

The First Spanish Short Wave Stations.

Development of Radio & TV Technology

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Abstract - In the thirties in Spain there were three big Short Wave Stations. One, belonging to Transradio Española in Aranjuez, 50 kilometers south of Madrid, which rendered radiotelegraphic services to the Canary Islands, Europe and America. Another, belonging to the Sociedad Anónima Radio Argentina (via Radiar), in Vallecas, on the outskirts of Madrid, also rendered radiotelegraphic services. The third belonged to the company Telefónica Nacional de España (CTNE), in Pozuelo del Rey, 50 kilometers east of Madrid provided radiotelephonic services to New York and Buenos Aires. In 1932, Aranjuez started broadcasting the programming of “EAQ-Madrid Radiodifusion Iberoamericana” directed to Spanish speaking countries. During the Civil War it became the Spanish Republican overseas broadcasting station. However, in 1937 as a result of the Battle of Jarama, Aranjuez became cut off from Madrid and the transmissions and call signs were transferred to the Vallecas transmitter EDZ using the call-sign EAQ-2.

I. THE CONCESSIONS

The group of Argentine radio amateurs, all doctors by profession, lead by Dr. Miguel Mújica which in 1920, created the first broadcast station in Buenos Aires, called Radioargentina, when this became Radio Nacional, they also created a society having the same name to operate the shortwave telegraphy circuit between the city of Río de la Plata and the Spanish capital, Madrid. The application for authorization from the Spanish government to establish the circuit was signed another doctor in the group, Enrique Telémaco Susini. A Royal Decree-Law of the 30th of March 1927 authorized the Radioargentina Society to establish an international transmission and receiving service using high frequency (shortwave) electromagnetic waves for direct communications between the Argentine Republic and Spain.

It was argued that in attention to national interest that always represented the easiest and fastest communications with the Hispanoamerican republics “be given without any character of monopoly with respect to what could be in conflict with current legislation”, which was by the auction system. The 21 conditions that were established included a 25-year concession period, that 75% of the personnel were Spanish, of which 25% would be military under training, public utility in case of expropriation, establish own link lines, and transmit free a daily Hispanoamerican message of 150 words, in accordance with the notes issued by the government.

The Spanish government would be responsible for receiving, retransmitting and distributing the service that would be dispatched subject to payment of a 0.20 gold-franc fee per word, whether terminal or transit, however, traffic between the Argentine Republic and Spain would pay 0.20 gold-francs to Spain.

Nine months after this concession, a Royal Decree of the 24th of December 1927, based on the previous concession to Radioargentina, the Spanish Transradio Syndicate was given, for the Spanish company that would be constituted before formalising the corresponding deed, the concession of having the right to establish international European and extra-European wireless communications services. This time, there were 23 conditions and differed from the other concession in that the transmission and reception personnel would be Spanish and be officially qualified Radiotelegraphists. The European service fees would be the same as the line or cable services and for the international extra-European service, when dealing with communications with Latin-American countries, the reduced fee to be applied would be agreed in each specific case. In addition, the daily Hispanoamerican daily information was 200 words.

The first stone was laid on the 12th of January 1928 for the building for the Radioargentina Society Transmission Station at kilometre six along the Valencia highway, between the Puente de Vallecas and the town of the same name. The ceremony was attended by the Council President, General Primo de Rivera, the Papal Nuncio and the Minister of the Interior. Mr. Ruiz de Valdivia said a few words in name of the Society’s Administrative Council, which were answered by General Primo de Rivera, who gave congratulations for making communications projects between Argentina and Spain a reality. This gives some idea of the importance given to the establishment of such services.

A Royal Command of the 23rd of May 1928 published the regulations governing relations between the Spanish State and the Spanish Transradio Society, especially for telegram traffic. However, Article 3 was significant in that it established that the State, instead of terminal and transit fees, would receive 10% of the gross income provided by this international traffic. Another Governmental Royal Command of the 28th of June 1928 provisionally authorised Trans-radio to make use of the long-wave wireless installation Madrid-Aranjuez-Alcobendas

and Barcelona-Prat-Campo de la Bota belonging to the National Wireless Telegraphy Company. This authorisation became definitive by a Decree Law of the 30th of April 1929.

A Royal Command of the 10th of August 1928 authorised Transradio Española S. A. to establish direct wireless communications from the Aranjuez Wireless Centre between Spain and any other country. This authorisation was based on Article 1 of the 1927 Washington Wireless Agreement, which defined the term “wireless communications”, which was authorised by the previous Royal Decree as: “the wireless transmission of writing, signs, signals, images and sounds of any type by means of radio waves”, which is considered to include radiotelephony communication.

The Gaceta de Madrid edition of the 22nd of July 1929 is very significant because page 538 contains two Royal Commands with parallel texts. One of them authorises the Spanish National Telephone Company to run a wireless service with Buenos Aires in Argentina from stations that were being installed in Pozuelo del Rey and Griñón and the other authorised Transradio Española to run wireless radiotelegraphy services with Argentina, Brazil, Cuba and North America using the shortwave stations at Aranjuez and Alcobendas. Both cases stated “Considering the highly significant reasons of convenience for national interests and the no less important ones for the strengthening of Hispanoamerican relations make it very necessary to execute these projects as soon as possible”. The CTNE stated “It is the wish of His Majesty, that this authorisation does not affect the right of the Spanish National Telephone Company to establish this service without any new concessions or agreed expansion of that already in force and with provisional character until the installation project presented by the Company is approved”. The Royal Command of the 31st of July approved the Transradio project, which subsequently applied for authorisation to enlarge the Aranjuez installations with radiotelephony shortwave equipment and directional antennas, which was approved by Royal Command on the 8th of October 1929, pending presentation of the corresponding technical project, which was finally approved by Royal Command on the 25th of January 1930.

This common paragraph may call attention to the two concessions that refer to national interests and the strengthening of Hispanoamerican relations and which is a repeat of the Radioargentina concession: “in attention to national interest that always represents the easiest and fastest communications with the Hispanoamerican republics”. The explanation may lie in the conclusions of the First National Congress for Spanish Overseas Commerce, held in 1923, which recommended the study of an international Hispano-American wireless network. Consequently, the National Council for Spanish Overseas Commerce requested the General Primo de Rivera government to study the possibility of employing the radiotelegraphy station at the Electro-technical and Communications Centre at Prado del Rey for the issue of public service dispatches with overseas countries, thus

establishing the network. The government took heed of the petition and the Royal Command of the 3rd of July 1924 authorised the constitution of a Commission responsible for regulating the use of the military station services by private persons. Moreover, the organisation of the 1929 Ibero-American Exhibition in Seville was under way and all the companies assessed the possibility of initiating the service on the 12th of October of that same year, which was then named the Day of the Race.

In April 1911, the Ministry for the Army established a long-wave radiotelegraphy service for communications with Morocco, the Canary Islands and European countries using the transmitter station at El Cerro del Cadalso, in Carabanchel which, today is Prado del Rey, together with the Morata de Tajuña receiving station. On the 13th of September, the Ministry for the Army notified the Ministry of the Interior that the transmitting station being constructed by the Compañía Telefónica at Pozuelo del Rey was causing interference to the operation of the receiving station at nearby Morata de Tajuña to the point of rendering the service unusable. The Ministry of the Interior passed the matter on to the Radio-communications Technical Council and Inspectorate which, at its meeting on the 5th of October 1929 agreed that the installation of the shortwave transmitter installation at Pozuelo del Rey should be abandoned, which was notified to the Compañía Telefónica by the Royal Command of the 28th of October 1929.

II. INAUGURATION OF THE SERVICES

Despite the previous, on the 12th of October 1929 the Holiday of the Race, saw the inauguration of the transatlantic Argentina-Spain and Spain-Uruguay telephony services. This act was held in the Spanish National Telephone Company at the Ibero American Exhibition in Seville, with the attendance of the Head of Government General Primo de Rivera, His Royal Highness Prince Carlos and other dignitaries. These were all received by the Company Vice-President Mr. Proctor, Chief Engineer Mr. Fried and the General Sub-director Mr. Jayme, all Americans. Conferences were held between General Primo de Rivera with the Argentine Minister of the Interior, the Spanish Ambassador to Argentina, the Uruguayan Minister for Foreign Affairs, the Spanish Minister in Uruguay and, finally, the Exhibition Manager, Mr. Cruz Conde to the President of the Montevideo Press Circle.

The radiotelegraphy service between Spain and América de Transradio Española was inaugurated on the 21st of October. The act was held at the Aranjuez transmitter station, presided over by His Majesty the King, with the presence of the Head of Government General Primo de Rivera, The Minister of the Interior and the General Secretary for Foreign Affairs. They were received by the Company Board President Mr. Setuain, together with senior council members Rosell, Borbón and Asensio and Engineers Mr. Jaspas and Mr. Masset. Special invited guest was Guillermo Marconi accompanied by his wife. They exchanged telegrams between authorities in

Argentina, Brazil, Cuba, Spain and the United States. The telegram from General Primo de Rivera to the Argentine Minister for Foreign Affairs said: "Eight days after voice communication from Seville, I can now do it today by wireless with this great nation ...". General Primo de Rivera evidently did not have a very clear idea of radiotelephony. Mr. Pedro Regueiro y Ramos, Chief of the Telegraph Brigade, was named Representative of the Ministry of Communications at the Spanish Transradio Administration Council by Royal Command on the 4th of December 1929.

Continuing in October 1929, on the 25th the Radiargentina Company opened the radiotelegraphy service to traffic from its transmitter stations in Vallecas and receiving station in Majadahonda. This was attended by banking representatives and the Madrid press, who were looked after by company management personnel, such as the Marquises de Amposta y Quintanar and the General Manager Mr. Ruiz de Valdivia. The Madrid personnel, both technical and administrative, were Spanish, with the former coming from the Telegraph Brigade.

The transmitting equipment consisted of the following elements: master oscillator, fitted with a quartz crystal for frequency stability, an amplifier or coupling stage to the frequency amplifiers, two frequency doublers, a 500 W amplifier that included the telegraph keying or telephony modulation, an intermediate 4 kW amplifier and a 20 kW power amplifier.

The transmitter equipment was completed with dc power supplies providing the various voltages for filaments, grids and anodes of the triode valves and the 10,000 V drectifier that fed the power amplifier anodes.

The signal power was radiated by dipole or doublet antenna with four radiating elements



Figure 1. Vallecas transmitter equipment

and four reflector elements forming an assembly that radiated power in the Madrid-Buenos Aires direction, concentrating it into a ten-degree angle. The antennas were fed by an open-wire transmission line mounted on posts, with a wire separation of 23 centimetres to provide a feed-line impedance of 600 ohms. Such antennas maintained Madrid-Buenos Aires communications open from October 1929 when traffic was opened, until September 1932 when they were replaced by a rhombic or double V-beam antenna.



Figure 2. Vallecas antennas

The main electricity input was three-phase taken from the high-voltage industrial sector, which was lowered by a transformer installed close to the transmitter station. The generator sets were as follows: 1) ac motor and 275 V and 5 Amp dynamo. 2) ac motor and 1,000 V and 2 Amp dynamo, 1,500 V and 0.5 Amp dynamo and 16 V, 60 Amp dynamo. 3) ac motor, two 2,000 V, 15 Amp dynamos and a 16 V, 50 Amp dynamo. 4) ac motor, 275 V and 2 Amp dynamo and 24 V, 100 Amp dynamo. Power amplifier high voltage was obtained from a 230/10,000 Delta-Wye transformer with outputs to compensate for mains power variations. The filter equipment comprised a high self-inductance choke-coil and two capacitors in series, each of 16 microfarads. Cooling required 46 litres per minute at a height of 31 metres. Circulation was via a suitable motor-pump set. The water leaving the valves was circulated through a fan-cooled radiator. At that time, the transmitter station site was a meadow for cereal cultivation without any water supply. Therefore, in order to have the necessary amount available for valve cooling a well was dug almost 90 metres deep, which provided very hard water that blocked the cooling piping. In the 40s, my father was responsible for station maintenance, which was performed on Sundays as the circuits were not open to traffic. For this reason, when I was eight or nine, I used to sometimes accompany him and I can still remember the problems of lime scale in hoses and access piping to valves and coils. Later, as an engineer myself, I installed a raised tank and reached an agreement with the Madrid Council to periodically supply potable water in a tanker lorry.

A Ministry of Communications Order of the 1st of June 1931 approved the location of the CTNE station site in Pozuelo del Rey, with the reservation, on petition from the Ministry for War, that the company was obliged to transfer, at its own cost, the Morata de Tajuña military receiving station, to the site to be determined, when interference was appreciated or the possibility of it existing was demonstrated at the Morata de Tajuña receiving station. It should be pointed out that the Primo de Rivera government which, according to many authors had favoured the ITT in the creation of the Spanish National Telephone Company, would act against it in

this case, however, the Republic government, which a few months later would propose expropriation of the company, would find a solution in its favour.

III. EAQ. RADIODIFUSION IBEROAMERICANA

Many American organisations and the Transradio Española made continuous applications to use the shortwave station with its antenna directed towards South America as a radiobroadcast service installation. Although a Royal Command of the 14th of January 1932 denied these applications, another dated the 12th of February 1932, authorised Transradio Española to use the Aranjuez shortwave station, with its antenna directed towards South America as a radiobroadcast station, with programming especially dedicated to the Canary Island archipelago and Spanish-speaking South American countries. This authorisation was provisional for testing purposes, without prejudicing any subsequent rights.

Intercontinental services made use of two 20 kW shortwave transmitters at Aranjuez, one was a Marconi SWB 1 and the other an S.F.R. One of them had an antenna pointing in the Madrid-New York direction for 15-metre transmissions (20 MHz) during the day. The other transmitter's antenna was aimed towards Buenos Aires and Río de Janeiro, also using the 15-metre band during the day. At night, both transmitters were tuned to 30 metres (10 MHz) using omni-directional antennas.



Figure 3. Aranjuez antennas

The valves and other elements required to produce the high frequency power were mounted on panels. The components parts were mounted inside open cabinets that were rigidly constructed with angular bronze bars. Where possible, all porcelain insulators had been removed and replaced with thick plates of glass.

The stability of the frequencies that had gained importance when operating with shortwave was obtained by employing a “Marconi Drive”, independent of the master oscillator system, so that the power circuits were forced to oscillate at the frequency to which the “Drive” was tuned. The latter circuit, which was fully screened from the rest of the circuits, was coupled to an oscillator circuit.

Two Marconi Type CAT 2 power amplifier valves were used, which employed petrol as the anode cooling fluid, together with an air blast to cool the grid, filament and anode assembly. The filaments were powered by a motor-generator set.

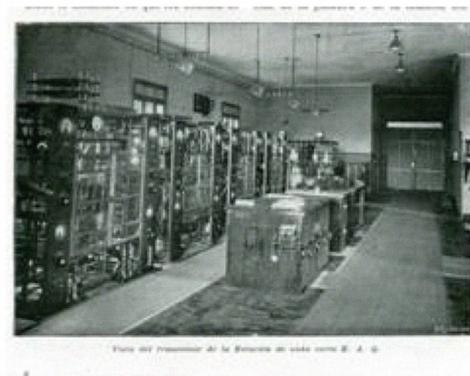


Figure 4. Aranjuez EAQ transmitter equipment

Based on this authorisation, Transradio commenced transmission to the Americas at 00:00 hours on the 22nd of May 1932. The President of the Republic arrived on time with the Minister for State, the Chief of the Military Headquarters, Mr. Queipo de Llano and the General Secretary to the Presidency Mr. Sanchez Guerra. These were met by Alcalá Zamora, the sub-secretaries to the Presidency and Government, the Director General for Security General Mola and all the personnel at the transmitter station. Four years later, many of these persons would use the microphones from opposite sides.

The Director General Mr. Villanueva announced to the listeners that the President of the Republic was going to speak to them, he read some pages in which he saluted the peoples of America and pondered on the prodigious means of transmitting the spoken word offered by radio.

A British organization, the International Broadcasting Co. (IBC), headed by Leonard Plugge during the 30s, intensified its competition with the BBC and attempted to create his own shortwave Empire Service just like the former. To this end, he reached an agreement with Radiodifusión Iberoamericana to use the Aranjuez EAQ Madrid station.

As from the 7th of August 7 1933, through an agreement with Radio Asociación de Cataluña, promoted by the Generalitat de Catalunya, a daily news bulletin of Catalan current affairs was transmitted, together with a weekly broadcast of reports and concerts entitled the “Hora Catalana”. The very first programme included a speech by President Maciá and an actuation by the Orfeón Catalán.

Programming continued and was widely accepted by hispanamericans listeners and this was the situation in which the Spanish Civil War commenced. A decree by the Ministry of Communications and the Merchant Navy on the 2nd of August 1936 authorised the temporary State commandeering of the Transradio Española shortwave installations intended

for commercial telegraphy services, authorised as a telephony radiobroadcast station. The Ministry took over the services and named a General Manager of the commandeered services. Nothing is done and, on the 6th of November 1936, in view of the belligerent situation at the gates to Madrid, the government moves to Valencia and the Madrid Defence Council is created with General Miaja leading it. By decision of the Popular Front Committee, orders are given to put the young journalist Arturo Barea in charge of the Press Department, which, in view of the information of the foreign correspondents realises the importance of press censorship that is established on the Telefónica premises with entrance by Valverde Street. On the same day as his appointment, he meets with the Government Delegate in Transradio Española pointing out the problem of censoring telegrams being sent outside Spain.

The EAQ situation is made worse by the employees not being paid and not having any money available to purchase components, especially valves. In view of this situation, the Transradio Government Delegate decides to visit Barea and explain the situation. The latter realises the potential of this transmitter in time of war and decides to look into the problem and try to resolve it. He manages to reach General Miaja, who names him his delegate at the EAQ station with full powers.

The station was located in the Fénix building in Alcalá Street, with modern studios and also well equipped, however, the bombing had forced it to be transferred into the basements. There were "cells" in a long corridor that had originally been lumber rooms or coal stores, each with a grille that gave onto pavement level in Alcalá Street. Some had been converted into offices and one into a studio simply by hanging army blankets on the walls to isolate it from noise. Barea took charge of the programming for this "Voice of Madrid" and his recognition as a commentator and speaker came about with the fall of Bilbao on the 17th of July 1937. The Republican propaganda had been based on the heroic defence of the Basque Country capital and when foreign news of its fall, a communiqué was launched indicating that only its heroic defence was to be mentioned. In view of all this, Barea went to see Miaja and he informed him of the negative effect that this could produce. The General agreed, but did not dare make any decision, then Barea suggested he write a letter, he did so and Miaja authorised. He personally read it and it was the very first time he had ever spoke into a microphone, not only did he do this, but he also called the editor of the only newspaper published in Madrid and sent him to publish it, which was how Madrid learned of the fall of Bilbao. From this time, Barea read a nightly letter in which he spoke of events in the Madrid streets, or of his journeys to nearby combat zones.

Numerous books and articles have been written about Republican propaganda during the Civil War with EAQ being the principal example of it. The version that I have employed comes from a novel, partly autobiographic by Arturo Barea, "The Rebel's Forge". I have used on other occasions about telecommunications in the Civil War and describe places that I have subsequently known through my work. The case of the

"Voice of Madrid" is not fundamental to his novel and I had no reason to appropriate it in case his intervention is not true which, on the other hand is highly detailed with the names of persons.

Along these same lines, it has also been published, including by myself, that the line connecting the Madrid studios to Aranjuez was cut during the Battle of Jarama and the Radioargentina transmitters in Vallecas were then used to continue broadcasting. In fact, when I was the Chief Engineer at Entel and responsible for the Aranjuez station, the operators told me about the cut in the line and that they were transferred to Requena, from where the service was to be resumed. The battle of Jarama started on the 5th of February 1937, thus before the fall of Bilbao, therefore everything described by Barea about his actions is not from EAQ in Aranjuez; but from EDZ (EAQ – 2), in Vallecas instead. It could be used in confirmation that when Barea describes his final chat over the radio after being replaced he said: "my old sergeant incessantly cleared his throat and blinked and the Vallecas engineer in charge of control called over the telephone to say that for once I had talked as if I had really had my heart and soul in it".

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