation of multi-year agreements (2016-2020) for IP traffic with the operators of the Telefónica Group. The idea was to bring together all the Group's international IP traffic in order to provide more technical robustness and better negotiation capacity in interconnections and peering with the main OTTs and global content providers. This negotiation would end with a global framework agreement including all the Group's operators, from Chile to

Guatemala, and from Spain to Germany, ensuring traffic growth with a CAGR of more than 40% per year and with the responsibility of quality in its delivery and distribution.

Another challenge faced by the newly created Telxius was to initiate the migration to a new generation of submarine cables to replace the magnificent, but obsolete, SAM-1. State-of-the-art cables allow more than the entire total capacity of the SAM-1 to be carried in a single pair of fibers, and with the possibility of designing many more fibers per cable, they multiply the nominal transport capacity by more than an order of magnitude.

Thus, during the following years, a series of major projects were undertaken that were to significantly change our international capabilities as a Group.

The first major project was the construction, 100% owned by Telxius, of the BRUSA cable (BRasil-USA) carried out by Alcatel Submarine Networks (ASN) with its more than 160 Tbps.

Likewise, the deployment of the MAREA cable, a transatlantic cable with mooring in Spain, was undertaken with strategic partners as relevant as Microsoft and Facebook, in which Telxius was responsible for the construction, which was entrusted to Subcom (formerly Tyco), and for the operations management (NOC). Everything went according to plan and finally at the beginning of 2018, Marea was brilliantly put into service.

Telxius' next decisive step in this new transatlantic submarine cable market came from Google and its DUNANT cable. In a long and intense negotiation, Google bought a pair of fibers in Brusa and Telxius acquired a pair of fibers in the new DUNANT cable, designed and owned entirely by Google and built by Subcom.

DUNANT made it possible to consolidate Telxius' presence in the European and transatlantic markets while providing redundancy and solidity to the traffic carried by Marea.

This new chapter in the relationship with Google was further strengthened with the agreement to purchase fibers in its Tannat and Junior cables, which would allow the southern end of the Sam-1 not covered by Brusa, which only reached Rio de Janeiro, to be redundant, and thus meet the need to replace the infrastructure that was inexorably reaching the end of its useful life in sections.

The penultimate chapter in that goal of replacing the Sam-1 came from the hand of the one we least suspected, our main competitor in Latin America, América Móvil. At the end of 2017, Subcom approached both operators by offering at a substantial discount a cable it had built for another Asian operator but had ultimately been unable to install due to lack of payment. After several months of negotiations where we had as our main challenge to be able to generate enough trust between both companies to be able to do something together, we finally signed the agreement for the construction and commissioning of MISTRAL, the cable that, linking Chile with the west coast of Guatemala, allowed us to replenish and give redundancy to all our connectivity needs in the South Pacific. The entry into service of Mistral in 2020-21 was a milestone in the collaborative relations between operators in the region, without OTTs in between, and paved the way for the development of more cables in the future with América Móvil, as we would demonstrate a year later with the negotiation of TIKAL in 2022.

It was also in this context that another of the services that both TIWS and Telxius had been marketing for a long time became more relevant: security services. Anti-DDoS (denial-of-service) attacks were becoming more frequent, intense and with more traffic and customers affected. Our Arbor teams had to be expanded and reinforced with Radware equipment and deployed to more points of presence in both Europe and Latin America. It is the only way to ensure the proper response to attacks that came with hundreds of Gbps of malicious traffic in some cases. These services are currently key to ensuring traffic quality and network availability for the Group's operators and third parties as well as their end corporate customers, making the Group's international network the first barrier of protection against massive international attacks.

… and then came 2020 and COVID. For what meant the closure of their businesses for many, for Telxius it was the definitive demonstration of the relevance and criticality of telecommunications networks and submarine cables in particular. It was the time of the highest simultaneous traffic increase in our history, with some customers, especially Microsoft, doubling and tripling the demand for international connectivity in the face of the avalanche of traffic and remote connections and with teleworking applications exploding. The Telxius network had to absorb a 40% growth in IP traffic alone in just a few weeks. The investment and construction efforts of new cables had arrived on time and proved to be up to the task, adapting quickly and with impeccable quality of service to the new reality.

COVID also accelerated what was already seen as a trend in the cable and international connectivity industry: the need to complement submarine networks with powerful terrestrial networks (backhauls) that would enable end-to-end connectivity of the main customer and content interconnection hubs. Little by little, Telxius began to invest in complementary networks in Toninas – Buenos Aires, Madrid – Paris, Frankfort, Rio-Sao Paulo, Virginia – Ashburn, among others.

This new post-COVID reality also influenced the emergence of a new concept of expanded docking station or mini border data center, which would allow large content providers (Amazon, Microsoft, Meta, Google,...) to locate data equipment near the terminations of submarine cables and large data consumption centers. This gave rise to the need for investment in the expansion of Sopelana to Derio by the Tide, or the expansions in Virginia Beach, USA, and Lurin, Peru, to give some examples.

After all these new cables installed by Telxius, we only had a small stretch left to finish the task of replacing the SAM-1. The union of Guatemala with the U.S. via Boca Raton in Florida allowed us to close the ring and with it all the connectivity and restoration needs that our customers need.

To meet this need, we extended the collaboration with América Móvil, our great competitor in Latin America, with whom, after the agreement reached with Mistral already reported, at the end of 2022 a new agreement was closed, this time for the joint construction of TIKAL, the new and, for now, last cable under construction of Telxius, this time with ASN as a supplier.

Below, you can see the relevance of the current Telxius network.

Today, we could say, as we have already pointed out at the end of the 90s, that following those guidelines marked in the 60s, we continue to maintain an international network of the first magnitude, embracing new technologies, both in networks and in services and security, and in all those requirements that new technologies offer us to meet the demands of our customers.

At the beginning of 2023, steps are being taken by Brussels to propose that Big Tech assume part of the cost of deploying Network Infrastructure. Surely the conclusions of this consultation and a possible concentration of Operators in Europe will be some of the relevant milestones of the coming years.

In the meantime, here is a brief history of Telefónica's International Network, collecting the testimonies of those who experienced it first-hand. In short, an exciting 100 years!

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Acknowledgments of the International Network Notebook

When Jose Ramón Vela and I were asked to coordinate a notebook on the history of Telefónica's International Network, I got a bug in my body.

Since I was a child I have experienced the International Network at home since my father was in the foundation of the Department of International Communications and I believe it was fundamental that the name and international position of Telefónica is what it is today. Between the two of us, we have contributed nearly 60 years to this wonderful company.

Enrique Blanco and Cayetano Carbajo, thanks to both of them for this gift, offered us the opportunity to work with my father, his team and the rest of the colleagues in writing the exciting story of this team of pioneers. I focused with them on the first decades of this trip and Jose Ramón already linked with the advances of the 21st century.

I fondly remember the talks in my house or in that of one of them, all of them providing documentation, anecdotes, vision of what they did in those years, with an illusion that frankly touched me deep inside. The same enthusiasm and desire to contribute has been conveyed to me by Jose Ramón and his team. They are the professionals, representing many others, who have made Telefónica, our Telefónica, what it is today.

These are the people who are the actors of this notebook, from here our thanks on behalf of Telefónica for allowing us to recover this success story for future generations:

EARLY DECADES

1. Manuel Armada Benito (DEP)
2. Antonio Barrero Serrano
3. Francisco Cecilia Aguado
4. Alberto Moreno Gómez
5. José Luis Rojo Serrano
6. Enrique Salvatierra Jimeno
7. Cristobal Torres Godoy (DEP)
8. Antonio Zafra González

21ST CENTURY

1. Antonio Anta Ruiz Hidalgo
2. Rafael Arranz Ruiz
3. Juan Carlos Bernal Perez
4. Serafin Borrego de Vega
5. Higinio Sánchez García Cervigón
6. Ignacio Ugalde García de Salazar
7. Eduardo Gomez Leal
8. Carlos Olea Ortigosa

And with the permission of Jose Ramón and the rest of my colleagues, if I may highlight it, my father, Vicente San Miguel García. It was his life and it has been mine. Thank you all very much

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