

Original article

## Evaluation of the correctness of the German military intelligence's findings concerning armament and equipment of the Polish Army in 1939 Part II. Aviation, Navy, radio communication, means of transport and logistics of the Polish Army

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### INFORMATION

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### ABSTRACT

The presented article constitutes the second part of the publication and is devoted to the current knowledge of the German military intelligence concerning the armament and equipment of land forces, Navy, radio communication, means of transport and logistics of the Polish Army in 1939. The article also attempts to assess the correctness of these findings. The presented article is one of several articles written by the author to present the knowledge of German military intelligence about the Polish Army in 1939, together with the assessment of the correctness of these findings. The article is based on archival materials of the 12<sup>th</sup> Foreign Armies East Intelligence Section of the General Staff of the High Command of the Land Forces of 1939, which developed synthetic elaborations for the top military commanders of the German army, based on the analysis and collective materials from the individual Abwehstelle. For years, the documents analysed were classified and delivered exclusively to the top commanders of the German army and Hitler's Chancellery. At present, they are entirely non-confidential and available to researchers at the Bundesarchiv-Militaerarchiv in Freiburg. Copies of parts of these documents, in the form of microfilms, can be found, among others, in the Archive of New Files in Warsaw.

According to the author, working out both – the Polish aviation and fleet – was carried out at a high and correct level. Nevertheless, it does not mean that no mistakes were made, even very serious – for example as regards the assessment of the number of submarines. The greatest negligence of the German Military Intelligence's findings on armament and equipment of the Polish Army concerns the equipment of signal corps. As the German Intelligence overlooked modernisation of communication equipment which took place in the years 1937-1939, there was no knowledge of, among the other things, the "N" type radio stations, which were used in almost every regiment. Scarcity of the Polish Army equipment as regards mechanical means of transport was well known. The shortages in the above scope were enormous. What is interesting, is the fact that logistics of the Polish Army was completely overlooked by the German Intelligence. It should be assumed that the German Military

Intelligence's figuring out of armament and equipment of the Polish Army was carried out on a high and correct level. Nevertheless, it does not mean that all the findings were appropriate and true. The accuracy of the correctness of the German Military Intelligence's findings concerning figuring out of organisation and composition of the Polish Army, and dislocation of the Polish units in time of peace, should also be highly assessed. Nevertheless, the Intelligence's findings, as regards signal mobilization process, figuring out the mobilization and operational plans of the Polish Army and organisation and the composition of the Polish Army during war should be evaluated differently. It results from the fact that the German Intelligence was not aware of, among the other things: number of divisions Poland would engage at war, names and composition of the Polish military units, very strong reserve of the High Commander, as well as it was not able to localize the Polish divisions developed over the borders just before the outbreak of war. Knowledge of the Polish economy was also on a very basic level. Therefore, the aforementioned negligence in the German Military Intelligence's findings on the Polish Army and Poland itself during the period directly preceding the war, should be regarded as major. Taking the above into consideration, the conclusion is that the German agency did not exist among the people holding high positions in the Polish Army; in the Central Staff, General Inspector of Training, Corps District Commands. Nevertheless, the overall view of the Polish Army recorded by the German Military Intelligence was correct. It was noticed that the army is weak, poorly equipped and badly managed and it would not be able to fight the enemy. It was a correct assessment.

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#### KEYWORDS

Abwehr, German military intelligence, reconnaissance of the Polish Army, 1939, Polish Army armaments

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## 1. Polish aviation combat measures<sup>1</sup>

German military intelligence knew not only organisation and composition of the Air Forces, but also the models, characteristics and numbers of the Polish Air Force aircrafts. One of the documents mentioned the following information:

- “State Aviation Works (PZL) 37 “Łoś” – 37 pieces,
- PZL 23 “Karaś” – 203 pieces,
- PZL 11 – 175 pieces,
- PZL 24 – around 85 pieces,
- also the following PZL aircrafts: 43, Potez 25, Lublin R VIII and Lublin R XIII” [1, p. 46].

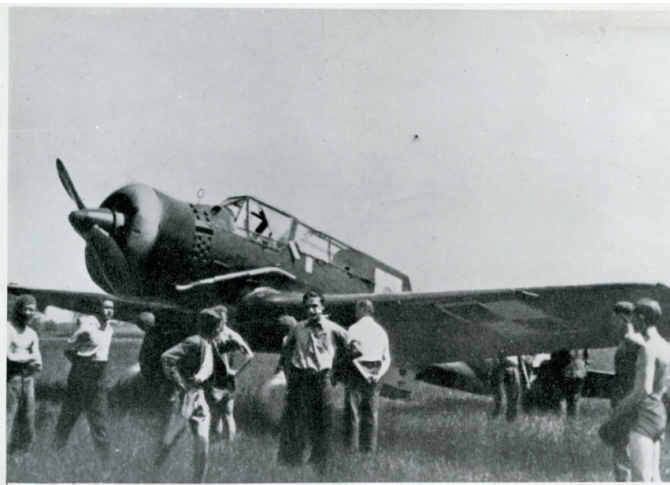
The evaluation of the aforementioned records indicates that the German Military Intelligence determined the number of the aircrafts quite accurately. Other records indicates that the

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<sup>1</sup> The following fragment of the publication was presented last year in the article written by A. Nogaj. *Sukcesy i klęski kontrwywiadu II Rzeczypospolitej na kierunku zachodnim w świetle dokumentów niemieckiego wywiadu wojskowego z rozpracowania Polski, opublikowanych w 1939 r.* In: Z. Nawrocki (ed.). *Kontrwywiad II RP (1914) 1918-1945 (1948)*. Vol. 2. Warszawa; Emów: Agencja Bezpieczeństwa Wewnętrznego. Centralny Ośrodek Szkolenia; 2014, p. 301-3.



**Fig. 1.** The pride of Polish technical thought. Very modern bomber “Łoś”.  
Constructed in Poland entirely  
*Source: From the collection of the Polish Army Museum.  
Photograph made available by Mr Andrzej Cichal.*



**Fig. 2.** The body of the aircraft “Karaś” – another very modern plane  
entirely constructed in Poland  
*Source: From the collection of the Polish Army Museum.  
Photo provided by Mr Michał Mackiewicz.*

Intelligence was aware of numbering and peaceful dislocation of the Polish aviation regiments. The historical literature does not provide a uniform view on the number of aircrafts constituting the equipment of the Polish Army in 1939. The Head of the Central Staff of the Polish Army, Brigadier-General, Wacław Stachewicz, mentioned in his memories that as of 1 September 1939, the Polish aviation had 300 combat aircrafts and 100 army cooperation and liaison aircrafts [2, p. 630]. Of course, he probably considered only modern planes that could rival the enemy. And he was probably right. At the same time, the German Military Intelligence included all the aircrafts constituting the equipment of the Polish Army, together with the obsolete ones. Czesław Grzelak and Henryk Stańczyk are of the opinion that in 1939,

**Table 1.** Comparison of the number of the Polish Army's planes according to data gathered by the 12<sup>th</sup> Intelligence Section of the OKH General Staff with the factual state

Type of military units	Combat aircrafts		Fighter aircrafts		Reconnaissance aircrafts		Liaison aircrafts		Total	
	12. Abt.	Factual state	12. Abt.	Factual state	12. Abt.	Factual state	12. Abt.	Factual state	12. Abt.	Factual state
Land Forces	150	166	300	287	350	228	135	180	935	811
Navy	15	–	30	–	40	–	–	–	85	44
Total	165	116	330	287	390	228	135	180	1020	855

Source: [4, table with the number of planes; 5, p. 149-50].

The Polish Army possessed 841 aircrafts in total, including 44 bombers, 300 fighter aircrafts, 292 cooperation aircrafts, 188 linear aircrafts and 17 seaplanes [3, p. 86]. The similar number of the Polish planes in 1939 was presented by Tymoteusz Pawłowski (see Table 1).

As evident, the officers of the German Military Intelligence overestimated the number of aircrafts constituting the equipment of the Polish Army by approximately 15% (together with the obsolete ones), thus not much in comparison to factual state. Knowledge of the German Military Intelligence on PWS-26 aircrafts was incorrect. The German Intelligence had no idea about this model, although 310 pieces were produced. At the same time, the Intelligence recorded PWS 19 – a model which was much older and worse. It also omitted cooperation, trainer and transport aircrafts in its calculations [4, p. 62-3; 6, p. 288-90]. It was known that part of the aforementioned aircrafts were obsolete. It was also aware of the Balloon Units which were good at the battlefield to observe the enemy's terrain, however only during World War I. During the war in 1939 they were horrifying archaism, cit: "The number of aircrafts available as of the 1<sup>st</sup> day of mobilisation (...). At the same time, it should be noted that part of the aircrafts should not be assessed as fit for military action due to their low technical performance<sup>2</sup> [4, p. 45-6]. The further part of the document provides information on liaison squadron, aviation ground organization, as well as airships formations and barrage balloons" [4, p. 47].

The overall assessment of the German Military Intelligence's knowledge on the types and number of the Polish aircrafts constituting the equipment of the Polish Army should be satisfactory, despite the negligence noted.

## 2. Navy combat measures

The German Military Intelligence was in possession of a lot of quite proper information on the Polish Navy. Kriegsmarine's Intelligence knew not only the Polish harbours and warships. It was also interested in the merchant shipping. It had knowledge about export and import of goods to Poland by sea. The Polish Navy was uncovered. It was known that:

<sup>2</sup> The further part of the document presents a table that details the number of aircrafts. In addition to presentation of findings of 12<sup>th</sup> Intelligence Section of the OKH General Staff, data was compared with factual state, as shown in the table below. Data of the German Military Intelligence was included in the columns described as "12<sup>th</sup> Abt."

“Seaborne forces consists of:

- 4 destroyers, including 2, 1500 tons each and 2, 2100 tons each, finished in the yeas 1928-1937,
- 2 submarines, 980 tons each, finished in the years 1929-1930,
- 3 torpedo boats, 365 tons each, finished in 1917 (one completely modernized),
- 1 minelayer weighing 2227 tons, finished in 1937.
- a number of smaller gunboats, minesweepers and special ships.

Gdynia is a naval port and Hel is harbour for submarines.

The riverine warfare in Pińsk has 16 river gunboats, 25-110 tons each.

During construction phase, the following ships are launched:

- 2 submarines, 1100 tons each,
- 2 minesweepers, 185 tons each.

The construction of 18 Motor Torpedo Boats is planned (...).

Naval Aviation consists of:

- 3 reconnaissance squadrons,
- 3 fighter squadrons.

There are around 85 aircrafts of the 2<sup>nd</sup> reconnaissance squadron of the riverine warfare in Pińsk together with about 20 planes” [4, p. 29-30].



**Fig. 3.** ORP “Burza” – one of the Polish destroyers  
*Source: [7, insert with photos, after p. 400].*

Factual state of the Polish Fleet in August 1939 was as follows: 4 destroyers (“Błyskawica”, “Grom”, “Burza” and “Wicher”), not 3 but only 1 torpedo boat, 1 minelayer, 2 gunboats, 5 auxiliary ships and 6 minesweepers [3, p. 86; 8, p. 81-150].

The Intelligence Section of the OKH presented different data on the naval aviation compared to information gathered by Polish historians. According to data of the German Military Intelligence, Poland had 85 aircrafts in total. Polish historians estimate that Poland had the Naval Air Squadron together with 3 squadrons, that in total consisted of 19 seaplanes and 3 float planes<sup>3</sup> [8, p. 150]. The data probably does not include aviation of Pińsk Fleet.

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<sup>3</sup> Czesław Grzelak and Henryk Stańczyk report, however, that in 1939 there were only 17 seaplanes. See: C. Grzelak, H. Stańczyk. *Kampania polska 1939 roku. Początek II wojny światowej*. Warszawa: “Rytm”; 2005, p. 86.

**Table 2.** Evaluation of the correctness of the German Military Intelligence's findings on the Polish Fleet in 1939

Type of ship	Data of 12 <sup>th</sup> Abt. OKH	Factual state
Destroyers	4	4
Submarines	2	5
Minelayers	1	1
Minesweepers	3	6
Torpedo boats	3	1
Gunboats		2
Auxiliary ships of the Polish Fleet		5

Source: [4, p. 29-30; 9, p. 661].

Also the German Military Intelligence's findings on Polish submarines were not precise. It was assumed that Poland was in possession of two and it was probable that more would reach Poland before the outbreak of the war. It was not known that the Polish Navy had been in possession of 3, instead of 2 submarines since 1932. There was also no knowledge about the fact that in February and April 1939, the aforementioned submarines that were to be under construction, in fact had already reached Poland [10, p. 33-93]. Therefore, within the scope of the Polish Submarine Fleet, negligence concerned underestimation compared to the factual state. It is surprising that for seven years (since 1932), only 2 Polish submarines had been noticed, instead of 3. What is also interesting is the fact that new submarines that had been in the Polish harbours since 1939, also went unnoticed. It was the most serious mistake of the 12<sup>th</sup> Foreign Armies East Intelligence Section of the General Staff of the High Command of the Land Forces, as regards findings on the Polish Fleet.



**Fig. 4.** One of the five Polish submarines, probably ORP "Orzeł"

Source: [7, insert after p. 64].

It was also assumed that there were 2 other minesweepers. They were regarded as under construction or launching – thus not prepared for combat. It was also a significant mistake in findings.

It seems that the German Military Intelligence's findings as regards the Polish Fleet – despite the negligence noted – was carried out at satisfactory level.

### 3. Equipment of signal corps

The Intelligence Section of the OKH informed about the signal corps (including the 1<sup>st</sup> Signal Regiment) equipment consisting of radio means. It included the company of long-distance radio stations RKGA (Correspondence Radio Station of the Army Groups – Radiostacja Korepondencji Grup Armii) comprising 9 radio stations with a range of 500 km (approximately 311 miles). In addition, each battalion of this regiment had 10 RKD radio stations (Correspondence Radio Station of the Division – Radiostacja Korepondencji Dywizji) with a range of 75 km (approximately 46 miles) and 10 ROD radio sets (Division Receiver Radio Station – Radiostacja Odbiornik Dywizji – division’s receiver). It was noted that during training, signal companies, probably an infantry division, was supplemented with 5 additionally assigned radio stations. It was assumed that mobilisation equipment of the Polish Army consisted of around 150 radio stations RKA (RKGA), about 300 radio stations RKG and 300 stations ROD<sup>4</sup> [4, p. 22-3].

The factual state was completely different. “Serial production of this radio station [N-1 – note by AN] commenced in 1936. All the equipment was manufactured in the Polish production plants. The Border Protection Corps (KOP) and Police used this type of radio stations. Originally, the product designation was AQ 1 and the military designation was N1. There were several different models, depending on the power supply type and means of transport. Both the receiver and transmitter was placed in one casing. Operating range: 2.25-6.75 MHz. Receiver’s sensitivity: 7 microvolts. Transmitter’s output: 21 W for telegraphy and 7 W for audio. The interval between individual waves was 25 KHz. Weight: 30.8 kg, together with battery supply case 9.2 kg, generator 50 kg, telescopic aerial 10 kg. After defeating Poland, the Germans continued production of these radio stations, marked with the symbol 1F” [11, p. 34-40].

The Intelligence Section of the OKH officers stretched the truth to a great extent, as regards the equipment of the signal corps, based on Abwehr Agency materials. It is evident that the German Military Intelligence overlooked modernisation of, among other things, communication equipment in the Polish Army which took place in the years 1937-1939. Data presented in 1939 was uncritical duplication of the findings of 1936. In fact, the Polish Army was in possession of completely different communication equipment. Also the radio station inventory was different.

Modernisation of, among other things, communication equipment that commenced in 1937, resulted in implementation of newer radio station models into military equipment. The older models – RKGA, RKA – were replaced with newer ones. The entirely constructed in Poland radio station of “W” type – higher command – stated to be introduced at the level of the High Commander and operational units staff. Within these stations, “W” model was of European range and “W1” model was to be used to maintain connection between the army and army group. At the same time “W2” model was to secure communication between armies and brigades staff and command of divisions and brigades. Unfortunately, as regards the large capacity radio station W1, only two testing specimens were made in 1938, designed for maintaining connection between the High Commander staff and armies. One of them was stationary and the other one was installed on a car. It was transported on six cars. The experience gained during the implementation of this model made possible to define the requirements for W2 radio stations, which were to maintain communication between armies

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<sup>4</sup> The name “radio stations ROD”, in fact meant receivers and not transmitters.



**Fig. 5.** Radio station N1, in a version produced by the Germans as F1. A frontal plate of the radio station consisted of 2 panels. The wider panel was a transmitter. The narrower panel – which can be seen on the left side – constituted a receiver of this radio station – note AN  
*Source: Photo and instruction made available by inż. Bogdan Szkuclarek SP3LD – Polish amateur radio operator and collector of communication equipment.*



**Fig. 6.** Radio station N1 in a German version together with a pedal-supply system  
*Source: Photo made available by inż. Bogdan Szkuclarek SP3LD.*

and divisions. Nevertheless, this model was not produced before the outbreak of the war. Frequency range: transmitter k 100 kHz-1 MHz, receiver 100 kHz-25 MHz. Total weight: more than 18.5 tons. Operation: 27 officers and soldiers [11, p. 47-9]. In this situation, at the level of the High Commander and army staffs, the older radio stations models were used – i.e. RKG/A – Radio Station of the Headquarters and Army Group (Radiostacja Kwatery Głównej i Grupy Armii). These radio stations were purchased in the years 1922-1928 in Great Britain. They were constructed in Great Britain, and manufactured in the production plant Marconi



Wireless Telegraph. Transmitter 50 W, umbrella antenna hanged on an antenna mast which was 26 meters high. Three cars were used to transport it. The first one transported the radio station, the second one – the antenna and the third one – combustion set for power generation. Transmitter's frequency range: 200-500 kHz. Operating range of the receiver: 100 kHz-1 MHz, and of the transmitter: 120-750 kHz. Range: 500 km (approximately 310 miles) for telegraphy and 300 km (approximately 186 miles) for audio. Weight: 7.5 tons. The aforementioned radio stations failed during the war. In addition, since the first days of the war, the communication network of the Polish Network became desintegrated. It was caused by poor condition of the communication equipment, as well as interception of the cipher of the "Kraków" Army by the Germans on 3 September 1939. The cipher was used by all armies and divisions. Although the 2<sup>nd</sup> Division of the Central Staff sent new ciphers, commanders were very mistrustful towards radio communication [11, p. 41-6, 52].

The radio station of "N" model – lower command – was very successful. Radio stations of this type were used to secure communication between divisions and brigades staff and regiments staff, heavy artillery and aviation. Radio stations "N2" were to secure communication within the regiment. "N3" model was to be used within the company [9, p. 691-7].

Radio station N2 was: "The most widespread radio station in the Polish Army. In 1935-1936, the first testing specimens were made in the amount of a dozen or so. It could be transported by various horse-drawn carts and cars. It was composed of two independent modules: transmitter, receiver and battery with battery supply, Technical data: Frequency range: 2.25-6.75 MHz. Transmission: telegraphy A1 and audio A3. The output: 6 W for telegraphy and 2 W for audio. Weight: receiver – 5.5 kg, transmitter together with generator: 24.5 kg. Battery supply case 11.3 kg" [11, p. 26-33].

According to gen. Stachiewicz: "The radio communication equipment was composed as follows: radio stations N3 had not been implemented yet; radio stations N2 had been implemented in the army since 1936 (1700 pieces, there were also 900 pieces under construction, radio station N1 was implemented in the amount of 270 pieces (another 1135 were under



**Fig. 7.** Receiver of the radio station N2 produced by the Germans as AQ 2 during the war  
*Source: Photo and instruction made available by inż. Bogdan Szkudlarek SP3LD – Polish amateur radio operator and collector of communication equipment.*

construction). These were very modern and top quality radio stations (the following models existed: tachanka, biedka and motor). Nevertheless, not until the outbreak of the war it was possible to achieve such positive results as regards communication equipment at operational levels of the command. New radio stations of this level (W1 and W2), were still in the preparation phase and were not introduced into the army. Therefore, during the September campaign, the signal units of the army headquarters, operational groups and partially division were equipped with a little amount of the obsolete radio stations of RKGa and RKD type. Only the High Command, besides the aforementioned equipment, was in possession of completely new radio stations of W type. One of them was fixed permanently (in the bunker in Warsaw) and one was moveable – on cars" [2, p. 271-6]. The infantry division was equipped with 2 old RKD stations, and a cavalry brigade with only 1 piece. Also each operational group was in possession of one piece of RKD and RKGa station [2, p. 272-3; 9, p. 696].

RKD was "Constructed in Poland entirely. The design was created in 1926. The first specimens were created in 1928. The radio station operated on medium waves of 6 W. Operating range of the transmitter: 430 KHz-1.2 KHz. In 1928, production of RKD radio station was launched in Warsaw. The radio station had 8 meters high three-ray and telescopic antenna. Emission: telegraphy and audio. Range: up to 70 km (approximately 43 miles). The aforementioned radio station had been phased out and replaced with radio stations N1 since 1938" [11, p. 10-25].

Therefore, the German Military Intelligence's findings on communication equipment in the Polish Army in 1939 were partly incorrect and significantly differed from the factual state. The Polish Army was equipped with more than 2000 radio stations which is four times more than the number determined by the German Intelligence (450). RKGa and RKD radio stations amounted to about 100 pieces. The German Military Intelligence had no knowledge about new models of "W", and in particular "N1" and "N2" types, although they had comprised the equipment of divisions and regiments since 1936.



**Fig. 8.** Replica of RKD radio station created by Mr. Piotr Gach SQ9KQZ from Bielsko-Biała  
 Source: Photo and instruction made available by inż. Bogdan Szkuclarek SP3LD  
 – Polish amateur radio operator and collector of communication equipment.

It is worth mentioning once again the commonly known opinion that the German Military Intelligence, both before and during the war, had no knowledge about the Cipher Bureau of the 2<sup>nd</sup> Division of the Central Staff of the Polish Army. This entity had already worked the encryption machine “Enigma” out in 1929. The author of the article is one of the few who is of the opinion that passing on full knowledge about encryption system “Enigma” in August 1939 was a significant Polish contribution to the common struggle and victory over the Hitler’s Third Reich. It was thanks to the Polish inspiration that the British Bletchley Park was built and “Ultra” was created. “Ultra” made possible to shorten the war in Europe certainly by one year and it is probable that even by two years<sup>5</sup>. Also the Americans built their system for breaking Japanese machine codes, including Japanese purple code developed based on the German “Enigma” thanks to the Polish idea. It should be added that although two of the top officers of the Cipher Bureau were in prisoner-of-war camp, both intelligence and security service of the Third Reich had no knowledge about the achievements of the Polish scientists and breaking codes by the British. Nevertheless, the German Military Intelligence uncovered the Polish intelligence radio station model, the first testing specimens of which were made in the amount of a dozen or so by “AVA” for the 2<sup>nd</sup> Division. The aforementioned radio stations were constructed by inż. Tadeusz Heftman, who continued his works in Great Britain, contributing to the production of several hundred intelligence radio stations, including AP3, AP4 and AP5 there<sup>6</sup>.

Therefore, the German Military Intelligence’s findings on radio communication equipment in the Polish Army were not correct at a sufficient level. Its knowledge about the communication equipment was obsolete to a great extent and insufficient compared to the factual state.

#### 4. Means of transport of the Polish Army

The German Military Intelligence had full knowledge about horrifying poverty and lack in the Polish Army’s equipment as regards technical and transportation means in 1939. As known, the Polish Army was the infantry which used mainly horse-drawn carts to transport the supplies and combat means.

Presenting motorization and means of transport of the Polish Army it was written: “Motorization of the army in Poland remains under close and mutual interaction with the general motorization in the country. Both are still in the initial phase. Only for 2-3 years the steps aimed at accelerating general motorization have been taken. The aforementioned steps include:

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<sup>5</sup> Conclusions of the conference which took place in 2004 in Bydgoszcz, dedicated to Marian Rejewski, the head of cryptologists team, who broke the Enigma code.

<sup>6</sup> It is worth mentioning that these production plants had manufactured min. 15 specimens of the German encryption machine “Enigma”, as well as “Lecida” before the war. After the conquest of Poland, the former Polish radio manufacturing company “AVA” located in Warsaw at the following address: ul. Stępińskiej 25 (a corner of Pancerna street), became a German company called “Brunnwerke”. Production of radio station N1, as well as the intelligence radio station A1 for the German army was continued by the Germans. At the end of 1939 or in January 1940, 3 radio stations were stolen from this plant. One of the radio stations was fully operable intelligence radio station A1 used by the 2<sup>nd</sup> Division of the Central Staff of the Polish Army. More on this subject in: *Dziękuję Wam Rodacy*. Londyn: Polska Fundacja Kulturalna; 1973; ZS. Siemaszko. *Łączność i polityka 1941-1946. Antologia*. London: Polska Fundacja Kulturalna; 1992; K. Malinowski. *Żołnierze łączności walczącej Warszawy*. Warszawa: “Pax”, 1983. A report on the Polish works within the territory of Great Britain in the years 1940-1945 concerning construction and production of special communication equipment, developed by inż. T. Heftman, and probably carried out in 1946, The Polish Institute and Sikorski Museum in London.

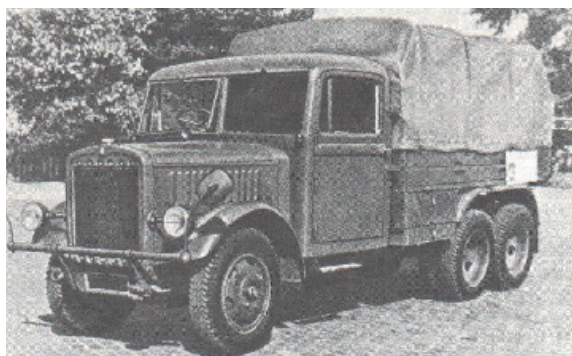


**Fig. 9.** Wagon – the basic means of transport for the Polish Army

- increasing own production (so far 59% of demand) through construction of factories and assembly workshops (foreign licenses and import),
- reducing the number of motor vehicles types,
- reducing import duties on individual parts,
- reducing fuel prices,
- tax reliefs.

In addition, enhanced steps were taken aimed at expansion and improvement of road network as their poor condition has constituted a significant obstacle for the motorization development” [4, p. 37-9]. The further part of the publication informs for example that as of 1 January 1937, there were 5545 trucks and 15885 motor cars. A year and a half later, as of 1 July 1938, the number of motor cars increased to the amount of 23064 and lorries by almost 50% to the amount of 7813 [4, p. 37-9].

The aforementioned data was not correct. In 1937, the total number of cars in Poland was 24.7 thousand, including 21881 motor cars and 5545 trucks. The total number of cars was mistaken by 15%. Much bigger mistake was made with regards to presentation of the number of cars in Poland in July 1938. Compared to data of 1 January 1938, when the total, registered number of cars in Poland was 44200, including 26248 motor cars and 6843 trucks, the error was: with regard to the total number of cars differed from the factual state by 81% and with regard to the number of trucks the amount was mistaken by 23% [13, p. 186; 14, p. 185; 15, p. 199].



**Fig. 10.** Praga RV truck  
*Source: [12, p. 179].*

The analysis of the above records guarantees a lot of joy for a contemporary historian. It is evident that data presented by the German Military Intelligence was taken from the aforementioned *Mały rocznik statystyczny 1937* (Concise Statistical Yearbook of Poland 1937). It is reflected in the records of the German Intelligence of 1 January by mentioning 5545 trucks, which is included in the Statistical Yearbook in the same way [13, p. 186]. Nevertheless, further data is different compared with the aforementioned Concise Statistical Yearbooks. As a rule, data is underestimated compared with data presented in the publications mentioned above [13, p. 186; 14, p. 185; 15, p. 199]. Bearing in mind the above, the following question arises: If the aforementioned Concise Statistical Yearbooks, publicly accessible at that time were known, why data contained therein had not been copied out directly and other data was given? The attempt to answer this question leads to interesting speculations and assumptions.

Nevertheless, the German Military Intelligence's findings on motorization in the entire country were correct. Their context leads to a conclusion that the Polish troops were poorly equipped with means of motor vehicle transport. However, from the record presented, it does not result that the German Military Intelligence's officers had precise information on motorization of the Polish Army. Nevertheless, an overall picture of a poor condition of the Polish motorization was correct.

Authors of historical studies, dedicated to the Polish Army from the pre-war period, usually pay very little attention to the motorization of the Polish Army. I think that apart from weakness of the Polish Army caused by use of a small amount of modern weaponry, it was the lack of motorisation and horse-drawn transport which significantly influenced Polish September dramas. "Motorization of the country and army was at development stage in 1939. The military units were saturated with motor equipment at minimal stage; the infantry division at war anticipated 76 cars (passenger cars, trucks and special-purpose vehicles), part of which (57) were assigned to anti-aircraft battery and motorized company of sapper battalions" [12, p. 17]. In order to fully notice the tragic poverty of the Polish army – well prepared for the war in 1939 which has already taken place – it should be noted that the German Light Infantry Division had around 969 passenger cars together with personnel carriers, as well as 1667 trucks, excluding armoured vehicles and service vehicles [3, p. 42, 69].

Bearing in mind that there were no cars, transport of military equipment and armaments required horse-drawn transport. Therefore, further information on the Polish transport given by the German Intelligence Section of the OKH was correct: "For the transport of light and medium machine gun, as well as Stokes mortars and ammunition in infantry (excluding convoy platoons), two-wheeled, one-horse vehicles are used ("biedka"). Cavalry and convoy platoons uses tachanka (multi horse-drawn light vehicles) for the transport of machine guns in infantry. The type that is to be implemented is called "shooting cart, model no. 33" ("wóz strzelecki wzór 33"). In addition, the following vehicles are commonly used:

- four-wheeled (two-horse) cart used as a combat vehicle (to transport ammunition, food, forage, office equipment, workshops, gas protective equipment, etc.),
- four-wheeled sanitary carts,
- britzskas (two-horse hunting trucks),
- field kitchens (four and two-horse).

With regard to march units, a park of convoy of military vehicles belongs to convoy platoon which constitutes a part of administration company" [4, p. 1-2]. There are many records concerning dramas connected with almost exclusive use of horse-drawn transport in the literature dedicated to the war of 1939. Let me note a piece of interesting information I have encountered. The 3<sup>rd</sup> Heavy Artillery Regiment consisted of two divisions. Each of them had 12 cannons (105 mm). Five fire units were assigned to each cannon, i.e. several dozen missiles. At the same time, only 4 missiles were loaded for artillery piece onto a wagon – during mobilization – due to shortages in horse-drawn transport. Although the 2<sup>nd</sup> division was in possession of more ammunition, it was not able to transport it. What was the combat value of this division, bearing in mind the fact that it possessed missiles and ammunition but was not able to transport it from the warehouses when the war started? [16, p. 22].

How the German Military Intelligence's achievements as regards determination of the level of motorization in the Polish Army should be assessed? No particular findings were made as regards the issue in question. On the other hand, however, it should be noted that context of information concerning Polish backwardness, as regards motorization, could lead to the conclusion that the situation in the army would be exactly the same. Therefore, general vision of the German Military Intelligence on the motorization backwardness in the Polish Army, lack of cars and almost exclusive use of horse-drawn transport by the army was correct. I think that the German Military Intelligence should be positively assessed, as regards the evaluation of motorization in the Polish Army.

## 5. Logistics of the Polish Army

The system of supplying army was known as logistics at that time. It was and it still is important, even very important for each army in the world, both in time of peace, and particularly at war. Uncovering dislocation of military and divisional warehouses, as well as stock replenishment system of the Polish Army at war should be one of the most significant tasks of the German Military Intelligence, who tried to figure the Polish Army out in 1939. Did the German Military Intelligence get to know the stock replenishment system of the Polish Army designed for the time after the war commencement?

The outline of organisation of material reserves for the army was presented by the Head of the Central Staff, gen. Wacław Stachiewicz. He mentioned that material reserves were being prepared for alarm and general mobilization, as well as at war. The main effort was aimed at creating the largest possible mobilization reserves. Care was taken in the area of ammunition and equipment reserves. At the beginning it was tried to cover the demand up to 90 and then up to 180 daily consumption units; "i.e. three-, and then six-month military consumption, calculated according to norms and for the army at mobilization" [2, p. 309]. In fact, it was managed to collect reserves for the first three months of war. These were huge amounts of ammunition and food. It is sufficient to mention that reserves of artillery ammunition were to amount; 2520 cartridges for 75 mm cannon and 1980 cartridges for 100 and 150 mm cannon, etc. Among other things, 500 thousand of grenades, for 840, 81 mm mortars of rifle ammunition, for 2 months of battle [2, p. 306-10].

Also 300 tons of explosive materials were collected for war. This amount did not cover the monthly demand of the army, which was estimated at 450 tons. Moreover, additional 1000 tons of explosive materials were acquired in France. Nevertheless, the purchased materials



**Fig. 11.** Convoys of military vehicles of the Polish Army  
*Source: From the collection of the Polish Army Museum.  
Photograph made available by Mr Andrzej Cichal.*

had not reached Poland before the outbreak of the war. The army had monthly reserves of: 110 thousand anti-tank mines. The units were provided with 80 thousand of the aforementioned mines before the outbreak of the war. Very small fuel stocks have been secured. The units were provided with the amount for 5 days of battle. Reserves for another 15 days were in containers and tanks. Also the food supplies were enough for 15 days after the mobilization. After 15 days, the supplies were to be replenished by purchases made within the territory of the country. In addition, 64 thousand tons of rye supplies and 28 thousand tons of oat supplies, which were dedicated to 15 days after the mobilization [2, p. 312-15].

The war stocks of weapons and ammunition were stored in 24 depots [17, p. 342], main depots in Palmiry near Warsaw, Stawy near Dęblin and Regany near Łódź. Depots for the western front were located in: Przemyśl and Kłaj near Cracow, Gałkówek near Łódź, Toruń, Pomiechówek and Grodno. Front-line depots were to be strategical retreat. They had been earlier dedicated for the needs of the so called eastern front. They were deployed in Vilnius, Lidzia, Hajnówka, Brześć, Cherkasy near Kovel and Holosko near Lviv [2, p. 311-2].

The mobilization food supplies for 7 days of battle were stored in mobilization warehouses of regiments and divisions. Similar food supplies were collected for horses. The supplies dedicated to particular armies were stored in military warehouses, developed on three replenishment lines in accordance to anticipated withdrawal of troops. The supplies of military warehouses were to be transported to division storehouses by railway transport. With regard to transport from division storehouses to divisions and units, motor, and in particular horse-drawn transport were to be used [17, p. 341-4]. It is the outline of the organization of supplies and equipment of the Polish Army in the period directly preceding the war.

From the analysed materials of the German Military Intelligence it does not result that the officers thereof had any knowledge about the aforementioned issues.

**Table 3.** List of evaluations of the correctness of the German Military Intelligence's findings on armament and equipment of the Polish Army in 1939

No.	The area of the Intelligence's interest	Summary evaluation of the correctness of the German Military Intelligence's findings on the Polish Army
1	Armament of regiments and infantry division	The armament of regiments and infantry division were figured out correctly, with no serious errors. The evident negligence was no knowledge about the Polish anti-tank rifle.
2	Armament of artillery units and sub-units	The basic artillery armament constituting the equipment of infantry and light artillery infantry division regiments, as well as cavalry brigades divisions were defined correctly. There was no use in adding information on models of the Russian cannons and howitzers of the war in 1920 that have already been included in the armament of the Polish Army in 1939. A number of mistakes were made with regard to working out the heavy artillery. It should be assumed that the overall evaluation of the German Military Intelligence's findings on the artillery does not exceed the pass mark.
3	Armoured weapon	The German Military Intelligence did not make any mistake as regards findings on armoured weapon. The parameters of combat vehicles were known in detail. The number of vehicles was also known. Therefore, the 12 <sup>th</sup> Section of OKH should be given a first class degree for findings on armoured weapon.
4	Polish aviation combat measures	The Polish aviation was worked out very well. All the aircrafts constituting the equipment of the aviation were known, as well as their number was defined relatively correctly.
5	Navy combat measures	The Polish Fleet was worked out only on a sufficiently correct level. This evaluation was influenced in particular by flawed working out of the Polish Submarine Fleet. It should be added that the Kriegsmarine's Intelligence had its own intelligence structure. There were number of intelligence materials in the archives, covering not only military fleet.
6	Equipment of signal corps	The German Military Intelligence overlooked modernisation of communication equipment that has been carried out since 1937. There was knowledge about the older long-distance radio stations (RGGA and RKD type) operating higher command. The radio stations of "N" type remained uncovered. It was mistakenly assumed that the Polish Army was equipped only with 450 radio stations. In fact, the number was for times higher. The overall evaluation of the German Military Intelligence's findings on communication equipment in the Polish Army should be seen at very poor satisfactory level. Furthermore, lack of knowledge about successful working out of the German "Enigma" code in the 30s, as well as not discovering, during the war, that "Enigma" codes had already been broken cost the German losing the war!
7	Means of transport of the Polish Army	The lack in the Polish Army's equipment as regards transportation means was known. No concrete figures were given. At the background of the overall shortages in the Polish Army – although it was not pointed out directly – the extremely low level of the equipment of the Polish Army, as regards the technical transportation means, was presented correctly. It was a correct evaluation.
8	Logistics of the Polish Army	There was no knowledge about the war stocks prepared by the Polish authorities, as well as their distribution and stock replenishment system.



## Summary

The attempt of evaluation of the German Military Intelligence's findings on armament of the Polish Army in 1939 was presented in the appropriate documents by the officers of the 5<sup>th</sup> Division of 12<sup>th</sup> Foreign Armies East Intelligence Section of the General Staff of the High Command of the Land Forces. The above analysis, included in a comprehensive summary (see Table 3), make possible to present a synthetically generalised evaluation of the level of correctness of the German Military Intelligence's findings on armament and equipment of the Polish Army in 1939.

The records presented show that the German Military Intelligence did not commit manifest errors in the evaluations on armament and equipment of infantry and cavalry. That is, the most important and numerous components of the Polish Army (WP). However, many mistakes were made in the presentation of the armament of the artillery, assuming, among other things, the presence of cannons from the Polish-Soviet war of 1920 in the equipment, which the WP did no longer have in 1939. Perhaps in 1939, having no current data, data from earlier years were used, i.e. data from the first half of the 1930s, when the Polish Army still had cannons in its equipment. Models of the heaviest artillery weapons were also unknown. On the other hand, the Polish armoured weapons were worked out very well.

The greatest noticed negligence of the German Military Intelligence's findings on armament and equipment of the Polish Army concerns the equipment of signal corps. As the German Intelligence overlooked modernisation of communication equipment which took place in the years 1937-1939, No knowledge about radio stations of "N" type which were used in almost every regiment, no information about anti-tank rifle, gross negligence in working out artillery are the evidence that the German agency was not present in the Polish Army's ranks, especially in the officers' corps – taking into consideration that the aforementioned changes had not been detected. The models of aircrafts constituting the equipment of the Polish aviation were known. Gross negligence can be observed with regard to findings on the Polish Fleet what was influenced by overlooking the factual state of the Polish Submarine Fleet.

With regard to the armament and equipment of the Polish Army, it seems that the German Military Intelligence's findings were not perfect. Nevertheless, it would be a mistake to underestimate the Intelligence's findings, noticing only the aforementioned negligence. It seems that despite the noticed errors, the German Military Intelligence worked out the armament and equipment of the Polish Army in the pre-war period, on relatively good and correct level.

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## Conflict of interests

The author declared no conflict of interests.

## Author contributions

The author contributed to the interpretation of results and writing of the paper. The author read and approved the final manuscript.

## Ethical statement

The research complies with all national and international ethical requirements.

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## Biographical note

**Adam Nogaj** – dr, historian, retired officer of the Polish Army. He completed his military service in the 9<sup>th</sup> Radio Reconnaissance Regiment (radio intelligence service) i.a. as the commander of the listening platoon in the KF band and in the 1<sup>st</sup> Assault Battalion (currently the

1<sup>st</sup> Special Commando Regiment – now called the Military Commando Unit) as the commander of the special (intelligence) radio station platoon and a youth and cultural-educational instructor. He was also a lecturer in military history, political geography and war geography at a military university. After completing his military service, he started working in IT companies. For many years he has been the owner and manager of a small software company. Author of several dozen scientific publications devoted to military reconnaissance and intelligence, special operations. He is also the author of a two-volume study, which is currently being prepared for printing, entitled *Oddział Wywiadowczy Sztabu Głównego ludowego Wojska Polskiego 1944-1945*. Currently, he is working on another work entitled: *Wojsko Polskie w ocenach niemieckiego wywiadu wojskowego w 1939 r.*

**Ocena poprawności rozpracowania przez niemiecki wywiad wojskowy uzbrojenia oraz wyposażenia Wojska Polskiego w 1939 roku**  
**Część II. Lotnictwo, Marynarka Wojenna, łączność radiowa, środki transportu oraz logistyka Wojska Polskiego**

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**STRESZCZENIE**

Prezentowany artykuł jest częścią drugą publikacji, prezentujący stan wiedzy niemieckiego wywiadu wojskowego o uzbrojeniu i wyposażeniu lotnictwa, Marynarki Wojennej, łączności radiowej, środkach transportu oraz logistyce Wojska Polskiego w 1939 roku. W artykule podjęto także próbę oceny poprawności tych ustaleń. Prezentowany artykuł, jest jednym z kilkunastu napisanych przez autora, poświęconych prezentacji wiedzy niemieckiego wywiadu wojskowego o Wojsku Polskim w 1939 r. wraz z ocenami dotyczącymi poprawności tych ustaleń. Artykuł bazuje na materiałach archiwalnych 12. Oddziału Wywiadowczego „Armie Obce Wschód” Sztabu Generalnego Naczelnego Dowództwa Wojsk Lądowych z 1939 r., który opracowywał syntetyczne opracowania dla najwyższych rangą dowódców wojskowych armii niemieckiej, w oparciu o analizy oraz materiały zbiorcze z poszczególnych Abwehstelle. Analizowane dokumenty były przed laty dokumentami tajnymi, dostarczonymi wyłącznie dla dowódców najwyższego szczebla armii niemieckiej oraz kancelarii Fuehrera. Obecnie, są one zupełnie jawne, dostępne dla badaczy w Bundesarchiv-Militaerarchiv we Freiburgu. Kopie części z tych dokumentów, w postaci mikrofilmów, znajdują się m.in. w Warszawie w Archiwum Akt Nowych.

W ocenie autora rozpracowanie zarówno naszego lotnictwa, jak również floty wykonano na wysokim i poprawnym poziomie, co nie oznacza, że nie popełniono błędów, niekiedy np. w ocenie ilości okrętów podwodnych, bardzo poważnych. Największe uchybienia niemieckiego wywiadu wojskowego w rozpracowaniu uzbrojenia i wyposażenia WP, związane są z wyposażeniem wojsk łączności. Wywiad niemiecki przeoczył bowiem modernizację sprzętu łączności, która miała miejsce w latach 1937-1939. Nie posiadano jakiegokolwiek wiedzy m.in. o radiostacjach typu „N”, które występowały w każdym prawie pułku. Znano polską biedę w zakresie wyposażenia WP w mechaniczne środki transportu. Braki w tym względzie były przeogromne. Co dziwne, w swych analizach wywiad niemiecki zupełnie pomógł kwestie logistyki WP. Przyjąć należy, że rozpracowanie uzbrojenia oraz wyposażenia WP niemiecki wywiad wojskowy wykonał na wysokim i poprawnym poziomie, co nie oznacza, że wszystkie ustalenia były poprawne i prawdziwe. Wysoko także należy ocenić poprawność ustaleń niemieckiego wywiadu wojskowego, związanych z rozpracowaniem organizacji oraz składu WP na stopie pokojowej, a także dyslokacji naszych jednostek w okresie pokoju. Zupełnie inaczej jednakże oceniać należy ustalenia tego wywiadu dotyczące przebiegu mobilizacji alarmowej WP, rozpracowania planów mobilizacyjnych i operacyjnych WP, organizacji oraz składu WP na czas wojny. Wywiad niemiecki nie miał bowiem poprawnej wiedzy m.in. o ilości dywizji, które Polska wystawi na czas wojny, nie znano nazw oraz

składu naszych armii, nie wiadomo nic o bardzo silnym odwodzie Naczelnego Wodza, nie potrafiono poprawnie zlokalizować naszych dywizji rozwiniętych nad granicami, tuż przed wybuchem wojny. Dysponowano także tylko bardzo podstawową wiedzą o gospodarce polskiej. Były to zatem bardzo poważne uchybienia w ustaleniach niemieckiego wywiadu wojskowego dotyczących WP i Polski w okresie bezpośrednio poprzedzającym wojnę. Wnioski stąd wypływające zdają się świadczyć, że agentura niemiecka nie istniała na wysokich stanowiskach w Wojsku Polskim; w Sztabie Głównym, Generalnym Inspektoracie Szkolenia, Dowództwach Okręgów Korpusów. Ogólny obraz WP odnotowany przez niemiecki wywiad wojskowy był jednakże poprawny. Widziano słabą, źle wyposażoną i źle dowodzoną armię, która nie będzie w stanie stawić czoła przeciwnikowi. Była to ocena poprawna.

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**SŁOWA KLUCZOWE** Abwehra, wywiad niemiecki, rozpoznanie Wojska Polskiego, 1939 r., uzbrojenie Wojska Polskiego

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