

Communications without secrets. Activities of Spanish listening and cipher services during two wars (1939-1945)

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Abstract- The appearance of radio communications supposed a revolution in the commercial field and also in the military field. Problems for information coordination and distribution disappeared due to the great simplicity of the wireless telegraphy. Moreover it was possible to avoid rigid and costly infrastructures that limited, in many cases, the correct use of communications. However the flexibility and the independence of a tangible physical media represented a potential danger: the capture and use of this information by non authorized people or organizations (so called illegal listening or eavesdropping). Spanish civil war and World War II showed the great importance of the eavesdropping services, used by all the contenders and by third countries interested in the Spanish situation. Some of these third countries were also interested in using Spain for their spying networks. Many historians said that Spanish war was a test field. If this is true, the German and soviet eavesdropping services were good pupils, although possibly the Italian services were the most active and useful. The Spanish services were excellent pupils obtaining a very high technical competence, even worthier thinking in the null technical knowledge at the beginning of the war. In fields as cryptanalysis, Spanish services were better many times than their supposedly teachers, allowing the rebel camp to be perfectly informed of the international situation once finished the Spanish war. During World War II the foreign eavesdropping services at Spain, mainly German and Italian, followed their work, sometimes collaborating with their Spanish counterparts. The ciphering services tried to reduce the danger associated with these eavesdropping, an objective not always got. This work aims to offer a broad view of the conduct of the eavesdropping, ciphering and cryptanalytic services, Spanish and foreign, during this period. Also we analyze their organization, effectiveness and achievements and failures during the tumultuous years since 1936 until 1945.

I. Introduction

After the birth of wireless telegraphy invented by Marconi, it was evident that the way to manage communications, dependent on a physical medium until that moment, was going to change dramatically. The problems related with coordination and information distribution were greatly reduced thanks to the ease associated with wireless telegraphy transmission. Also the costly and rigid infrastructures that limited frequently the correct use of communications disappeared. However this flexibility and independence of a tangible physical medium represented a potential danger: the

catching and use of this information by people or organizations non authorized, something called today “illegal listening” or eavesdropping. The military field was not going to be a mere viewer of these new technique advancements. On the contrary, they were adopted quickly as a clear enhancement for the military communications that were limited, until that moment, to optical communications, wire communications or the more classical ones, as the mail or carrier pigeons. Marconi machines were used by the British for Boers war and they also were one of the factors for the Japanese victory in the Russian-Japanese war of 1904-1905. In this last war new applications appeared for the use of wireless communications. The Japanese installed a radio machine in each ship on its fleet. This radio machine was a very basic one, with only a range of 60 miles and it can operate for a single frequency. The Russians also installed radios in their ships and in several land stations. They discovered that when the Japanese were about to attack, the number of messages between Japanese ships grew greatly. Seen from today this can be interpreted as the first known traffic analysis [3]. It was in the same campaign when radio was used for the first time to interfere the enemy communications. On March, 8, 1904, the cruisers Kasuga and Nisshin and a destroyer were going to bomb Port-Arthur. A radio station operator intercepted the communications between Japanese ships and began to use the radio to interfere enemy communications. We really are not sure if this was the cause, but the Japanese cancelled the attack and they retreated.

First World War was the high point that obliged to do a global redefinition for communications. The ease of diffusion and a better coordination between own forces implied a great ease of interception. It was necessary a greater protection extent than the present then. Cryptography was the most evident candidate and also the most suitable. Everybody knows that to do a successful cryptanalysis one of the problems is to have available a great number of messages. This problem was solved due to the wave characteristics of radio broadcasting, so cryptographic systems in use were adopted and reinforced because there were no alternatives to the use of radio and telegraph.

French army was quickly aware of the problem and, at August and September, 1914 they admitted the obstacles

related with wireless telephony and ordered silence to all stations ascribed to the Armies General Staffs [13]. As a French officer of the cipher section said: *“In today conditions of wireless telephony, these waves can be captured by anyone, by the enemy at front, by neutral countries more or less vigilant and by the enemy for large distance communications directed even to the inverse of operations theatre. If the messages are transmitted in a clear way, all information trusted to radiotelegraphy is going to be made public”* [20].

Diplomacy was also affected by problems related with these interceptions. At 1908, during the Italy-Austria crisis, when the Austrians got Bosnia and Herzegovina, it is dated the first known case of tapping and deciphering of communications for obtaining diplomatic information. The Austrians used the intercepted information to guide their policy related with that crisis [3].

II. Spanish communications before civil war

Not so quickly as its neighbors Spain added gradually wireless communications for the Army and the Navy. A possible reason is the characteristics of the kind of war Spanish are involved, a colonial war. In this kind of war the enemy was not especially prepared. The first known radiotelegraphy stations used by the Spanish army were installed at 1908 for the link between Melilla and Almeria. It was precisely this year when radiotelegraphy was used for the first time for a military action [17]. One year later a campaign station was installed, first at Restinga and then finally at Alcazaba de Zeluán, that linked with the fixed stations at Melilla and Almeria, with ships at less than 200 Km, and with near portable stations. By the end of 1911 the military radiotelegraphic network had fixed stations at Melilla, Ceuta, Larache, Almeria, Barcelona and Carabanchel (Madrid). Also there were stations for training at Centro Electrónico de Madrid and at Escuela de Ingenieros at Guadalajara, and several portable ones more for tests and exercises [17]. At 1913 a Telefunken radio station was installed at two kilometers of Melilla that had a range of 750 Km. This station replaced the old one at Alcazaba [16].

The Navy also adopted the new technology that allowed a better coordination between their ships. The Royal Order of September, 19, 1911 agreed to place radiotelegraphic stations in all the Navy ships but the torpedo boats. Most of the stations were Telefunken, although there were two Marconi, one for the “Carlos V” ship and the other for the “Princesa de Asturias” [17].

When First World War began, without the need for fighting well technically prepared armies, Spain was not between the leaders in technical aspects neither of using radio nor for cryptographic aspects. The key and cipher systems used by Spain were very weak. One of the best experts in cryptography of the German Army, Lieutenant Stützel, assured that, not having but a very poor knowledge of Spanish language, he was able to decipher all messages between

Spanish ambassador in Berlin and Madrid. A peek on the cryptography books published in Spanish shows that the most recent were written in the last 20 years of XIX century [6], [19]. There was no special interest in any field by these matters. At the end of First World War, the Royal order of June, 1, 1920 established the first Spanish radio goniometric network conducted by the Navy [3]. It was composed of five stations in Estaca de Vares, Toriñana, Trafalgar, Monte Toro and Tarifa and, at 1925, another station in Maspalomas in Great Canary. However most of military communications were yet done by telephony, optical or telegraphy stations and the main function of communications was only the basic one, not taking into account applications as the tapping or eavesdropping. The situation was going to change quickly.

III. Spanish civil war

When the war began the Army had only two Transmissions Units, at El Pardo in Madrid and the Transmissions battalion at Morocco, placed at Ceuta. Both units joined the rebel camp and the loyal, republican camp, stayed in a very delicate situation from the point of view of communications. At 1936 the precariousness in radio for linking the great units was evident. At the Navy in the rebel side the situation was the same, its telecommunications service was very poor and things went better only with the German and Italian help. Radiotelegraphy stations were installed at land and at the naval units. It is important to emphasize the radiotelegraphy station provided by the Germans and installed by Italian personnel at San Fernando (Cádiz) [18]. Also the security for communications was poor and the used ciphers were very weak and even commercial dictionaries for ciphering were used [7].

Although at the first stages of the war the first function was the coordination and links of own troops, the advantages of capturing the enemy information were soon discovered. The activity was poor during the first months, the radio material was scarce and many times the radios at the ships were used for listening functions and for helping on spying [30]. Initially the eavesdropping of enemy radios at Palma de Mallorca was made with the machines at the ships “Ciudad de Palma” and “Ayala Mendi”. Afterwards two radios of the radio academy of the Transmissions Company and the receiver of the Police Radio [23]. The listening material is supposed to be German although Palma was under Italian influence.

The month of August in 1936 the Engineers Major Antonio Sarmiento León-Troyano was appointed as the responsible of the leadership, organization and distribution of ciphers between the higher units. Also he was responsible of organizing the eavesdropping at the fronts and at the rearguard and also of distributing the information between the Second Sections of the different General Staffs. Sarmiento was going to be a key piece for future because he was able to organize a very efficient service even taking into account his scarce resources when he began. Many times the best deciphering

men at the war were so by chance because almost all of them had no experience at all in cryptography.

German and Italian help were decisive for the military that took part in the coup. Without this help the rebel band were going to be in an unsustainable situation and maybe to surrender. Hitler gave a first help for crossing the strait at the end of September, 1936 with the so called "Magic Fire" operation. Afterwards he increased his intervention in Spain with the Otto operation in which he sent, besides 24 tanks and anti-aircraft material, radio equipments [28]. Soon after that, the first Enigma [22] machines arrived for ensuring the rebels communications. The need for ensuring the communications was imperative for both bands. All communications were routinely captured and easily deciphered because of the weak used keys. The Navy received their first Enigma machines for the cruiser "Canarias" for coordinating the ship with the German and Italian naval forces, using a trilingual watching code using super ciphers tables, the DEI code, an abbreviation for "Deutschland, España, Italia". For this coordination, 180 copies of this code were distributed between the three implied Navies.

Once turned into a real civil war, and with the agreed international help, some detachments of eavesdropping and cryptography specialists came from Rome, Berlin and Moscow. The Condor Legion included two groups of communications and radio intelligence, called Wolm Group [28]. German navy had, instead of a very active participation in war, a function dedicated to send war material and to intelligence work. OKM, the German Navy General Staff, collaborated with the Condor Legion creating a new section called "Gruppe Nordsee". This group was made up by 75 men who took charge of the radio communications and supplies. They had two radio telegraphy operators at Salamanca that operated with the key name "Anker", 14 men at Cádiz, with the key name "Partner", three at Ferrol with "Peter" as their key name, one in Sevilla, "Witan" and 12 at the AS/88 maritime watching squadron at Melilla and, later, at the Balears. They were mainly dedicated to inform of the activities related with the loyal ships and also of the French, British and Russian transports with supplies for the Spanish Republic [28].

The Italians at Ufficio D (Decifraggio), dependent on the CTV Information Service, Ufficio I [14], were one of the most active services during the war. Conducted by the Lieutenant Coronel Francesco Dragone, they had a good communications listening and deciphering service. They had always part of the staff near the battlefield [31]. Their members collaborated closely with their Spanish comrades, having even mixed deciphering groups. Their efficiency against the military keys was modest but it was better for the diplomacy keys and also for eavesdropping. However they never broke the Russian keys [14]. As it is showed later, once finished the war, they stayed at Spain for some years, working with the Spanish deciphering services.

The Russians sent to Spain during the war several groups of radio intelligence and coding specialists, whose definitive number varies depending on the authors, but they didn't exceed 200 people in the most optimistic case. The secret between the Russians was even higher than for the Germans and Italians and, at least for the deciphering advisors, their name was not known and they are known simply as "tovarich".

The British didn't participate but, during the war, they got a great volume of military and diplomatic messages, many of them ciphered with Enigma machines. The messages were from the Germans, the Italians and from the General Franco band. This great messages volume, in war time, allowed them to know the behavior of the involved nations and also gave them a very good material for cryptanalysis. This was of an incalculable value afterwards for breaking the Italian naval Enigma [9].

The British had available much information about the relationships between the rebel band and the Italians, thanks to their tapping in the communications between Rome and Spain. It appears quite sure that the rebel embassy at Rome used codes for their ciphered communications with Madrid, instead of the Enigma machine, K-203 that was sent to them but, inexplicably, was lost. Today we don't know what happened exactly with this Enigma machine [22]. The knowledge of the content of Spanish and Italian messages was probably the origin of the retirement of the Italians' Plan Garibaldi, a plan to create and send an expeditionary corps of 20000 soldiers for fighting in the General Franco side. It appears possible that some unofficial contacts existed with the rebel authorities and the Italian ones that made the Italians to reconsider a much than probable violation of the international agreement signed after the first meeting of the Non Intervention Committee [14].

Coming back to Spanish contenders, the cryptography workgroups were formally established, at Burgos, associated to the rebel Military Information Service (SIM), at Zaragoza, ascribed to the fifth Army Corps, Palma de Mallorca and Irun, ascribed to SIFNE ("*Servicio de Información de la Frontera Nordeste de España*") [4] [26]. All these groups, together with the German and Italian groups and with the naval cryptography group at Cádiz should begin to work with the daily collected ciphered eavesdropping.

At the beginning of 1937, in Salamanca, the Cipher Service and the Diplomatic Department were created. Else several diplomatic missions out of Spain were established that used initially Enigma machines for their communications as in the cipher service. Also in 1937 the Transmissions Headquarter of the Franco's General Headquarter was built. Its mission was to coordinate the transmissions of the different armies [16] and, afterwards, a general listening and a cryptographic department ascribed to Franco's Headquarters. This department was the responsible of receiving the successes got by the different groups, as broken keys, its storage in a general repository and the redistribution to the rest of groups, avoiding duplicities in the work.

The success of the deciphering services in the rebel side must be associated, besides the organization, with a number of men that, without previous knowledge, reached an outstanding level. On the other hand the same happened in the loyal band, not so brilliant because of the absence of a stricter organization. However, at the individual level, they had great experts as we will show later. Likewise the actions of Italian experts, mainly in the diplomatic field, were a great help for the Franco's side. Table I shows a number of experts of the rebel band, following a document of July, 12, 1939, by Coronel Sarmiento [32].

TABLE I
EXPERTS AT THE REBEL SIDE IN 1939

Fifth Army Corps	José María Iñiguez y Almech, Federico Alzamora.
Baleares	Baltasar Nicolau Bordoy.
Corpo Truppe Volontari (CTV)	Francesco Dragone, De Nacki, Vuolo
Military Information and Police Service	Antonio Espinosa, Gonzalo de Erice, Juan Solabre Lazcano
General Headquarters Department	Román Martínez de Velasco.

We think that the deciphering done by the Germans were done by the cryptanalysis group at the German Cipher Department, headed by Wilhelm Fenner that, besides the Spanish loyal ciphers, was also dedicated to the French ones [2]. We cannot rule out the possibility of the help to Franco of some German expert [32], but it was not the general rule and Coronel Sarmiento's document appears to confirm this hypothesis because there is no German expert in it. However, more than 40 broken keys are assigned to the Germans in the war [25].

The radio goniometry, a service directly related with the eavesdropping, was also greatly used. Using combinations of listening and radio goniometry a number of unit situations maps and communications centers were got [33]. Also they were used for eliminating clandestine radios.

It was evident, being the eavesdropping done in both bands that sooner or later they were going to use it for "poisoning" the enemy. The "information poisoning", sending false, but credible, ciphered information with codes known by the enemy, or even easier, without ciphering, is one of the nightmares of any information service. This is the reason for contrasting the information got by eavesdropping and deciphering with other information hold by other information services. An example of "information poisoning" was the masking of the military maneuvers in the battle of Ebro, done by the Republican SIEM ("*Servicio de Información del Estado Mayor*") and SIM ("*Servicio de Investigación Militar*") that worked very well given the initial results of the operation.

Another reason for talking of the great importance of the listening services is the big number (66561) of captured radiograms since February, 1937 until March, 1939, only by

one service: the Baleares Headquarters radio listening service. This service had an outstanding prominence because they also broke more than 200 republican keys, something that let them obtain fundamental information for the success of the rebel army.

IV. Second World War

Once finished the Spanish civil war, the eavesdropping services objective changed. They received orders for locating French and British stations that made up the radiotelegraphy networks at the west Mediterranean sea. They were ordered to capture the radiograms and also to fix timetables, wavelengths, tunings and every feature with a possible interest. Also the members of the republican deciphering services are searched and they are offered to join the listening and deciphering services of the new government [34]. The high capacity of the members of these republican services ought to be also outstanding because the responsible of the French listening services searched them at the refugee camps in France for joining them to the French services. One group of seven Spaniards integrated in the "D" group [5], [25] at the PC Cadix, a deciphering center of German communications. In this group, beside the Spaniards, there were French and a group of Polish men. Among these Polish, the group had the mathematicians Rejewski, Zygaliski and Rozycki, the first to break the Enigma machines. The "D" group was made of five young officers of the deceased Spanish Republic and two political commissioners. They were all enrolled at the French Foreign Legion because the center was exclusively military. The head of the group was generally known by his last name, Camazon and many years later it has been known that he was Faustino Antonio Camazon that, once finished the war, continued his deciphering work for the French at the Foreign Affairs Ministry [24].

Coming back to Spain, once finished the war, the General Staff and its services are reorganized and it appeared the Fourth Department, Cryptography, dependent on the third section, Information and Sarmiento is appointed as the responsible of the department. The duties of the department were cipher and keys, radio goniometry, listening and deciphering. The department is installed at Madrid, in a rented floor at Lagasca, 205. At another floor at Madrid, Reina Victoria Avenue, the house of the radio telegraphist and cryptanalyst Juan Solabre, the transmissions center is installed. Several other facilities are installed in different localizations, used by personnel at the Army Transmissions Center for listening and radio goniometry. The Italians, that had a very valuable set of international codes, are installed at Lagasca until 1944, when they leave Spain. The responsible was Lieutenant Coronel Francesco Dragone that was, as we have seen, the responsible of the Italian CTV contingent until 1940, when he died. The substitute was Major Damiani [15]. The official mission of Ufficio D was intercepting and deciphering the telegraphy messages and also the messages sent by

Spanish censorship. They deciphered 6437 messages during 1940 and 650 were considered useful [14].

Soon after the end of the war a selected group of Spanish men went to Italy for learning counter cipher. Afterwards this group would be under the orders of Sarmiento. This was the origin of a serious problem for Italians. Until this date the Italians could easily decipher Spanish codes, even the diplomatic ones, but since then Spanish changed their codes and Italians were not able anymore to read them again. We really can't be sure if this was by chance or simply by caution, although we think the caution is the best reason to apply. It is important to remember that the Italians were specialized in "diplomacy", a technique that the Spanish knew perfectly. Also the Italians, working at Lagasca with the Spanish, were sure that they were being spied by the Spanish [15], a suspicion considered by us very well founded. At least we can assure that Spanish group, even working closely with the Italians, was doing eavesdropping on Italian communications [35].

At the General Staff third Section the diplomatic services of the nations in conflict were closely watched, by using interceptions, with the help of experts from Abwehr, the German military information service, of the telephone lines of the main embassies located at Madrid. The keys of U.S.A., Japan, Portugal and Vichy embassies were deciphered easily [21]. This allowed obtaining diplomatic information, very necessary for the new regime. The information was got reading the intercepted telegrams of the different diplomatic embassies when communicating with their delegations at Spain. The Department collected the ciphered messages, classified them, analyzed them and finally deciphered them. A bulletin was made daily with all this information and the information provided by the center at Paris, whose responsible since 1942 was the radio telegraphy operator Olegario Riande and provided by the center at Mallorca, collected by Nicolau and also by the center at Algeciras.

The diplomatic codes were not the only work because the new regime needed to consolidate, so the internal opposition must be eliminated. Although the police had their own cipher and counter cipher experts, from time to time they ask for help to Alto for eavesdropping and deciphering. This collaboration was fruitful, at least for the police, and a good example is the ESMISO key used by communist agents, broken by experts at the fourth department [32].

Another good example of the actions against the opposition was the neutralization of subversive propaganda coming from outside Spain. One of the least known cases was "Radio España Independiente", a communist radio station also known as "La Pirenaica", began to transmit from Moscow in 1941. Such radio station was an evident danger for a country with a very strict censorship for press and radio. It cannot be closed physically but the regime built installations near the airport for jamming the radio waves and the effect was similar.

During the first years of the world war the regime was openly German supporter inside Spain, although not so openly

outside Spain, because it needed the allied imports. It is important to remember that Franco won the war thanks to the generous help of his German and Italian allies and the Axis seemed, until 1941, unstoppable. Probably one of the fruits of this faith in the victory of Germany was the so called C Operation, the Spanish attack plan against Gibraltar Rock. It was presented in his final form on October 1940 by the Army Central General Staff to General Franco that approved it with enthusiasm [21]. All information services, included the technical ones, were working on this plan, as can be deduced of the reception, on September, 26, 1940, at the information section and the eavesdropping and deciphering section, of a very detailed map of Gibraltar harbor, with indications of the great units found there [32].

The collaboration followed for eavesdropping and technical help for observation, very important at the strait, the entrance at the Mediterranean sea of the allied ships, routinely watched and controlled by the different watching stations located at the zone. We suppose that the control for this zone was the origin of the trip of Lieutenant Coronel Antonio Sarmiento to Sevilla, Algeciras and several villages at Morocco [32].

During the first years of the war the British were very interested in anything referred to Spain. The possibility of Spain entering the war helping to Germany could unbalance the situation very dangerously for the Germans, because of the excellent geographic location. Another preoccupation was the supplies sold to the Germans, specially the wolfram. The British were very careful [1] and their actions were more oriented to diplomacy than to sabotage and subversion. They obtained information by listening more than by spying. In June, 1941, it was possible to break the code of Kryha machine, used for ciphering communications between Hisrowak at Berlin and Sofindus at Madrid. These eavesdropping were one of the most important sources of economic intelligence related with Spain. In May, 1943, 95% of the traffic between both companies was deciphered, near 6000 messages [9], [10].

However sometimes, given the passivity of Spanish authorities in everything related with Germany, there were direct actions. One example was the "Falaise" operation done by SOE ("Special Operations Executive", a British secret unit for subversive actions) that sometimes used Spanish people for this kind of actions. On January, 12, 1940 a Spanish communist and a jew barman used 35 pounds of plastic explosive to destroy the watching station at Tanger [27].

The German military information service headquarters at Spain, the Abwehr, was located at Paseo de la Castellana, 4 in Madrid, in a building annexed to the German embassy. The Abwehr had a number of stations distributed by different towns and sea zones that informed about the movement of merchant ships to the head office at Madrid, to Berlin or to the submarines operating in the zone. To have an idea of the generated traffic is a good idea to think in the 34 radio operators and 10 feminine assistants at the deciphering offices [8]. Inside KO-SPANIEN, as was named the Abwehr's

Spanish section, there were nine different groups that took their name following the correspondent responsible.

The Büro RUNDE was the responsible of the radio stations that helped the navigation of German airplanes and submarines operating at the Vizcaya Gulf and the Atlantic Ocean. These stations were called Sonne and they were installed at Lugo and at the San Pablo airport at Sevilla. The Sonne, operating since mid 1943 was discovered by radio monitoring. This new system, very easy and a direct descendent of the used systems at the England Battle, operated on low frequencies and it only needed a simple radio receiver for its use [12]. The Büro SEIDEL had 128 members and operated the OKW radio station at Madrid, at 13, San Bernardo Street. This Büro collaborated with the General Staff in subversive radio detection in Spain. The Büro PLANKERT had a wide radio stations network operating all through Spain, with 89 eavesdropping and deciphering experts for military and diplomatic transmissions. Finally the Büro BODDEN, the secret name for an observation and sea traffic control operation for Gibraltar strait [11], [21].

V. Conclusions

Illegal listening (eavesdropping), communication networks identification and cryptanalysis of ciphered messages are not at all new technology. Spanish experts, beginning as simple spectators, acquired quickly experience and required knowledge. Spanish civil war produced some Spanish experts that excelled at for example deciphering. During the first years of life of the Fourth Department the number of experts never was more than 15. However the work done was enormous. The republican cryptanalysts, gone from Spain after the war, collaborated actively with the allied forces and our investigations confirm that their level was good. Many cases confirm us that, beginning as pupils, they exceeded the performance of their teachers. Let this work serve as a tribute to all those experts, no matter their band at the war that got the respect and admiration of their theoretical teachers.

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- [34] Interview to Fernando Baringué Millat, old member of the republican SIEM deciphering services. He declined this offer when he came back to Spain, from the refugee camps at France.
- [35] A note for the Sixth Department, Statistics, with a ciphered message between the Italian Consulate at Algeciras and Italian Embassy at Madrid, dated May, 14, 1941. Source: J.R. Soler's private archive.