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## THE MAIN ISSUES OF AIR DEFENCE BETWEEN THE TWO WORLD WARS

### Abstract:

*The authors present the main issues of air defence between the two World Wars. They give a general overview of air components of the Italian – Abyssinian, the Japanese – Chinese and the Spanish civil war as well. This article demonstrates the major experience of the application of air forces especially anti-aircraft artilleries, fighter activities, monitoring and reporting services and civilian air defences.*

### INTRODUCTION

The appearance of flying instruments opened up new dimensions and prospects of a war. The military regimes adapted new tools for the military purpose at an incredible speed. Almost at the same time as the production of Montgolfier brothers' balloon and using it for military purposes (reconnaissance) began, the idea and practice to fight against it also appeared. The successful experiment on 5th June 1783 in Annonay was followed by I. C. G. Hayne Prussian engineer's book in 1784, which dealt with the new device for the military use. The airship was used for detection in the siege of Mabeuge, Metz and Charleroi in 1794, in the battle of Fleurus in 1795<sup>1</sup>, and in the siege of Mainz, Stuttgart and Donauwörth<sup>2</sup>. A successful flight test on 17th December 1903 opened up a new era in the history of aviation, which led to the dynamic development of aeronautics. Not many devices „rose to the top” in such a short time in the means of armies.

As a result, the organization and development of the air force began<sup>3</sup>. The XXth century brought the revolution of military affairs as well. The adaptation and practical usage of scientific and technical achievements were probably the fastest in this field. First France, then Great Britain, Italy, Russia, and a bit later Germany organized and set up their air force system and first air squadrons. In 1910, Russian and French<sup>4</sup>, in 1911 German and Austro-Hungarian armies as well used aircrafts for reconnaissance and courier services in their army manoeuvres. Airships also participated in these activities.

Soon the navy experiments began too. (On 14th November 1910 a successful take-off was implemented from the deck of Birmingham cruiser / USA /).

The military commands started, though with not the same capacity, to deal with effective protective options as well. Ground fire means and aircrafts themselves were the fundamental tools for them, but very soon they turned out not to be effective enough without the information of monitoring and reporting systems. This resulted

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<sup>1</sup> Maloványi Sándor: A repülőgép megjelenése és alkalmazása az első világháborúban, ZMKA Hadművészet története tanszék, Jegyzet (évszám nélkül), p11.

<sup>2</sup> Siménfalvy Tihamér főhadnagy: A léghajó a tábori és várharcban. Magyar Katonai Közlemények (a továbbiakban MKK) 1909/11, p1016.

<sup>3</sup> Groehler, Olaf: A légi háborúk története 1910–1970, Zrínyi Katonai Kiadó, Budapest 1980., p11.

<sup>4</sup> A repülőgépek felderítő szolgálata az 1910. évi francia hadsereggyakorlaton, MKK 1911/1 5p2–60.

in the appearance of the three fundamental components of the air defence during the „Great War”: fighter forces, anti-aircraft artillery and reporting posts.

At the beginning of the World War I it turned out that the defence was necessary against aircrafts, which counted to be still relatively new weapons, as during their exploratory activities their artillery firing caused significant losses. Their duties expanded soon, such as to bombing courier services, troops, transport junctions and objects, etc. It became necessary to apply own similar military equipment (armoured reconnaissance aircrafts), and also to develop a new type of a protective device (the anti-aircraft artillery) against the enemy planes. Although at the beginning of the war none of the countries had a significant amount of air vehicles, this soon changed dramatically<sup>5</sup>. The quantity of aircrafts by the end of the war increased 17 times in the German army, 31 times in the French army, 34 times in the British Army and 18 times in the Austro-Hungarian army; meanwhile the duties of the rudimentary air forces became more and more specialized. By 1918, the basic means of air forces formed: fighter, bomber, reconnaissance air troops, in about a 40-40-20% split<sup>6</sup>.

During the war aircrafts not only performed reconnaissance, courier service, and fire-control tasks, but increasingly also bombing troops and objects. It became clear to all individuals and organizations dealing with military issues that the hinterland would become just as vulnerable as the front. This fact led to the creation of a civil air raid.

## **1 THE DEVELOPMENT OF AIR DEFENCE AFTER THE GREAT WAR**

The dynamic evolution of aircrafts after the World War I – which were almost exclusively applied in military tactics - added a new task slowly becoming of a military strategic significance. Potential bombing of hinterland objects as aircraft duty became of growing importance, which I was only a sporadic activity during the World War.

Thus, not only the front and its immediate background needed to be protected from air strikes but also the protection of the inner areas of the mother country had to be planned and organized.

Air defence and its implementation according to the general idea consisted of the following:

- Air defence fighter forces;
- Air defence artillery;
- Monitoring and reporting systems;
- Passive defence regulations, which were divided into military and civilian parts;
- Prevention activities.

The high and even growing speed of the attacking means, the difficulties in detecting attacks, and the decreased reaction time to attacks became more and more serious problem for air defence. Because of them, the degree of the organization and preparation of air defence had a very high significance. It was reasonable to organize air

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<sup>5</sup> Maloványi Sándor: A repülőgép megjelenése és alkalmazása az első világháborúban ZMKA Hadművészet története tanszék, Jegyzet (without year denotation) p46.

<sup>6</sup> Groehler, Olaf: A légi háborúk története 1910-1980. Zrínyi Katonai Kiadó, Budapest, 1983. p39.

defence on a territorial basis for the detection of air threats, repelling attacks (active air defence), or reducing the consequences of disasters (passive air defence<sup>7</sup>).

The armament restrictions and the total failure of Geneva Disarmament Conference<sup>8</sup> inspired the political and military leaderships to carry out the growing arming. The 20's and 30's wars were also analyzed with great attention. By the thirties, there was some new war experience available, which was definitely worth using in building up the air force, air defence, and operating them in the future. In the indicated period, three major wars were fought, in which air-military activities also took place. That experience could be used.

## 2 THE ITALIAN - ABYSSINIAN WAR

On October 3rd 1935 Italy started to attack Ethiopia to subjugate it and make it a colony. With more than 300 aircrafts, Italy was practically unrestricted air superiority from the beginning of the fight. The Ethiopian "Air Force" was just as insignificant and outdated as its ground-based air defence.<sup>9</sup> The Italian Air Force basically stroked on military formations, as the country almost didn't have any infrastructure and economic targets which were worth attacking. The attacks against the armed forces, as the response was minimal, were usually from a low-level flight. The Italian ground forces broke the Ethiopian barriers, which were considered to be stronger, by the focused strikes of the Italian artillery and air force. They could cause significant losses from the air in the Ethiopian troop concentrations, reserves, and the retreating forces.

The air force was also successfully used for dealing with the supply, air transport and medical tasks.<sup>10</sup> Direct actions against the population - sometimes very savage - had more of a psychological effect; however, they had no impact on the outcome of the war. The most serious problems of the Italian air force were thousands of kilometres of supply and resupply lines, a complete lack of the local possibility of components and refuelling, and the uncommon climate. This war gave very little practically useful experience and information for other air forces because of the excessively disproportionate balance of power on the two sides.

## 3 THE JAPANESE - CHINESE WAR

On 7th July 1937 Japan attacked China again to extend their jurisdiction. The Manchurian Japanese land forces and the flying forces of a part of the fleet<sup>11</sup> operated with one another according to a joint plan against the Chinese targets. Besides the military targets they attacked mainly large cities, however, they couldn't make rapid success as they expected, although the Chinese civilian population suffered serious losses. Moreover, at the beginning of the war the Japanese bombers attacked without a

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<sup>7</sup> „Passive air defence, "the country's protection of a structure whose purpose was: a defence against air raids administrative, social and economic organization, to prepare the population for protection against air raids and air strikes to reduce the effects of the liquidation of damages." *Hadtudományi Lexikon*, p786. Magyar Hadtudományi Társaság, Budapest, 1995. Főszerkesztő: Szabó József

<sup>8</sup> *Hadtörténeli Levéltár (HL) HM 1934. Eln.o. I. tétel 113129.*

<sup>9</sup> They owned 6 pieces of POTEZ fighters. **Groehler**, Olaf: *A légi háborúk története 1910-1980.* Zrínyi Katonai Kiadó, Budapest, 1983. p125.

<sup>10</sup> Horváth Árpád: *A hadirepülés évszázada.* Zrínyi Katonai Kiadó, Budapest 1968. p124.

<sup>11</sup> About 300 aircraft belonged to the Army payroll, and 219 devices to the Navy. **Groehler**, Olaf: *A légi háborúk története 1910-1980.* Zrínyi Katonai Kiadó, Budapest, 1983. p127.

fighter cover suffered major losses. At the beginning of the war, the Chinese air force possessed more than 100 fighter planes. After the Japanese Air Force won the air superiority, they could operate relatively without limitations. It was achieved by striking airports, military infrastructure and supplies and not by civilian terror-bombings. By this – not yet finished – war, military leaderships could learn the following:

- Weaker, but still tightly organized ground forces and hunter aircrafts can cause unpleasant losses to fighter bombers even besides their fighter companions;
- It is essential for the different military air force means to co-operate, since the Japanese won air superiority over China involving their naval air force;
- In the shipping training, besides the individual coaching, practising bond tasks is of the major importance. The Chinese air force was in a drawback compared to its Japanese enemy in this field as well;
- It had no sense or effect to bomb civilian targets before winning air superiority, and even after that it was doubtful it could achieve the desired result;
- For the protection of the civilian population and industrial production, it is necessary to plan, organize and solve the early alarming, building of a shelter system, fire fighting, rescue, and covering, masking the potential civilian targets as well.<sup>12</sup>

From the above - very briefly - mentioned two wars, very few conclusions could be made for organizing a modern air force, air defence. However, from 1936, there was a war in Europe, which, regarding its geographical, climatic, expansion, quantitative and qualitative features, could serve with lessons worth learning. It was the Spanish Civil War.

#### **4 THE SPANISH CIVIL WAR<sup>13</sup>**

The open conflict of the republican and the coup forces began on 17-18th July 1936. The size and quality of Spanish air force and air defence corresponded to the category of what the contemporary Hungarian military trade press called the 'small countries' air defences and air forces. Out of the 277 aircrafts<sup>14</sup>, which were considered to be moderately modern - 214 pieces were in the hands of the republican forces<sup>15</sup>.

However, the "Franconian national" forces were very quickly supplemented with Italian<sup>16</sup> and German<sup>17</sup> air forces, and later the Republicans also received aircrafts from the Soviet Union<sup>18</sup>. The war was observed with a great interest by military regiments, including the Hungarian General Staff as well. They had relatively accurate and up-to-date information on the application of air force and air defence issues, and thus they could make the correct conclusions. The Hungarian military leadership gained information primarily from the "nationalist" sources, and although they sometimes differed mainly in terms of quantities from the dominant source of Olaf Groehler, they were yet plausible. In the first half of 1937 the opposing forces were roughly balanced.<sup>19</sup> Both parties owned about 200-200 means (this quantity also increased

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<sup>12</sup> Komposcht Nándor: A honi légvédelem háborús tapasztalatai a fejlődés szolgálatában. Légoltalmi Közlemények 1941. december 15., p393-394.

<sup>13</sup> Mainly according to HL. VKF 1.o. 2912/Eln. 1937 és a HL.VKF 1.o. 262/Eln. 1938.

<sup>14</sup> The Spanish air force mainly consisted of NIEUPORT-52-C-1and BREGUET 19A-2 aircrafts.

<sup>15</sup> Groehler, Olaf: A légi háborúk története 1910-1980. Zrínyi katonai Kiadó, Budapest 1983., p129.

<sup>16</sup> Mostly CR-32, SM-79 és SM-81 type aircrafts.

<sup>17</sup> Mostly JU-52, HE-45,46,51,70,111 aircrafts.

<sup>18</sup> I-15,16, SB és R-5 aircrafts.

<sup>19</sup> HL. VKF 1.o. 2912/Eln. 1937.

significantly for both parties during the year). They were 40-45% fighter aircrafts, 30-35% bomber aircrafts, 20-25% reconnaissance aircrafts. The Hungarian military leadership could only get some data about anti-aircraft artillery from the "national" side. According to that, they had 14 batteries of 75 and 88 cm anti-aircraft guns and an unknown quantity of air defence guns.<sup>20</sup> From the republican side it could only be found out that they had unknown number of anti-aircraft guns and cannons, many of which were received from the Soviet Union. There were no credible data about the construction and number of the applied monitoring and reporting patrols. By and large, however, the acquired information - especially in matters of the application - proved very important and useful, usable procedures and experience. These can be summarized in the following areas.

#### General Features:

- The application of air force and air defence was the most important issue of the leadership. The maximum efficiency was achieved by a strictly focused, centralized leadership. For the protection - not in the general organization, management, but in the concrete implementation of combat - however, a decentralized method often proved to be more effective;
- For the effective implementation of the air defence, very closely coordinated armaments, and in need, the allocations of tasks were needed. Certain safeguarding tasks could only be fulfilled with air defence artillery although the fighters were to be much more efficient;
- Safeguarding the manoeuvres could not be successfully resolved;
- A significant part of air force losses were caused by its own fire (due to the poor cooperation, flow and exchange of information and organization) and technical problems. This ratio could be up to 20% or more.

## 5 THE EXPERIENCE OF THE APPLICATION OF AIR FORCES

Air forces were used for the following duties:

- To detect enemy troops, protection systems, movements, transfers, vulnerable military and civilian targets;
- To strike on military and civilian targets: air force was particularly used against troops settled in the front-line and its immediate surroundings. They were mostly involved in solving tactical tasks. The effectiveness of attacking civilian targets and population was below the expected level. The most active actions were against the following priority military targets: "command battery posts, headquarters, infantry protection, charging infantry, tanks, battery posts, monitoring sites, suspicious thickets and forests, reserves, airports, motor car mainstays, ports". Interestingly, although it would be quite logical, the posts of anti-aircraft artillery were very rarely stroke from the air, strikes were tried to be repelled by artilleries. The most typical civilian targets were: „railways, trains, railway stations, warehouses, bridges, post centres, radio stations ”;
- To fight in air with the bonds of the attacking air enemy;
- Manpower supply and transportation;
- Rarely courier;

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<sup>20</sup> As a comparison, the Hungarian Royal Army's similar toolkit consisted of 192 pieces of aircrafts then (Tóth Sándor: A Horthy hadsereg szervezete (1920–1944) I. rész, Hadtörténeti közlemények 1958/1, 63. oldal), 21 air defence artillery batteries, and 112 anti-aircraft artillery machine guns gradually deployed in war.

- Weapons used by air forces:
- The most important weapon was the bomb: against infantry mostly sensitive explosive bombs were used (mainly the 1-10 kg type). Incendiary bombs were used in the bushy, wooded parts. For larger targets and destructing forts 20-25 kg bombs were used. Bigger bombs were rarely - and rather for psychological effects (panic) - applied. The biggest bombs were usually 50 to 250 kg explosive ones;
- After the bomb release when attacking military targets – depending on the strength of the fighter protection and repelling fire – the flying devices often re-stroke, using machine gun fire;
- A mix of exploding and incendiary bombs were used against civilian targets; to demoralize the combatants and the civilian population flyers were often scattered down from aircrafts;
- As an occasional weapon, a smoke bomb was also sometimes used, especially against the field armies and the frontlines;
- According to the information given to the general staff no combat gas was used.

#### Battle methods of air forces:

- In case of stand combat and long-term protection: after a systematic, accurate detection, attacking the selected targets in several waves;
- In case of a moving battle: occasional attacks were in common, they were based on the information gathered during the battle, and on direct detection. Most of the air attacks against troops carried out by air forces were done during the day, at lower heights (usually from 50 metres altitude). Great care was taken to maximize the use of terrain features. The battle tasks were usually implemented by at least coy convoys – even in the detection at least by squads. Several consecutive waves followed one another above the target or the target area. The activities of aircrafts were strictly integrated into general combat operations, particularly in the regions of direct engagement. Air Force had the following place and role in breaking the protection: "artillery preparation, air strike, tank infantry attack and then infantry attack."
- The squad and regiment bonds approached civilian targets often at night, usually from high or at least from medium altitudes, then they descended low or to near-Earth-altitude and from there they carried out the bombing. To assess the impact, the bonds either stroke again after a short time of circling above or left the target area. They repeated the attack 4 or 5 times if it was necessary. Particular care was taken to choose and plan the approach path. Most bombers carried out the attacks with the fighter escort. The ratio of fighters could reach 50% of the bonds. Striking force bonds avoided well-organized anti-aircraft systems as far as it was possible.

## **FIGHTER ACTIVITY**

The fighter forces were the part of the air force the same as the defence; they played a decisive role in carrying out their duties:

- One of their most important duties was to accompany and protect the attacking bonds. If there were no repelling fighters, they also took part in striking on ground targets;
- Their effectiveness in repelling the enemy's striking bond was variable. Mostly they couldn't take part in the battles at the front because if their alarm was from the ground, they were almost always late. However, if they were in preparedness



above the important protected objects, their mere presence was enough to repel the attackers.

## **AIR TRANSPORT**

Manpower supply actually had significant major role only at the beginning of the Civil War when the "national" forces were dropped into Spain.

## **6 THE EXPERIENCE FROM THE APPLICATION OF ANTI-AIRCRAFT ARTILLERY**

On the one hand air defence artillery assets were to protect troops, headquarters, warehouses near the front line, and bases. This protection could only be effective with a very good disguise, dispersal, coating and hiding. Poorly hidden goals "almost attracted" air attacks. Therefore, both parties used deceptive equipment as well. As we have already mentioned above, anti-aircraft artillery and its tools were rarely directly struck from the air. On the other hand, another important set of tasks of the anti-aircraft artillery was to protect the significant objects farther from the front. It had to solve the protection of industrial and political centres, transportation routes, destinations and other infrastructure, storage facilities and reserves. During the air defence of troops, it was a serious problem to get the information necessary for the fire control to the appropriate fire means in time. Therefore, the batteries often had their own reconnaissance, surveillance, and reporting services.

The effectiveness of air defence artillery assets was highly variable. Near the front line, usually from near-Earth altitude, they could shoot a maximum of 3-4 shots per batteries, and this could only be done if the observation and organization were very precise and well-planned. The biggest problem - almost insoluble – was to protect marches and manoeuvres. They couldn't find an adequate solution to this problem. Out of the destroyed aircrafts 16-20% was shot down by air defence artillery devices<sup>21</sup>. The effectiveness of anti-aircraft guns was minimal. Even if they shot an attacking air device, they could rarely destroy it by the shot. Their effect was more of psychological nature. With their fire they could force aircrafts to move higher or to manoeuvre, thus reducing their task-implementation accuracy and efficiency. Recognition was a major problem. It was often the case that the anti-aircraft fire means shot any pop-up - often their own - aircrafts. They couldn't avoid it even with the most careful trainings and a thoroughly prepared staff.

## **THE EXPERIENCE OF APPLYING MONITORING AND REPORTING SERVICE**

There was little direct information about the monitoring and reporting services' activity, but many conclusions could be drawn rather indirectly. Monitoring had to be organized for the protection of combat troops on the one hand, on the other, for civil objects. For the effective use of anti-aircraft fire means, observation and reporting posts had to be directly added to batteries. Their constant activities were necessary. To alarm fighter air forces and civil air defence, it was necessary to build up a relatively coherent system (according to the requirements a multi-line, seamless one). The theoretically

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<sup>21</sup> This ratio was very similar to the results achieved in World War I.

predicted 8-kilometre detection distance on average fell by about 5 kilometres in practice, due to the low attacking altitude capacity of aircrafts. The monitoring and reporting services used public telephone and telegraph lines to the maximum. It was necessary for the monitoring entities to be equipped with vision and hearing amplifier devices.<sup>22</sup> The aircraft detection and identification were not reliable. Poorly organized monitoring and reporting systems caused huge losses and damage - typically for the Italians.

## **THE EXPERIENCE OF THE CIVILIAN AIR DEFENCE**

The civilian air defence was led by the competent military authorities. They tried to insert it into the unified air defence system, with more or less success. The "national" forces often attacked civilian targets which were not too important from the military point of view. They primarily measured blows on political and economic centres and large cities. The financial consequences of the attacks were significant, but the impact on the population was much smaller. "After an air strike whole neighbourhoods became ruins." However, after the first shock, the population quickly overcame its initial panic, and they carried out rescue and restoration effectively, if it was well-organized. Aircraft attacks caused a relatively small number of fatalities. The construction of shelters, organized fire fighting, clearing up ruins, and the blackout significantly reduced losses. The most important experience was that: before the war the civilian population needed to be prepared what to do, otherwise in the first period of the war excessive loss could be expected.

## **CONCLUSION**

The wars of the thirties, especially the Spanish Civil War, provided many valuable lessons for all armies, which were ready to analyze and evaluate the events. Of course, they could not give general, valid, complete rules and principles for all future wars, because they were local. The useful lessons the civil war taught were learnt by the military leaderships, also including the Hungarian military leadership - especially in matters of application - and used in a creative way, such as training, practice, and in the future in the field of planning, organizing and implementing combat operations.

## **Bibliography references**

- [1] Harcászati szabályzat (tervezet) I. rész. Harcászati elvek, Stádium sajtóvállalat részvénytársaság nyomdája, Budapest 1938.
- [2] HL. VKF 1.o. 2912/Eln. 1937., HL.VKF 1.o. 262/Eln. 1938.
- [3] Groehler, Olaf: A légi háborúk története 1910–1970, Zrínyi Katonai Kiadó, Budapest 1980.
- [4] Komposcht Nándor: A honi légvédelem háborús tapasztalatai a fejlődés szolgálatában, Légoltalmi Közlemények 1941. 24. szám 393-396. oldal
- [5] Tóth Sándor: A Horthy hadsereg szervezete (1920–1944), Hadtörténeti Közlemények 1958/1-2 51-70. oldal, 1958/3-4 64-85. oldal

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<sup>22</sup> Primarily with binoculars and listening devices.