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One Hundred Years of the Serbian Air Force (1912. – 2012.)

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A hundred years ago, Serbia was among the first 15 countries in the world to have its own aviation and one of the first five to have its Air Force performing first combat actions as early as the beginning of March 1913 during the First Balkan War. Over these one hundred years, the Serbian Air Force has had 543 different aircraft models and 7,590 military aircraft out of which 3,748 were nationally produced.
The idea about an independent development of the national aviation industry was born in the early 20s of the last century when the newly-formed aviation of the Kingdom of Yugoslavia, which had stemmed from the Kingdom of Serbia after WWI, made a decision to set up its own aircraft development industry. Therefore, the ŠB-1 trainer by Ikarus, introduced into the AF operational use on 28 March 1924, can be considered as the beginning of the aviation industry in the region.
Neither WWI, WWII nor the 1999 USA-led NATO air strikes on Serbia, which defended its right to existence, could not destroy Serbia's aviation aspirations –*Made in Serbia*-tagged aircraft still have been produced and exported.

AT the end of the last year, on 24 December 2012, the Air Force of Serbia marked a century of its existence. A hundred years ago, Serbia was among the first 15 countries in the world to have its own aviation and one of the first five to have its Air Force performing first combat actions as early as at the beginning of March 1913 during the First Balkans War [9].

Having been internationally recognized at the Congress of Berlin in 1878 after five centuries of fight against the Ottoman Empire, the Kingdom of Serbia started forming a modern, well-equipped army as a future guarantee of its independence. With its deep understanding of modern times and technological achievements of the epoch, Serbia was among few in the world to realise the importance of aviation in the incoming age.

Nine years after the first Wright brothers 'historic flight, on 17 December 1903, the Air Force Command was formed on 24 December 1912 in Nis by the decree of Duke of Radomir Putnik, Chief of General Staff of the Serbian Army. The first commander of the Serbian Air Force was an aviation engineer, Major Kosta Miletić, who acquired his first flight experiences as a lieutenant and balloon pilot in Russia in 1902 [11].

First Serbian military pilot, Sergeant Mihajlo Petrović (1884.-1913.)

A hundred years ago, Serbia thus ranked among the pioneers of the world aviation, engaging its Air Force at the beginning of March 1913 during the First Balkan War and the Skadar town siege as help to its ally, Montenegro, against the Turkish Army. The proof that the Serbian Air Force formation was carefully conceived, planned and

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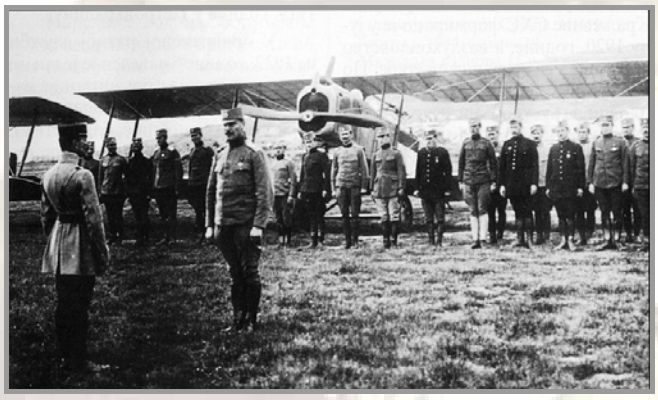
executed was the fact that the first class of Serbian pilots was sent for training to the Louis Bleriot Training Aviation Center in Etampes in spring 1912. In December of the same year, Serbia purchased three Henry Farman HF-20 biplanes, one Bleriot XI one-seat monoplane and two Bleriot XI-2 two-seaters.

The history of the Serbian Military Aviation recognizes Sergeant Mihajlo Petrović as the first Serbian military pilot to acquire a flight permit (No 979) from the International Aviation Federation. In a combat-reconnaissance flight on his Henry Farman HF-20 over Skadar on 20 March 1913, Sergeant Mihajlo Petrović was killed, thus becoming the first casualty in the history of the Serbian military aviation and the second one in the world aviation history [10].

OLUJ plane, the first Serbian armed plane on which Sergeant Miodrag Tomić won first Serbian victories in air duels

During WWI, in April 1915, the 8mm Schwarzlose machine gun with six 100-round boxes was mounted on the Bleriot XI-2 aircraft together with air bombs (2x16kg or 4x12kg) originally constructed by Serbian Colonel Miodrag Vasić. This first armed plane in the Serbian Army got a symbolic name OLUJ (Storm). It brought the first Serbian victories in air duels on 9 and 23 June when Sergeant Miodrag Tomić shot down two German planes. Its last flight occurred on 23 January 1916 after a successful combat flight in the vicinity of Ljes (Albania) - strong wind broke it on the airport apron after landing.

Serbian Air Force was the first in the world aviation history to realize medical transport of the wounded and sick by the end of September 1915. One of the wounded soldiers in that first medical transport was Štefanik, a Czech pilot-volunteer, later to become a Czechoslovak Minister of War.



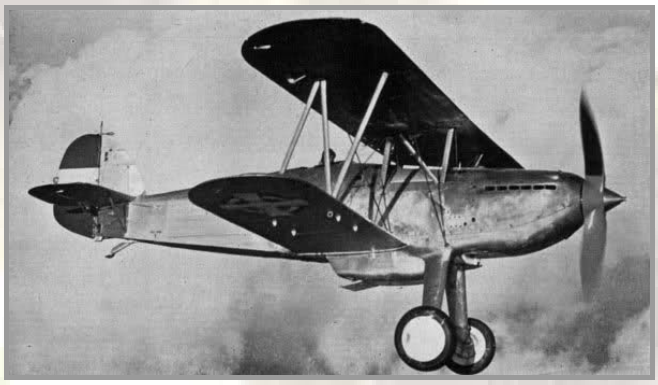
Inspection of Serbian and French pilots from the ***Srpska avijatika*** squad at the Salonika front

During 1915 and until the end of WWI in 1918, more modern airplanes entered into operational use, among them being DORAND AR-1, BREGE 14, MORIS FARMAN MF-11, NIEUPORT NIE-24 and SPAD S-7. In May 1916, Serbian Air Force was located in Mikra near Thessaloniki (Greece) within the operations for the breakthrough of the Salonika front. Five Serbian-French squadrons, known as ***Srpka avijatika*** (Serbian aviation) were formed on the basis of the Entente decision dated March 1916.

Stemming from the Kingdom of Serbia, after the breakthrough of the Salonika front on 18 September 1918 and the end of WWI, the Kingdom of Serbs, Croats and Slovenians emmerged first, to be followed by the Kingdom of Yugoslavia in 1929. The Air Force of the newly-formed kingdom(s) continued to gain in significance so that, besides purchasing foreign aircraft, the Kingdom started its own design and production of military aircraft in 1923 in order to avoid being dependent on foreign suppliers.

Training aircraft ŠB-1

Based on the government incentive and suport as well as on the country's scientific, technical and human potential, five aircraft production companies were formed on the Serbian teritory by the beginning of the Second World War. These were **Ikarus** (1923), **Rogozarski** (1924), **Zmaj** (1927), **Aeroplanska radionica** (1927) and **Utva** (1939).The other parts of the Kingdom of Yugoslavia did not present a suitable ground for the development of aviation industry for various reasons [5,9].



Hawker Fury II aircraft

Ikarus was the foundation of the Serbian and Yugoslav aviation industry. Set up by a group of aviation enthusiasts around a pilot Dimitrije Konjović on 13 October 1923, it officially started work on 20 November of the same year. In less than for months, the first airplane, ŠB-1, Little Brandenburg, was produced, on 3 March 1924. Many an aviation historian agrees that the crucial moment in the creation of the Serbian/Yugoslav aviation industry was an official delivery of this training airplane to the representatives of the First Air Force regiment in Novi Sad on 28 March 1924. This symbolical handing over of the first Serbia-made airplane represented the embryo of the national aviation industry.

Bristol Blenheim bomber (Ikarus B-1 variant)

Ikarus produced training aircraft for the Army and Navy Air Force in its plants in Novi Sad until December 1932 when it moved to its new location in Zemun, near Belgrade. The new location was carefully chosen since the Belgrade University had already had an aviation department within the Technical Faculty, which was a rarity for that-time European universities. Besides nationally-designed aircraft, e.g. IK-2, Ikarus produced Hawker Fury II, Bristol Blenheim and Potez-22 (220 items) using licensed documentation [5,9].

Potez-25 aircraft (A2 variant, equipped with a domestic Jupiter aero engine)

Rogožarski was founded by Živojin Rogožarski in Belgrade in April 1924. The first airplane to be produced was Fizir F1V with the 260 hp Maybach engine. This plane represented the company at the 1927 air show organised by the Little Entente countries and superiorly won the first place in flight construction elements. This first world success of the Serbian aviation industry enabled a serial production of the plane.

Fizir F1V aircraft

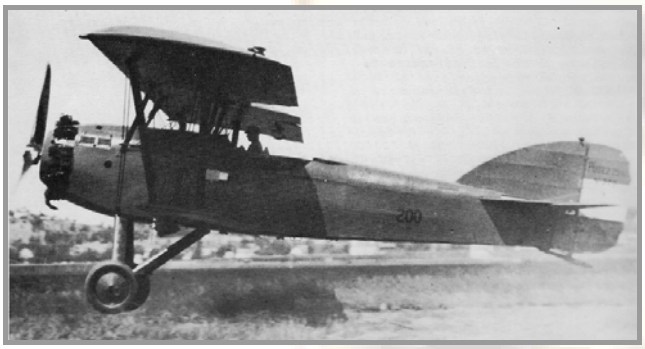
After the Fizir F1V, other airplane types followed such as a licensed Hawker Hurricane and a national „miracle“ of construction of that time, IK-3 low-wing fighter, the prototype of which took off on 14 April 1938 for the first time [3, 5].

Aviators of the Kingdom of Yugoslavia next to the IK-3 aircraft

In the middle of 1940, a series of only 12 of these fighters was supplied to the Air Force of the Kingdom of Yugoslavia due to an erroneous defence policy of the then-government and the Karadjordjević dinasty who allocated significant funds to the purchase of 63 German Messerschmitt Me-109. In April 1941, when the fascistic Germany attacked Yugoslavia without a declaration of war, while defending Belgrade against 450 German aircraft, four IK-3 airplanes (all other aircraft were undergoing a scheduled overhaul) shot down 11 fighters, mostly Me-109. Due to IK-3 superior manoeuverability, Yugoslav pilots would succeed in getting behind the attackers in three subsequent manoeuvers and achieving the kills. Only one IK-3 was shot down in air duels. A fighter pilot, Sergeant Milisav Semiz, managed to shoot down four Luftwaffe aircraft before landing and setting his own, damaged aircraft on fire to prevent Germans from capturing it.

Pilot Sergeant Milisav Semiz (1912.-1970.)

The **Zmaj** factory was founded by an engineer Jovan Petrović and a manufacturer Dragoljub Šterić in Zemun on 15 March 1927. They were first in the region to produce, using the license documentation, an all-metal aircraft Dewoitine D-27 in 1929. Their well-known serially produced aircraft are those for basic and transitional training, nationally-designed Fizir FN and Fizir FP-2. **Zmaj** conquered a very specific hydroplane manufacture as well as a production of the passenger three-engine airplane Spartan [1,9].



Breguet 19 aircraft

Aeroplanska radionica (Airplane workshop) or the Aviation Technical Facility was founded in Kraljevo in September 1927 as a state enterprise. In 1928 the government let Breguet, French firm, organise the production of Brege-19 aircraft. Until 1933, 425 aircraft, bombers and fighters, were produced. Having specialised in manufacturing bombers, the Facility easily conquered the production of German two-engine bombers Dornier Do-17 into which K-14, nationally-produced (in Rakovica, near Belgrade), engines were fitted in [2,5].

Dornier Do-17 bomber

Utva was founded towards the beginning of WWII, in March 1939, in Pancevo as a glider manufacturer. After the war, it extended its scope in the Republic of Yugoslavia.

Apart from the already mentioned aircraft types, other models were also in operational use in the Kingdom of Yugoslavia, such as Ikarus IO, Rogožarski PVT, Rogožarski R-100, Avia BH-33, Fiesler Fi-156, Savoia Marchetti SM-79, Dornier Do-22, etc [3,5].

Dornier Do-22 seaplane

The Kingdom of Yugoslavia capitulated in April 1941 to significantly more numerous and technically superior armed forces of Germany, helped by Italy, Hungary and Bulgaria. In the first days of warfare, although inferior to Luftwaffe, the Yugoslav Air Force pilots gave strong resistance, shooting down dozens of aggressor aircraft. Serbia was dismembered among Germany, Hungary and Bulgaria, while Croatia formed its state which remained a satellite of fascistic Germany until the end of WWII.

The uprising in Serbia in July 1941 spread to the other parts of Yugoslavia with the mainly partisan-led resistance to ocupation. The defection of pilots Franjo Kluz and Rudi Čajavec on Potez-25 and Brege-19 in May and June 1942, respectively, from Croatia AF to the free teritory under the partisan control can be considered as the beginning of the formation of partisan aviation. At the end of 1944 and the begining of 1945 aviation regiments were formed, mostly equipped with Soviet aircraft Yak-3, Yak-9 (Яковлев) and IL-2 (Ильюшин), as well as British Spitfire [5].

Yak-9 fighter

After WWII, depending on the world political scene, Yugoslav Air Force was equipped with aircraft from both the East and the West, besides those Yugoslav-designed and produced ones. The most prominent foreign models in operational use were An-26, MiG-21, MiG-29, Polikarpov Po-2, Moskito Mk-6, Douglas C-47, Lockhed T-33, F-86 Sabre, F-47D Tanderbolt and F-84G Thunderjet. The most significant helicopter models were Ka-25, Ka-28, Mi-4, Mi-8 and Sikorski WS-55. Based on a French license, the production of various models of Gazele SA341 helicopters was conquered in the mid-70s of the last century and they were produced in **Soko** factory in Mostar.

A couple of F-84G Thunderjet aircraft in flight

Faced with the political rift with the USSR in 1948 and the economic and military blocade from the West in the middle of the last century, Yugoslavia tourned to its own resources in all walks of life, aviation industry included. **Ikarus, Utva** and **Soko** became the main aircraft manufacturers. Different aircraft models were produced on the basis of the project designs of the Aeronautical Technical Institute (ATI), formed in Belgrade in 1946, today within the Military Technical Institute (MTI, Vojnotehnički institut –VTI) [4].

With **Rogožarski** and **Zmaj** pre-war factories merged in, **Ikarus** produced airplanes until 1962 when it started to specialise in bus production. On the basis of the existing design documentation of the pre-war fighter IK-3 and after its modification, the S-49A aircraft came out of the Ikarus production facilities in 1949 to be followed by a low-wing cantilever monoplane S-49C in 1952 which became the first domestic aircraft armed with air-to-ground missiles [4].

S-49C fighter

After WWII, Ikarus-produced aircraft included approximately 500 models, such as: Aero-2, Kurir and Ikarus 522 (serial production), Ikarus 232 (experimental one, with a pilot in the horizotnal position), J-451M Stršljen and S-451M Zolja (which broke the world speed record with 501kh in the category of ultra-light jet aircraft on 19 May 1960) [4,5].

S-451M Zolja aircraft which set the world speed record in the category of ultra light aircraft in 1960

Apart from gliders, **Utva** specialised in the production of light airplanes of different types such as the utility aircraft Utva-56, the agricultural aircraft Utva-65 and a few versions of the light military aircraft Utva-66. Several successful construction solutions of light aircraft gave birth to original Aero-3, Tip 212 and 213, Trojka, Utva-75 and Lasta [5].

Utva-66H seaplane

At the beginning of the 1990s, after the collapse of the Republic of Yugoslavia, **Utva** became the standard-bearer of the Serbian aviation industry and the main implementer of MTI aeronautical projects. After massive destruction during NATO air raids in 1999, **Utva** rose like phoenix. The reconstructed production facilities gave birth to a trainer Lasta for starting, basic and combat training – the first *Made-in-Serbia* aircraft to enter AFs of foreign countries since 2010, before entering into operational use in Serbia itself [6,7].

LASTA aircraft

At the moment, **Utva** co-operates with the ATI on the realisation of a turboprop trainer-combat aircraft for advanced combat flight training. Besides its basic purpose, the Kobac is especially suitable for anti-terrorist, anti-sabotage and anti-insurgence operations in inaccessible terrains such as gorges and narrow river valleys where highly sophisticated aircraft are inefficient and too risky to be used. The realization of this project, provoking a particular interest out of the country, is due in 2013-2014.

KOBAC aircraft

Soko was set up in Mostar (present Bosnia and Herzegovina) on 14 October 1959 and was the most prominent aviation manufacturer in the then-Yugoslavia. Due to some strategic reasons of the then-common state, a part of production facilities, human resources and production programmes (Ikarus 522 aircraft) was moved from **Ikarus** to **Soko** (which would prove to be harmful for the industry of Serbia).

JASTREB (J-21) aircraft at the apron

In the early 1960s, on the basis of the ATI project design, **Soko** conquered the serial production of a two-seater advanced jet trainer and attack aircraft Galeb-2 (G-2) which became a sensation at its first international air show (Farnborough Airshow). Its one-seated combat version (Jastreb J-21) appeared later. A significant number of all 450 aircraft produced was exported [8].

The end of 1960 and the beginning of 1970s saw the joint Yugoslav-Romanian development project of a twin-engined high-wing single-seat jet strike fighter Orao J-22 which is still in operational use in the AF of Serbia. Besides the combat version, reconnaissance and training versions have also been developed [4-6].

ORAO (J-22) aircraft taking off

The single-engined two-seater low-wing jet trainer fighter Super Galeb G-4 was produced in the early 1980s by the ATI and **Soko**; the technological advancement was such that, at the time, the aircraft became one of the main competitors in the JPATS program for the procurement of primary training aircraft for US Naval Air Force. The disintegration of the SFRY prevented the program realisation so only a small number of these aircraft were exported [4,8].

GALEB G-2 and G-4 aircraft in flight

Soko conquered the production of helicopters as well. The most significant project in this area was the licensed production of different models of Gazelle SA341 helicopters.The Gama helicopter version should be mentioned in particular; it was intended for antiarmour combat after a successful construction modification implemented by the MTI. The helicopter is armed with Maljutka antitank missiles and Strela-2M IR guided anti-aircraft missiles [4,5].

GAZELA helicopter, GAMA version for antiarmour combat

The end of the Republic Yugoslavia saw the end of the **Soko** manufacturer.In the region of the ex-Yugoslavia, the only aeronautical producer has been Serbian **Utva** which, together with the scientific staff of the MTI, has successfully been realising the Lasta and Kobac projects. The disintegration of the SFRY has put an end to the most spectacular aircraft project of the then-Yugoslavia, the NA supersonic aircraft. Had it not been for the end of Yugoslavia, Rafale, Eurofighter and F-16 would have an outstanding competitor in the world market [6].

NA supersonic aircraft

The externally-provoked civil war and sanctions followed by the agression of 19 welthiest NATO Western

countries in 1999 led Serbia to the brink of biological and technological survival. Technologically, Serbia has regressed in many areas for almost half a century. For defying the new world order, Serbia has suffered massive retaliation as an example to other nations.

Patriotism and courage which amazed not only the liberal part of the world but also the aggressors themselves were manifested throughout the country. However, what Serbian pilots and AF did will be learnt in world art of war manuals as an example of ultimate patriotism and courage. Although aware that the balance of power in the air was far from even (1:100 or more), pilots would take off bravely. Even Air Force Deputy Chief of Staff, pilot Col.General Ljubiša Veličković, got killed in combat [13,14].

Throughout history, Serbian sky proved to be hostile to all aggressors. In 1999, the pride of the USA Air Force, F-117 fighter and B-2 bomber were shot down over Serbia together with the stealth technology of the new world order [12].

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Sto godina srpskog ratnog vazduhoplovstva

Srbija je pre sto godina bila među prvih 15 država u svetu koje su imale avijaciju i jedna od prvih pet čije je ratno vazduhoplovstvo već početkom marta 1913. godine, u toku Prvog Balkanskog rata, izvelo svoja prva borbena dejstva. Za ovih sto godina srpsko ratno vazduhoplovstvo je kroz 543 različita modela imalo u svom sastavo 7590 vojnih letelica od čega je 3748 bilo domaće proizvodnje.

Ideje o samostalnom razvoju domaće vazduhoplovne industrije su nastale još početkom dvadesetih godina prošlog veka, kada je novoformirano vazduhoplovstvo Kraljevine Jugoslavije, koja je nastala na temeljima Kraljevine Srbije nakon Prvog S.R., donelo odluku da se krene u sopstveni razvoj vazduhoplova. Zato se začetnikom vazduhoplovne industrije na ovim prostorima može smatrati školski avion "ŠB-1", fabrike "Ikarus", koji je u sastav RV uveden 28.03.1924. godine.

Ni I i II S.R., ni bombardovanje 1999. godine od strane NATO pakta na čelu sa SAD, kada je Srbija samo branila svoje pravo na postojanje, nisu u Srbiji ugasili želju za dokazivanjem na vazduhoplovnom polju pa se tako i danas u Srbiji proizvode i izvoze avioni pod oznakom Made in Serbia.

Сто лет сербских ВВС

Сто лет тому назад Сербия была в числе первых 15 стран в мире, которые имели авиацию и одна из пяти первых, чьи военно-воздушные силы в начале марта 1913 года во время Первой Балканской войны совершили свои первые боевые действия. За последние сто лет, сербские военно-воздушные силы через 543 различных моделей имели в своём составе 7590 военных летательных аппаратов, из которых 3748 были отечественного производства.

Собственные представления и идеи о развитии отечественной авиационной промышленности появились в начале двадцатых годов прошлого века, когда вновь образованные военно-воздушные силы Королевства Югославии, построенного на фундаменте Королевства Сербии после Первой мировой войны, решили начать развитие своего собственного самолёта. Поэтому зачинателем авиационной промышленности на наших просторах можно считать учебно-тренировочный самолёт „ШБ-1" завода „Икарус", который был введен в состав военно-воздушных сил 28-ого марта 1924-ого года.

Ни Первая, ни Вторая мировые войны, ни НАТО-агрессия и бомбардировки в 1999 году во главе со США, когда Сербия только отстояла своё право на существование, в Сербии не погасли желание выдвигаться в области авиации, так что сегодня в Сербии производятся и экспортируются самолёты под маркой *Сделано в Сербии*.

Cent ans de l'Armée de l'air serbe

Il y a cent ans que la Serbie était parmi les 15 pays du monde qui possédaient l'aviation et l'une des cinq premiers dont l'Armée de l'air au début du mars 1913 a effectué ses premières actions de combat pendant la Première guerre balkanique. Durant ces cent ans l'Armée de l'air serbe avait 7590 aéronefs de 534 modèles différents dont 3748 aéronefs étaient de production nationale. L'idée du développement indépendant de l'industrie aérienne nationale est née au début des années 1920 où l'Armée de l'air de la Monarchie Yougoslave, qui a été crée après la Monarchie Serbe après la Première guerre mondiale, a pris la décision de commencer son propre développement dans le domaine de l'aviation. C'est pourquoi le premier aéronef national est l'avion école „ŠB-1" mis en service le 28.3.1924. produit à l'usine Ikarus. Ni les deux guerres mondiales ni le bombardement en 1999 de la part de l'OTAN guidé par les Etats-unis lorsque la Serbie a seulement défendu son droit d'exister n'ont pas éteint le désir de Serbie de travailler dans le domaine de l'aviation et à présent on produit en Serbie les avions et on exporte les avions marqués par produits en Serbie.