

History of the Spanish Association of Telecommunication Engineers (Asociación Española de Ingenieros de Telecomunicación, AEIT)

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Abstract — The Spanish Association of Telecommunication Engineers (AEIT) is a private non-profit organization that was established 83 years ago. Since it was created, the AEIT has been defending this profession, the telecommunication engineers, and the way engineering has to be done in order to improve quality of communication services, in a direct way, and to develop our society and enhance the economy, in an indirect one. To meet that objective, well prepared professionals who are able to design networks and services were needed. The AEIT has been involved in reaching it.

Chronological order will be followed in this paper, completed by some relevant aspects, which will give a general view of all the things that the AEIT has done during its life.

Keywords – Spanish Association of Telecommunication Engineers; Body of Telegraphists; Spanish Telecommunication Engineers Degree; Telecommunication Engineering; Professional Competences;

I. WHAT IS THE AEIT?

The Spanish Association of Telecommunication Engineers (AEIT) is a non private profit organization that was established 83 years ago, in 1926, almost at the same time that the telecommunication engineer degree was created in Spain in 1920.

Its members are PhD (DPhil) and telecommunication engineers; although the AEIT let that the last year degree students belong to it, within special conditions.

At the beginning, there were only a few telecommunication engineers, less than thirty; but in spite of that they decided to found it.



Figure 1. Logotype of the Spanish Association of Telecommunication Engineers, AEIT

It is not possible to know what would have happened if the AEIT would not have managed things the way it did it. It is very difficult to identify which “triumphs” have only been got through actions taken by the AEIT, because there are always many agents involved in these matters, and results are not immediately. But whether these achievements have been obtained directly through the AEIT performance or not is not the question. The point is that the AEIT has been managing things in order to improve the profession of telecommunication engineer and some successes have been obtained.

The way AEIT was organized and the effects that this have in the profession gave it more prestige and more confidence to its members, who have increased its number up to 12.000 nowadays.

There is only one association of telecommunication engineers which has been established in the whole country of Spain. There are also some regional organizations, which were created by the AEIT. These organizations work together with the AEIT through some Memorandum of Understanding and between all of them try to improve the profession of telecommunication engineer.



Jesús Sánchez Miñana

Figure 2. Book edited by the Telecom Historical Forum, AEIT, relating life and works of one of the pioneers of telecoms: the Spanish telegraphist Enrique Bonnet. COIT 2006

II. ORIGIN OF THE TELECOMMUNICATION ENGINEERS DEGREE

The telecommunication engineer was formally created in 1920. Its creation differed from the one that most of the others engineering had. Mining, Forest, Naval or Civil engineering had arisen within the Ministries that had the competences in each technique, so that they could have specialized people who could work in each matter. The engineers got their degree in some Special Schools or Academies that belonged to the respective Ministry. These Schools of engineering were not part of the University, as the rest of the Schools or University Centres. These groups of engineers, who were civil servants, received the name of Engineers Bodies <<Cuerpos de ingenieros>>. There was an Engineer Body for each specialty.

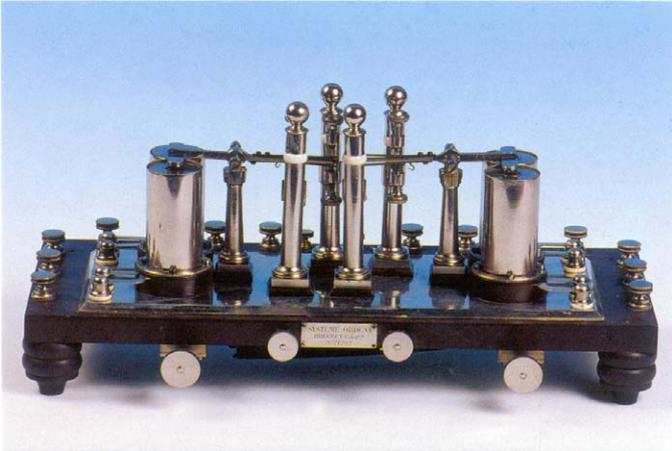


Figure 3. Duplex designed by the Spanish telegraphist Orduña. 1879. Source: Postal and Telegraphic Museum.

Things were different in telecoms. The electric telecommunication officially started in Spain in 1855, with the promulgation of the 22nd of April Law. With this Law the Government decided to implement a telegraphic system in all the main cities of Spain: one for province and one in each abroad department. This Law also founded the Telegraphists Body or Cuerpo de Telégrafos, that belonged to the Home Office, which was the Ministry where all the electrical competences were. This Body was a group of civil servants that had the responsibility of implementing the telegraphic system.

The Body of Telegraphists tried several times to create a specific Body of Telecom Engineers, but they did not succeed in this issue. In 1864 they almost achieved their objective as a Body of engineers was created. Although the norm that established it did not say anything about the name of the engineering, the fact that this Body had their competences in all the electrical matters makes us think that the name of body could be Electrical Engineers Body. An Academy where students of engineering would get this degree was constituted in the same norm as well; however, some problems disabled the starting of the Academy and studies did not begin.

Several times during the XIX century the Body of Telegraphists Engineers or Electrical Engineers tried to be formed, but all the political changes that took place in that period did not let it happen. At the end of the century, in

1890 a School of Electrical Engineers was created, but this time by the Overseas Ministry, not by the Home Office where the Body of Telegraphists belonged. At that time, the results of the Cuba War made disappear that Ministry, and with it, the new School and the plans for the Electrical Engineers.

Although the telegraphist engineer or electrical engineer degree was not created in the XIX century, since 1855 different schools of telegraphists were set up, but with different names. It is important to stress that in 1864 a special school for Sub-directorates (the highest level jobs inside the Body) was created. Unfortunately it only lasted a few months, because a new norm was published and the Academy of the electrical Engineers was created, as we have explained. Besides, since 1876 to get a promotion inside the Body several exams had to be passed. This way was guaranteeing that the highest level jobs within the Body of Telegraphists would be occupied with people with a proper knowledge. However these studies were not engineering ones.



Figure 4. Hughes 1875. Source: Postal and Telegraphic Museum.

Since the beginning of the twentieth century, the school included a special program for higher education; these studies let people apply for jobs of the highest level. In 1913 the Telegraph Official School was created. As it was usual at that time, the School incorporated the program for higher education, but with a different structure from the previous ones.

In 1920, sixty five years later than the electrical telecoms formally started in Spain, Telecom Engineering became a degree. It was the Home Office, -through one of its departments, the Telegraphy Official School-, who began to

impart teaching of this engineering. It imparted, as well the medium grade ones. With these studies “*the Spanish telegraphists could have the same scientific level that they have in other countries*”, as it was said in the introduction of the norm that created it.



Figure 5. First Telecommunication Engineer Title. 1921.

Only civil servants from the Telegraphists Body could attend to that training; two years of service were also needed, and a certificate of the boss of the new aspirant approving his attitude should also be given. Besides, the maximum age to attend to this education was 35 years old.

In 1921 the first titles were awarded to the young engineers who had passed the Higher Program of studies, according to the Plan of 1913, and the recognition that was approved cause by the structure given in that course. As we have said, all of them were civil servants that belonged to the Telegraphists Body.

III. THE TELECOMS SITUATION AT THE BEGINNING OF THE TWENTIES

At that moment, the telegraph service was a monopoly developed by the Public Administration through the Directorate of Telegraphs. In fact, the competences for the telegraph services were in that Ministry until the end of the 1970's.

The telephone service was established and exploited by the National Public Administration, and for the same Directorate. However, in some cases there were also contracts with some Municipalities and particular firms to install and manage these services; in these latest cases Telegraphs had the right to control the way the service was given and to audit the stations, lines and material before the service began to be given.

Radiotelephony and broadcasting were different from previous services, as they always implemented by particular enterprises. Because of that they required the authorization of Telegraphs before the service started. Telegraphs that had to revise the techniques used and the project presented in order to approved it.

The Telegraphists Body, in general, and Telecoms Engineers, as part of it, had their professional competences related to the different telecoms services. During the second decade of the twentieth century it seemed that the Telegraphists Body (including the Telecom Engineers) could get more responsibilities than it had. However in a short period of time these matters were defined and telephony and broadcasting stayed out the Telegraphists competences.

In 1923 the Government began to establish the bases of the Spanish broadcasting, publishing a first regulation for particular stations. At the end of the year, a Wireless Telegraphy National Conference was held with the objective of analyzing broadcasting in Spain and proposing some regulation to Government. In 1924 the first stage of the broadcasting was concluded with the publication of the first norm. Some months later, the first radio stations were approved EAJ-1, Radio Barcelona, EAJ-2 Radio España of Madrid, EAJ-3 Radio Cádiz, EAJ-4 Estación Castilla, EAJ-5 Radio Club Sevillano, and EAJ-6 Radio Ibérica.

On the other hand, in 1924 Government subscribed a contract with the Compañía Telefónica Nacional de España, Telefónica, in order to organise, reform and increase the telephone service in the whole country, given the monopoly of the service to Telefónica. It was a Spanish firm of the International Telephone and Telegraph (ITT). Two years later, in 1926, ITT also established in Spain Standard Eléctrica, that manufactured switching equipment and telephone devices.

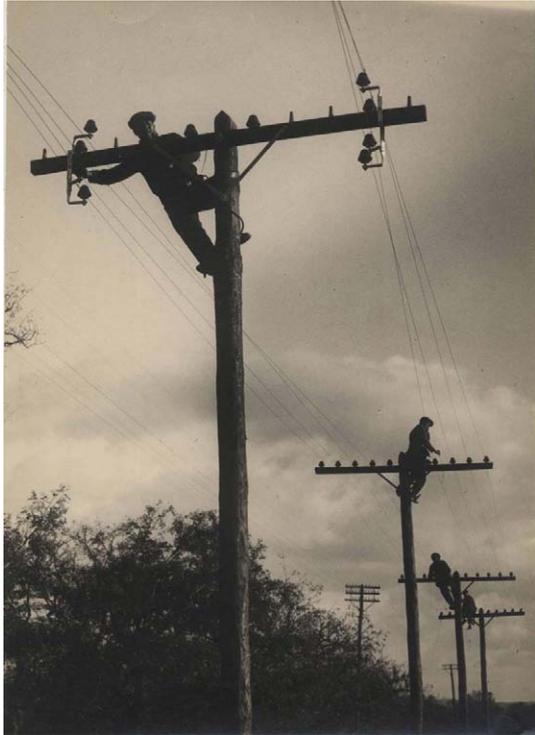


Figure 6. Development of the telephone service by the Compañía Telefónica Nacional de España. 1925

Telephony and broadcasting needed to be developed, and for so telecoms engineers were essential. All the telecom engineers belonged to the Telegraphists Body although some of them were already working in private companies. However the

impulse that telecoms had at that time was the cause that a bigger number of experts in this matter were needed. This is the reason why the forecast of this profession changed radically.

The number of telecoms engineers that began to work outside of the Directorate of Telegraphs was considerable. They collaborated with companies that needed telecoms professionals, especially experts in the implementation of the telephone system. As an example of this, while in 1924 there were only two engineers that worked outside the Public Administration, a year later there were 12 of them.

At that time all the engineering, apart from Industrials, were professions that were established inside of the Ministries which had competences in each technique, and because of that all the engineers were civil servants. In the XIX these engineering started to create a professional association which represented the interest of their members, and although industrial engineers were a not public administration profession, it also had its own association. These associations were reunited in the Instituto de Ingenieros Civiles de España (Spanish Civil Engineering Institute) that was formed in 1905.

IV. THE CREATION OF THE SPANISH ASSOCIATION OF TELECOMMUNICATION ENGINEERS AND ITS FIRST AIMS

It is difficult to know why the decision of founding the Spanish Association of Telecom Engineers was taken, but historical knowledge of the situation can give us some clues.

The number of new engineers was increasing as years were passing by, but there were not a lot of them, as it was a new degree. During the course 1925/1926 there were only 43 telecom engineers. Perhaps the demand of experts in telecoms that existed in the private sector and the fact that the other engineering had professional associations were the causes that some engineers decided to create the AEIT.



Figure 7. Facade of the Telecommunication Palace where the Home Office was. Madrid 1931. Source: Compañía Telefónica Nacional de España

In 1926 the Association was established with several objectives, but they could be summarised as “Defence and improvement” of the profession. The name given at that time was Spanish Association of Telecommunications Engineers and Technicians. The president was a telecommunication engineer that was working outside the Public Administration,

and his immediate followers were working in private firms as well.



Figure 8. Public Telephone establishd at the Retiro Park. Madrid. Source: Compañía Telefónica Nacional de España

As we can observe from the name, there could be also technicians in the Association. Perhaps the association decided to admit other telecom experts as the number of engineers was so reduced. However, later documents demonstrate that members were only engineers.

In 1930 there were 58 engineers and a milestone for the profession was going to happen. There was a re-organization in the Telegraph Official School, and as a result of that the Telecommunication Official School was created. This new School changed the way people could attend to the telecoms engineers studies; it was not necessary to belong to the Body of Telegraphists any more. Any Spanish person or foreigner, with the proper authorization of the General Directorate of Telegraphs, could be an aspirant. Within the new School, the medium degree took form and the radio-communication medium grade was created; women also could attend, although only for the lowest level studies, as assistants.

1931 was also important for the Telecommunication Engineers as the second milestone occurred: the Government approved the professional competences of the telecom engineering. Eleven years after the engineering degree was created, the competences were defined in a Royal Decree. The AEIT had something to do in this and in the way they were

obtained so quickly, if we compare them with other professions. For instance, the industrial engineers got their degree in 1850 and they acquired their competences in 1935.

The Royal Decree was welcomed by the telecomm engineers, but the other engineers did not feel the same, specially the industrial ones who asked for an amendment. However, this requirement did not have any result as the telecommunication engineer competences were confirmed in 1932.

However, 70 years before, in 1861, the telegraphist Ignacio Hacar had been employed by Mouilleron as an engineer to manage the implementation of the telegraphic line of Aragón (a region of Spain). This contract is important, because a Spanish telegraphist joined a foreign firm as an engineer, although the degree would be created in 1920 and the professional competences would be identified in 1931.

During its first years of life, the AEIT did a very important effort to introduce the telecomm engineering to society, political authorities, and other engineering, and also to explain the role that the engineers had to play in society and how it was related to the development of our country. Besides some activities were addressed to its members, as conferences, so that they could know the state of art in this matter, and they could have knowledge up to date after leaving the School.

In 1932 the Association decided to change its name for the one it has now: Spanish Association of Telecommunication Engineers. We do not know exactly why this decision was taken, but perhaps the fact that it was not necessary to be a civil servant to attend the courses of telecommunication engineer, the publication of the professional competences, or the fact that the number of telecom engineers was increasing influenced that choice taken.

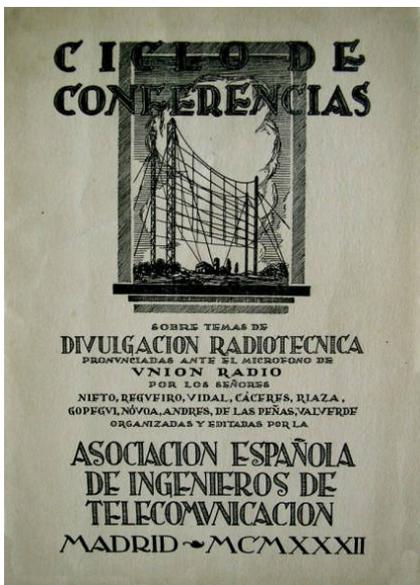


Figure 9. One of the first books published by the AEIT. 1932

V. THE AEIT AFTER THE CIVIL WAR

During a few years after, the AEIT continued introducing the telecoms engineers to society and giving conferences and courses to its members. The Civil War, that started in 1936 and finished three years later, interrupted almost all the activities in Spain and the AEIT's ones. After that period everything started again, but weakly because of the situation of the country.

The telecomm engineering was created later than other engineering professions, and because of that the AEIT have to do a big effort so that this profession was recognised by the Government and some entities. We could consider three main areas in which the association strongly worked during this period: the creation of a Telecom Engineers Body (different of the Telegraphists Body); the recognition of the profession in the norms that Government was elaborating; and the integration in the Federation where all the Spanish Associations of Engineers were: the Civil Engineering Institute.

As we have explained before, the telecommunication engineer degree was created as part of the Telegraphists Body. There was not a specific Body for them, as it was for the other engineering. The publication of the new Law of telecommunications and services in 1940 formed the Telecom Engineers Body, but only in a formal way. To develop it, a Royal Decree had to be elaborate identifying its structure, rules, and its members. The AEIT did a lot of things in order to accelerate this process, some of them were very risky for its Board (bearing in mind that at that time Spain was with a dictatorship Government). Finally it was in 1948 when the Body was established with the telecom engineers that were at the same time civil servants. Once the initial list was configured, people that wanted to join this Body have to pass a Public Opposition. That means that the Body of Telecomm Engineers was created almost 100 years later than the electrical telecoms were established in Spain and with different circumstances from the ones that existed in the middle of the XIX century.

The second activity in which the AEIT was involved after the War has to do with the new political regime that Spain had, and with the norms that needed to be transformed or even created. Public Administration was elaborating several ones related to the organization of workers in different sectors: radio communications, broadcasting, telephony, railroad; and so on. The new norm projects were analyzed by the different departments within the Public Administration, and in some cases some other external and private agents were asked to collaborate. The AEIT demanded to participate in some of them; the objective of the Association was that all the jobs related with the telecommunication professional competences were developed by a telecommunication engineer and pretended that all the norms considered that possibility. We have to bear in mind, that although the competences were defined, there were some intrusion in the area of telecoms by another professions. It is always the same when a new degree and profession is created; the other professions think that they loose competences in some areas in which they were working before.



Figure 10. Federation of the Associations of Spanish Engineering: the Institute. In 1960 the President was Manuel Márquez, a telecom engineer.

Besides the actions taken with the Administration, some other activities were done directly to companies in the private sector in order to obtain the same objective. The way they were conducted differed from the previous ones; this way while in some cases the companies were developing its own internal rules, in others there was necessary to inform about the competences of the telecom engineers.

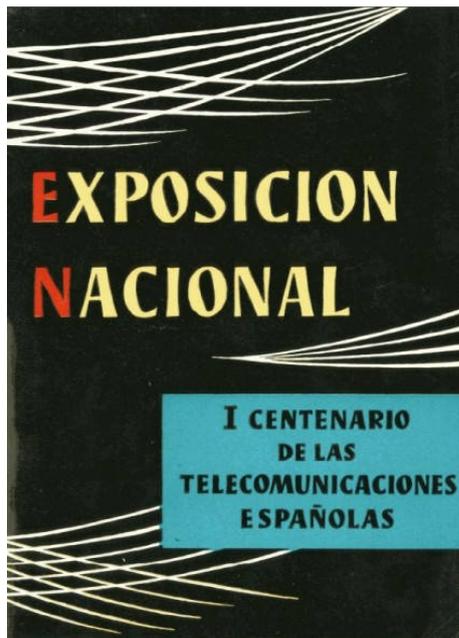


Figure 11. Book published as a consequence of the National Exposition that took place in 1955 to commemorate the 100 years of electrical telecoms in Spain.

The third matter where the AEIT was implicated during this period was in the integration of the AEIT in the Federation of the Associations of Spanish Engineering: the Institute. This organization was created in 1905 by the 5 more important engineering created during the XIX century. They decide to join together in a new organization so they could be stronger

and get more things for engineers, as they have many things in common. Since that no other engineering was admitted.

When the Civil War was finished there was a change and the Association of Navy Engineers joined the Institute. After knowing that, the AEIT decided to form part of it and started to work on that. There were a few informal contacts with the Institute since 1946 and as a consequence, a formal request was sent by the AEIT. All the engineering which formed the Federation had to reach to the same conclusion, the AEIT could join it, and had to approve it. After having some meetings with the presidents of the other engineering associations, everything seemed to go well. However two things happened that provoked a change.

In the one hand, the Institute decided to organize a National Engineering Conference and the AEIT and the other engineering associations which were not members of the Institute, were not invited to participate on it. Some actions were taken which Government and due to that, Government recognized that all the engineering had to collaborate in it. However, the Institute did not invite the AEIT to participate in the organization of the Conference and it did the same with the other associations that were not part of the Institute. We can not ignore, that the presidents were invite to moderate some of the table of panels, and that all the engineers were invited to participate in a personal way.

On the other hand, and at the same time, the Institute sent a proposal including the tariffs of all the civil engineers to be approved by Public Administration. The proposal said in the preamble that these tariffs could only be used by the engineers who formed part of the Institute; besides it considered that these engineers were higher level than the others. Some concepts included in these tariffs were specific of telecom engineers, regarding their professional competences approved in 1931 by the Ministry. The AEIT, and some other associations that did not formed part of the Institute, send a formal complain and the proposal was sent back to the Institute for amendments. In addition an inter ministries Commission was created and engineers from different specialties were invited to join it, and between them some telecommunication engineers. When years later the tariffs were approved they could be used by all the engineers.

Because of all these matters the AEIT decided to postpone its integration in the Institute. With the new decade, the fifties, a new Board began to manage the Association and tried to join the Institute again. The AEIT was integrated in the Institute in 1952. That was considered as a kind of recognition by the other engineering.

VI. TRAINING

Since it was created, the AEIT has been defending the profession, the telecommunication engineering and the way engineering have to be done in order to improve quality of communication services, in a direct way, and to develop our society and enhance the economy, in an indirect one. To get that objective, well prepared professionals who were able to design networks and services were needed.

To get that purpose two important things were done by the AEIT: one oriented to students and the other to professionals.

In the first one, the AEIT helped in telecommunications study plans, and was involved in the way degrees was evolving. Until 1957 the Telecommunication School, where the academic degree was obtained, depended directly of the Ministry that had the telecomm competences, Home Office; the same thing happened with the other Schools of engineering.

At the beginning the relation between the Telecommunication School and the AEIT was very strong; some of the members of the steering committee of the Association were professors at the School and even some presidents of the AEIT were its Directors. That made that the professional opinion was known and considered by the School.

Since 1957, all of the Engineering Schools were reunited for the first time, and passed to form part of the University. The AEIT, as well as other professional associations, was invited to participate in the elaboration of the study plans for the degree. As time was passing by, all these things have changed. Nowadays, the AEIT formed part of the Commission where all the directors of the different telecom engineering schools discuss about the plans. One example is the work that has been done very recently for the European Higher Education Area (Bologna process), where the AEIT was involved a lot.

The second one is related with the training the engineers need after finishing their studies at the University. The AEIT is organizing some courses and conferences for them in order to achieve this purpose, some or them free of cost and the others with a cheap cost.

The AEIT has a compromise with training, due to fact that it gives professionals the possibility of getting new knowledge and applying for new career opportunities. Because of that, this has been one of the activities that the AEIT has done since it was created, so that it keeps its members up to date after finishing the studies in the University.

Nowadays, as technology has been developed a lot, the AEIT has three ways of imparting courses: on line, in-situ and a mixed of the formers. That gives the same opportunities to all the engineers, without thinking of the place where the live. The only thing is that in on lines courses people can not make relationships which are the other participants, which is also another objective of the association.

VII. TECHNICAL ASPECTS

Another area in which the AEIT has been involved and should be stressed in this paper, it is the one related to the technical aspects. There are several examples that could be emphasized, but we will only focus in two of them: the first national television plan and what it is called “telecomm common infrastructures”.

In 1955 the AEIT wanted to commemorate the 100 years of electrical telecoms in Spain, and organized some activities for that. One of them was a Conference. Several areas were defined in it which reflected the state of art of technology. At that time, television was not started yet in a formal way in Spain and an area on that matter was held in the Conference

program. In that area a panel of experts were discussing about the best way to implant the television service in Spain. The Iberian Peninsula is a country with a lot of mountains, and that makes that a lot of areas did not receive enough coverage, so some of the plans that were utilised in others countries were not valid in Spain. The experts propose a quick way of implementing the service.

The conclusions of the Conference were given to Government and, between them, there was a plan to develop television in the country. The project was adopted by Government and in a few years Spain television started in the main important cities and was connected to the international networks, in the same way it was described by the AEIT.

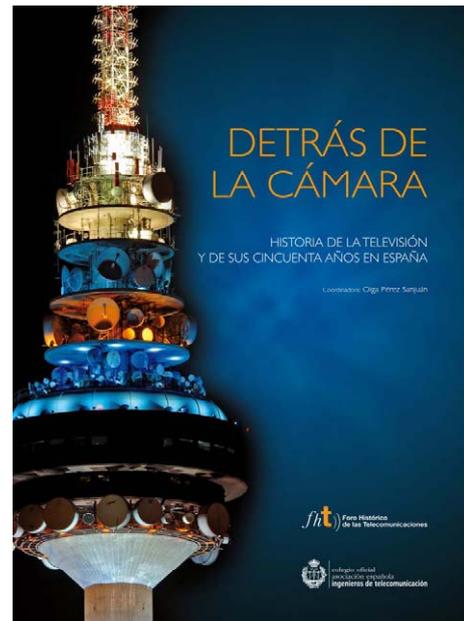


Figure 12. Book published to commemorate the fiftieth anyversary of television in Spain. It is a technical history book elaborated by the Telecom Historical Forum, AEIT. COITand AEIT 2008.

Regarding the second issue, at the end of the XX century telecoms were playing a very important role not only in a professional aspect but also in the domestic ones. Houses needed to be prepared for that. In Spain houses are mainly flats, and most people live in cities. According to the main characteristics of our country a proposal was done in other to contribute to the development of knowledge society: the “telecom common infrastructures” (TCI). At that time, there were several analogical channels of television –some for the whole country, other regional and another locals,- the satellite channels, the broadcasting networks, the telephony operators, and the cable operators.

The telecom engineers were working together with some organizations, including the Public Administration, until an agreement was made to create the bases of the telecom common infrastructures.

The “telecom common infrastructures” let access to all the telecommunication services inside the buildings. It is a way to facilitate telecoms in a liberalised market, and let people the opportunity to choose the services or operator they want,

warranting cheap quality infrastructures, and what we consider more important, in a transparent way to users. These TCI developed some criteria to be used during the next 20 years and all the new buildings have to comply with the Royal Decree which approved it. To obtain this, a telecom project, signed by a telecommunication engineer, has to be presented at the same time than an architectonic one, signed by an architect. Nowadays the telecom engineers are working in a new TCI based in optical fibre.

VIII. STRUCTURE

One of the objectives of the AEIT is to improve the networking within its members. This aim has been in the organization since it was formed. For that a lot of things have been done. The social events that the AEIT organised as conferences or courses and the cocktails that were served later let people meet each other and develop social relations. There were special events, as social dinners or balls, that have the same objective. Nowadays these things are easier due the new possibilities that technology give us. We consider ourselves as a big social net.

As the number of engineers was increasing and the professional activities were developed in different geographic areas of Spain, the structure of the association had to change from a centralised organization to distributed one. First of all, delegations were created in those areas that had a certain number of engineers that demanded it. The delegations began to appearing at the end of the sixties.

The political changes that happened in the country at the end of the seventies originated Regional Governments, and that had some consequences in the AEIT. Delegations began to disappear and instead regional associations began to be established, operating in the land of the new political regions. The new regional associations started at the end of the eighties.

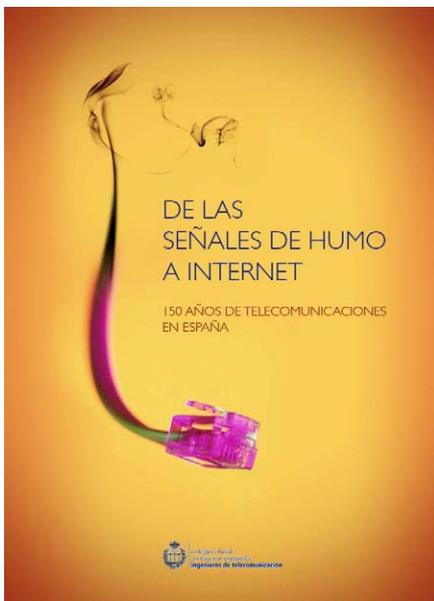


Figure 13. Book published to commemorate the 150th anniversary of electrical Telecomms in Spain. It is a technical history book elaborated by the Telecom Historical Forum, AEIT. COITand AEIT 2006.

Now the AEIT has delegations in all the regions of our country, in spite of density of engineers which it is not homogeneous.

IX. CONCLUSIONS

- The telecommunication engineer degree was officially created in 1920.

- The Spanish Association of Telecommunication Engineers (Asociación Española de Ingenieros de Telecomunicación, AEIT) is a private non profit organization that was established in 1926. Its members are Phd and telecom engineers.

- Its objectives could be summarised as Defence and improvement of the profession.

- The AEIT has been defending telecommunication engineering and the way engineering have to be done in order to improve quality of communication services, in a direct way, and to develop our society and enhance the economy, in an indirect one.

- The AEIT has been involved in training, so that we could have professionals who are well prepared, and they are able to design networks and services.

- The AEIT has participated in the main milestones of the profession.

- Its initiatives have been developed through several Rules and Regulations.

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