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The historical development of Latvian aviation and airfield territories

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Abstract. In the 20th century, built airfields and airports, have significantly impacted the European landscape and environmental quality today. Territories that have lost their former function can now be considered as a stimulus for the creation of new landscapes and for urban development. The publication covers the history of Latvian aviation through time, where a total of 97 airfields have been established, which served as military, agricultural, sports, and civil aviation airfields. Scientific literature, popular scientific literature were used to gather information. For mapping was used ArcGIS. Nowadays, according to the data of the Civil Aviation Agency, 9 airfields are certified – 7 civil aviation airfields, and 2 air transportation airfields. As well as a military base of the Air Force has been established at Lielvārde airfield. Airfield's development opportunities until now have not been researched in Latvia, this is the first study to capture resources available and development strategies.

Keywords: airport landscape, planning, post-industrial airfield

Introduction

Around the world, in the 20th century, several hundred airfields and airports were built, which have significantly impacted the European landscape and environmental quality today [10; 9; 14]. Architects and landscape architects, urban planners, engineers, etc. have been involved in the transformation of abandoned airfields, reducing and eliminating the negative impact on the environment, by creating new landscapes. Post-industrial heritage reflects human activities through time. The Soviet period and regaining of independence of the Baltic states affected the further development of these territories; as a result, today there are abandoned airfield territories of different sizes and with different raised problems, which degrade the surrounding landscape and do not contribute to the growth of the cities.

The degraded areas are a relatively new problem and need their own terminology, which would be used in political documents, legislation, and education. In other countries, the problem was recognised in the 1970s, but in Latvia, the problem of these territories became widely popular ten years ago [2].

The reuse of abandoned and degraded post-industrial territories and their integration into the urban environment is a topical subject, taking into account the fact that the need for additional territories for urban development is increasing and these lands are an unused resource. The post-industrial brownfield landscape, hereinafter post-industrial airfield territories, consists of a large-scale landscape with adjacent buildings that have lost their original function. These territories can be described as non-ecological, aesthetically unattractive, and functionally unused open landscapes. Such post-industrial landscapes have the potential to become productive, which would prevent different negative consequences affecting the surrounding, densely populated areas. Territories that have lost their former function can now be used as a resource, which is considered as a stimulus for the creation of new landscapes and for urban development [10].

Method and Materials

The development of Latvian aviation was examined, where the history of Latvian aviation was divided into time periods related to the political and economic conditions in the country, developing the growth of aviation. The development of Latvian aviation can be divided into five periods. Latvian War of Independence, in 1918-1920, which is the reference point for the beginning of Latvian aviation. The interwar period in 1921-1938, known as the heyday of Latvian aviation, and World War II in 1939-1945 when Latvian aviation was eliminated, see Figure 1.

Both scientific literature and popular scientific literature were used to gather information, as well as mapping was applied using *ArcGIS*.

The period of Soviet occupation from 1944-1989 was related to the creation of agricultural airfields and the strengthening of military airfield networks. However, Latvian aviation in the period of 1990-2022, after Latvia's Independence was regained, resulted in the mass abandonment of airfields, see Figure 2.

Latvian War of Independence in 1918-1920

The Latvian War Aviation Regiment, originally the War Aviation Group, Division, was established in 1919 by former Latvian war pilots of the Russian Army, who returned to Latvia after World War I and the proclamation of Latvia's independence. By this time, air bases and airfields were established such as: Spilve, Tukums, Vecauce, Vaiņode and Pētersfelde (around Dobele) and a temporary battle airfield in Cēsis. During the battles of Cēsis,

Fig. 1. Timeline from 1918 to 1945 [Author's visualisation based on the sources, 2022]

Fig. 2. Timeline from 1945 to 2022 [Author's visualisation based on the sources, 2022]

Fig. 3. Krustpils airfield with soldiers of the Aviation Park [Latvian War Museum [6]]

the National Armed Forces of Estonia and Latvia did not yet use aviation. Because at that time Latvians did not have their own military aviation. When the Strazdumuiža truce was concluded, as a result of which the German troops had to leave Riga, the German troops left Spilve airfield and moved to the original Kurzeme airfields.

Major General Count Rüdiger von der Goltz was sent on behalf of the German government to lead the German 6th reserve corps together with the Latvian southern brigade of Colonel J. Balodis, fighting together against the newly founded Baltic states, against Russian communism, while protecting Europe and Germany. However, the major general had other hidden intentions to put the Baltic states under his control and restore the monarchy in Germany. When the true intentions of Germany were discovered, soon after that the Latvian army was created. With the unification of the Southern and Northern brigades, General Simansons was appointed as first commander-in-chief of the army. During this time, he established a headquarters, and shortly after that he organised various structures of the army: the engineering corps with the aviation department, and the supply and armament department. On 19 June 1919, an army aviation group was established with Commander Alfrēds Valeiks. The task was set to prepare pilots for combat missions as quickly as possible, creating as an aviation unit on the Latgale front, the main battle base of the national aviation, Krustpils airfield (established during the time of the Tsar, during World War I), see Figure 3 [4; 6].

On 22 July 1919, the formation of the headquarters department of the aviation group took place with Commander J. Priedītis. Two aircraft were assigned to the department: Sopwith Strutter No. 2341, constructed in 1915 in England, and

Fig. 4. Aviation Division Spilve airfield in 1920 [Latvian War Museum, [6]]

Nievport 24 bis No. 4300, constructed in 1916 in France. Shortly after that, on 5 August the 1st flight took place at the Latvian national airfield in Spilve, which was followed by other training flights. Since the acquired aircraft were in relatively poor condition, a repair base was needed to restore the aircraft. And this was created on the premises of the cement factory in Spilve. Parts for repair, as well as items useful in aviation, were collected from former air bases and airfields abandoned by the Germans: from Ozolnieki, Pētersfelde near Dobele, Vecauce, where the Germans had a school for the observers, and Vaiņode. Later, the repair workshop was moved from Spilve to Riga – the aviation department of the army's main mechanical workshop. September of the same year was significant; the Latvian National War Aviation made the first combat flights under the leadership of J. Priedītis from Jumpravmuiža and Spilve airfield of the Latgale front [4].

German troops hesitated to leave Latvia, even though the Treaty of Strazdumuiža was concluded. The conclusion of a secret agreement between Bermont and von der Goltz, in which German troops voluntarily joined with the Russian western troops under the leadership of Bermont, contributed to the fact that on 8 October, German-Russian troops attacked Riga. Unfortunately, during the entire Bermontiade, the Latvian Aviation Park was unable to create a sufficient aviation department at the Sigulda airfield, which was the first airfield of the Aviation Park front (used during World War I as an airfield for Kurzeme and Lithuanian Tsar army bombers). However, despite this, the Latvian army, which rapidly increased in numbers, faced the Bermontiade regiment. In 1920, the Aviation Park became strong thanks to the acquired German and English aircraft. In the fight against the Bolsheviks, who were based at the Rēzekne airfield, four aircraft of the park took part in the combat flight. With the conclusion of a peace treaty between Latvia and Soviet Russia, in August 1920, the war of Latvia's liberation against the German-Russian troops ended. Aircraft were mainly used for reconnaissance from a high altitude to be protected against infantry weapons. The abandoned German airfield of Pētersfelde, which is located 7 km from the Dobele-Kalnmuiža road, was taken over by the Aviation Park, placing the third aviation department [4].

The year 1919 is related to the time of the War of Independence when the first military aviation units of the Armed Forces of the Republic of Latvia were established, which were based at the Biķernieki airfield. Along with the establishment of a unified structure of the Latvian Army, the Aviation Group was also created, which was later (in 1920) named the Aviation Park [6; 24].

Latvian aviation in the interwar period of 1921-1938

As the number of aircraft gradually increased, the activities of the Aviation Park also expanded, and it was planned to increase the number of flying pilots. As a result, the Aviation School was established under the leadership of P. Stūrāns. The first aviation festival in Spilve took place in 1920. A month after this festival, the fund for injured pilots of the Latvian Aviation Park was established. Since then, the aviation festival has been held every year, see Figure 4 [4]. Initially, the Aviation Park had a small number of aircraft, until 1921 when additional equipment arrived and it was renamed the Aviation Division [6; 24].

At the Aviation School, in addition to daily military training flights, the Aviation Division was involved in "peacetime" airmail flights. In the 1930s, packages were mainly delivered to Valka with intermediate landings in Cēsis and Valmiera [4]. In 1924, the Aviation Division consisted of 5 squadrons: fighter, scout, artillery, corrective, and reserve. A network of airfields was also created: in Spilve, Krustpils, Daugavpils, Liepāja, and Gulbene [6; 24].

In the period 1922-1925, new foreign aircraft were purchased: single-seat fighter Ansoldo A-1 Balilla, light bomber reconnaissance vehicle SVA-9 and SVA-10, training aircraft, etc.

1926-1927 The Aviation Division was renamed the Military Aviation Regiment with commander J. Baško. In the period 1928-1929, continuous training of new pilots took place after the replacement of Commander A. Skurbe [4].

The last decades of military aviation (1930-1940) could be considered the "heyday". Because at that time, the most modern purchased aircraft from abroad were available [4]. In the period up to 1930, the aircraft fleet included 150 aircraft, which were supplemented over time with various foreign mission aircraft, training aircraft, and 26 Gloster-Gladiator II biplane fighters.

The base of the Aviation Regiment was located in Spilve, while the aviation workshops were located in Kalnciems. Initially, military aviation was located in Riga, but at the end of the 1920s, it was concentrated closer to the country border [6; 24]. The Aviation Regiment grew rapidly by 1934; reconnaissance and fighter aviation were developed. Reconnaissance squadrons were deployed in Krustpils and Gulbene, and a fighter squadron was in Riga [4]. Also, aircraft construction developed rapidly under the "Law on Civil Aviation" of the Council of Ministers. The most important aircraft were built in the workshops of Liepāja naval port – KOD type aircraft, as well as aircraft designed by K. Irbītis built at the State Electrotechnical Factory [16].

With the change of political system made by K. Ulmanis on 15 May 1934, the further development of war aviation changed. Aviation reorganisation was carried out by the newly elected army commander, General K. Berķis who participated in aviation flights of 6 aircraft groups with landings at Krustpils, Ludza, Daugavpils, and other airfields. The Aviation Regiment also held training flights in Daugavpils during summer camps and additionally used the base at Spilve, Krustpils, and Gulbene airfields. The name Aviation School was changed to Aviation Courses in 1935 [4]. Until 1936, the largest airfields in Latvia were Spilve, Skulte, Liepaja, Krustpils, Daugavpils, Gulbene, Ventspils, and Jelgava [6; 24]. In the last years of the Military Aviation Regiment's existence (1937-1940), the main event was the unified aviation festival of 1938, in which various Latvian aviation organisations took part with different aircraft together [4].

It should be mentioned that in 1921 the first regular passenger airline was opened, Riga-Kaunas-Königsberg-Danzig-Stettine-Berlin. In 1937, however, the German-Soviet airline "Deruluft" provided air traffic to Riga from Moscow and Berlin. The Polish "Lot" provided air traffic to Vilnius and Warsaw, but the German "Lufthansa" provided air traffic to the Nordic countries and Berlin. The best airfields in the Baltics were created in Riga, providing international flights. Also, during the Soviet occupation, Spilve and Rumbula airfields were used for commercial flights from Riga. However, Liepāja and Ventspils airfields were also used for passenger traffic [16].

World War II from 1939-1945

Along with the signing of the pact of mutual assistance in Moscow in 1939, which was signed without the government's knowledge by the Minister of Foreign Affairs of Latvia V. Munters, the establishment of the military bases of the Red Army followed: in Liepaja, Ventspils, Ēdole, Durbe, Priekule, Ezere, but USSR army regiments entered Kurzeme and Liepaja. Also, the construction of Russian airfields was carried out in Grobiņa, Ezere, and Vaiņode. Along with that, flight restrictions for the Aviation Regiment were introduced in the region of Liepāja, Durbe, and Ventspils. Bombers of the Soviet Union occasionally landed at the war airfield of Cēsis-Priekuļi. The events created the need for intensive training to increase the readiness of war aviation. Training flights took place over almost all of Latvia: in Daugavpils, Krustpils, Gulbene airfields, as well as Bauska, Tukums, Ventspils, and Jelgava landing fields. On the other hand, the main base of the Latvian War Aviation Regiment was the airfield in Spilve-Riga with hangars, petrol warehouses, etc. auxiliary buildings. Similar airfields for squadrons were in Krustpils and Gulbene, and Daugavpils airfield was always used for summer camps. The reserve airfields of the Latvian Aviation Regiment were located in Jelgava and Ventspils. The Aeroclub managed landing fields throughout Latvia, which were also used in sports aviation for glider and regional competition flights in Kuldīga, Tukums, and Vaiņode. Plans of the aviation industry did not evolve taking into account the military-political developments. And a general ban on flying in the Aviation Regiment was announced, as a result of which the USSR occupied the main airfield of the regiment – Spilve airfield [4].

In 1940, after the Soviet occupation, the Aviation Regiment and the Latvian Army were eliminated [6; 24]. This can be explained by the beginning of the Soviet era and the awareness that the aviation officers would try to protect Latvia; therefore, to maintain power, it was decided to either shoot the officers or send them to Siberia. As for the Latvian aircraft, they were hidden in the "Provodnik" factory, a couple of aircraft were taken to Russia, and the rest were left to degrade [3].

With the arrival of the Soviet Union, the occupation of Latvia had begun, accepting a declaration stating that the land was the property of the country. Along with the land reform, see Figure 5, the establishment of military airfields was carried out on agricultural lands, eliminating the farms, dismantling the buildings, and planning the territory. Agricultural lands were also divided, and the farms

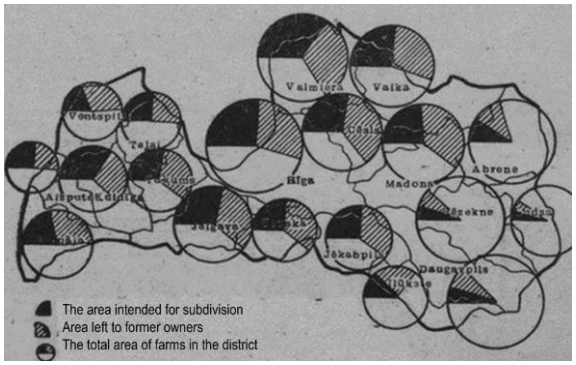

Fig. 5. Bolshevik land reform in 1940 in Latvia [Rūtenfelds, 1943 [29]]

from the period of Latvia increased, renaming them state farms [29].

The beginning of World War II can be traced back to the already mentioned year 1939 when Latvia was occupied by the Soviet Union and the future of Latvian aviation was decided. In 1940, the Red Army created Long-range Bombing Aviation, which carried out raids during the USSR-German war. However, German war aviation was superior, resulting in the loss of a large part of the air force [13]. But later, in 1941, German troops entered Latvia [23]. In 1942, the USSR created the Air Force Long-range Aviation of the Red Army, whose task was to destroy any enemy war objects [13]. Therefore, later, in 1944, the Red Army of the USSR occupied Riga again, which contributed to the retreat of the German army and the occupation of Latvia [23]. Along with the development of aviation, it was used in passenger transport, cargo transport, medicine, agriculture, and forestry, as well as in sports. Aviation was considered to be important in terms of defence, so it developed rapidly during World War I. Together, the land, sea, and air forces indicated the country's defence capability. Consequently, the USSR Air Force and the Red Army grew in development based on the socialist industry [27]. Sources mention that in 1944, the USSR used both civil and military aviation, which means that during the war it used existing airfields and built new airfields for war operations [30].

Aviation during the Soviet occupation in 1944-1989

It is important to mention that Latvia only learnt about the use of aviation in agriculture in 1941, when the All-Union Exhibition of Mechanisation was held in Ukraine, mentioning the victory of socialist agriculture. During the exhibition, it was possible to get familiar with the experience of increasing the yield. Various types of agricultural machines and tractors, whose task was to increase the growth of agriculture, were at the exhibition. Also mentioned was the aviation method in the fight against pests, therefore improving sugar beet crops, and improving cotton and forest areas, as well as swampy areas [15].

But initially, during the post-war period, tractors (for cultivating, sowing, and harvesting) were built in the USSR for agricultural purposes. While in other places outside the territory of Latvia, aviation was used in agriculture. For example, in the Krasnodar region, 49 collective farms were using chemical methods against weeds. This increased the harvest. Pests were also eliminated in large areas in the Krasnodar and Stavropol regions. And the most interesting thing is that by flying with an aircraft and spraying fields with a chemical substance, the cotton fields were prepared for harvesting [5]. The USSR used helicopters in agriculture from 1959 until 1969. They were used in places that tractors and aircraft could not access: mountain slopes, valleys, and places with different obstacles [1].

Until 1969, a take-off and landing area for agricultural aviation aircraft was built in the Barkava Soviet farm, in the Madona region. This airfield is significant because it was the first one built at the expense of agriculture in the republic. This year, a contract was signed with 100 farms that used agricultural aviation services. The Barkava Soviet farm was a model for other farms, which promoted the idea of building common agricultural aviation airfields. Warehouses for mineral fertilisers and chemicals were also built at the airfields. As an additional benefit, sanitary aviation for the population would be expanded. At that time, the Institute of Land Management Design studied and compiled the economic possibilities of airfield construction. Each airfield could support 5-14 farms. The developed calculations pointed to many benefits, such as airfields on farms would be cheaper than if mineral fertilisers were spread by tractor equipment, as well as the work would be completed on time, where the weather would not be able to affect it. In addition to that, extensive use of aviation would allow for saving not only time but also manpower [21; 7].

Following Barkava's positive example, a five-year plan for the development of the national economy of the USSR was prepared, which in 1971-1975 decided to increase the yield of crops. It was believed that the creation of agricultural airfields and the use of aircraft, see Figure 6, contribute to crop production, as the fields are fertilised early in the spring. Also, the fact that aircraft are irreplaceable because regular equipment is unable to enter the field in early spring [28].

Using AN-2 and JAK-12 aircraft, pilots of the Latvian Civil Aviation Authority treated the agricultural lands of Soviet farms with plant protection products used in Dobele, Bauska, Madona, Jelgava, Daugavpils, and Ogre region farms.

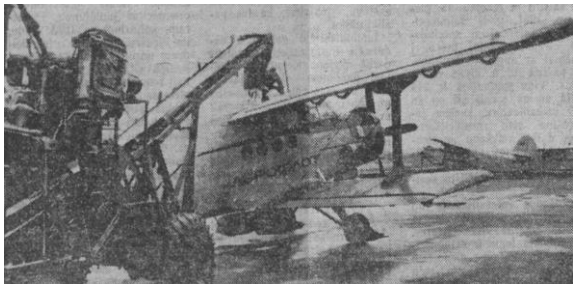

Fig. 6. Loading of mineral fertilisers on an aircraft at the agricultural airfield of the Soviet farm in Priekule [Pliens, 1985 [25]]

Fig. 7. Use of aircraft in agriculture [Ronis, 1967 [28]]

Fig. 8. Soviet war airfields and war ports in occupied Latvia [Laiks, 1984 [17]]

Inter-collective farm "airfields", hard surface runways, were built in the republic. They were built in Madona, Liepāja, and Riga regions, and they were also built in Bauska and Saldus regions [26].

In 1973, agricultural aviation services were already provided to 170 farms. In many places, farms set up fields with a hard surface – airfields. This made it possible to sow mineral fertilisers in the fields in early spring and use aircraft to sow clover and wheat. This ensured an increased yield of cereals, based on the experiments. Airfields are located in Liepāja, Riga, Rēzekne, and Madona regions [18]. Along with the development of agricultural aviation, a civil aviation airport was established. The airport "Riga" was opened in 1974. The sources mention that overflights from airfields were made within the borders of the USSR [16].

As field cultivation work had to be done in the springtime, when it was impossible to get to the field with motorised equipment due to moisture, collective farms and Soviet farms were increasingly forced to use agricultural aviation to improve the fertility of fields with mineral fertiliser. With the help of aircraft, the work was done quickly, see Figure 7. Once there four aircraft were working in the farms of the Liepāja region, which served the Soviet farms of Priekule, Aizpute, and Liepāja. As well additional aviation agricultural services were received by K. Marks and Durbe collective farms, "Pionieris", "Zieds", "Ļeņina ceļš", Vaiņode, Gramzda, and Medze Soviet farms [25].

The sources also mention that the USSR established a military base in the Baltic states. The sources mention that 22 military airfields were built in Latvia by 1984: In Tukums, Daugavpils, Dundaga, Ezere, Cēsis, Jēkabpils, Jelgava, Liepāja, Lielvārde, Bauska, Ogre, Pāvilosta, Preiļi, Rēzekne, Riga, Vaiņode, Valka and Ventspils, see Figure 8 [17].

Since agricultural aviation has brought great benefits to agriculture, its impact on the environment did not receive much attention. Until 1988, the question of the negative effects of agricultural aviation on nature was considered in public consultation. However, G. Eniņš was the one who tried to propose an exception to the bill. On the other hand, A. Zobens opposed the banning of agricultural aviation, arguing the huge benefits, as well as mentioning the fact about the extensive network of airports, which cost tens of millions of roubles. However, considering the fact that plant protection products are sprayed by aircraft (called chemicals in the articles), which cause great damage to the environment, water bodies in the fields, streams, habitats in the field copses, and living animals and insects are mentioned as an example [31]. Since the environment was polluted by the use of agricultural aviation, and as technical regulations were often not followed to promote further environmental protection, in 1987 the Agro-Industrial Committee together with the Ministry of Health Protection, the Society for the Protection of Nature and Monuments of Latvia, the Ministry of Land Reclamation and Water Management, the Civil Aviation Administration, and the Baltic Fisheries Board determined the following at the meeting. Since 1988, it is only allowed to use granular mineral fertilisers in the territory of the republic with the help of aviation, prohibiting any activity around the territories of nature reserves. It was determined that the limit of sowing granular mineral fertilisers is 500 m from rivers, lakes, and water reservoirs, as well as 300 m from settlements and homesteads [22].

To summarise, in the period from 1945-1991, agricultural aviation was widely used. During this period, there were approximately 100 chemical airfields. Used helicopters: in special aviation and sanitation work. Sports aviation was based at Bauska, Cēsis, Glūda, Cīrava, and Langaži airfields [7; 8].

Latvian aviation in 1990-2022

In 1991, after the restoration of independence, the first international flight was made, after which "Riga" airport acquired the status of an independent state capital company [16]. The sources mention that by 1994 military airfields had been established on the territory of Latvia, as well as about 100 small agricultural airfields of collective farms and state farms. They were no longer used, being left to gradually degrade. This is because the Ministry of Transport decided that the maintenance of small airfields was not necessary, as well as their maintenance required large financial resources and it was not known whether the airfields would still be used in the future. Taking this into consideration, if necessary, it will be more profitable to build new airfields [11].

In 1991, after the restoration of independence and the establishment of the Latvian Defence Forces, the State Airspace Protection and Control Service was established. And in 1992, an air defence department was established, which was called the Air Force Headquarters. An aviation base was also established at Spilve airfield in Riga, which is assigned to civil aviation aircraft.

Shortly after 1994, the Aviation base was moved to Lielvārde airfield. Jēkabpils and Tukums airfields were also assigned to the Air Force [6; 24]. The Air Force not only monitors national defence, but also participates in search and rescue, as well as participates in the transportation of injured parties and extinguishes fires in cooperation with the Disaster Medical Centre [16].

In 1992, the Ministry of Transport took control over the military airfields of: Vaiņode, Jelgava, and Daugavpils. Daugavpils airfield belonged to the Daugavpils region municipality and Jelgava airfield was leased to Riga Aeroclub. However, the Ministry of Defence was responsible for the military airfields of Lielvārde, Tukums, and Jēkabpils [12].

In 1995, an airport and airfields were established in Latvia, such as the international airport "Riga", the airports: "Spilve", "Liepāja", as well as airports that are not used: "Ventspils", "Rēzekne", "Daugavpils". Former military airfields: Lielvārde, Jēkabpils, Tukums, Vaiņode, Jelgava, Daugavpils (Naujiena), Paplaka. Military reserve airfields, such as Zaļenieki, Limbaži, Ezere, Kalupe, and Mārsnēni (Skangaļi). Also, 78 general aviation airports are located throughout the territory of Latvia [19].

In 1996, the Air Force took part in the first international training "Baltic Challenge" at the Ādaži base. A year later, due to a lack of funds, the Ministry of Defence, led by T. Jundzis, closed the Tukums and Jēkabpils airfields. In 1998, the Regional Airspace Initiative was signed in the Baltic states between Latvia, Lithuania, and Estonia. An international agreement on the creation of the BALTNET Airspace Surveillance System has been concluded. In 2003, radio equipment posts of the Airspace Surveillance Squadron were located in Ventspils and Rēzekne [6; 24].

In 2007, a border guard aviation support point was established at Ventspils airfield (Kokars, 2022). From 2009 to 2013, a NATO-compliant airfield with technical buildings was built at the "Lielvārde" aviation base in a project co-financed by NATO Security Investments. In 2018 it became the training centre of the Air Force [6; 24].

International air traffic is controlled by "Riga" airport, Liepāja airport has been certified for commercial flights since 2016. The following general aviation airports were established: Spilve, Ventspils, Cēsis, Ikšķile, Limbaži, Ādaži, as well as 7 general aviation heliports in Latvia. Hot air balloon flights are actively used in Latvia, where tourist flights are conducted in Sigulda, Cēsis, Kuldīga, and Liepāja. Different types of international hot-air balloon festivals and sports competitions take place in Latvia [16].

However, nowadays, according to the data of the Civil Aviation Agency, 7 civil airfields and 6 heliports are certified. Air transport airports – VAS International Airport "Rīga", SIA Avia company "Liepāja". General aviation airfields – SIA "Ventspils" (Ventspils), SIA "Meža īpašnieku konsultatīvais centrs" (Cēsis), Ikšķile airfield, SIA "Vidrižu Atvari" (Limbaži), SIA "Adaži Airpark" (Ādaži). General aviation helicopter airfields – SIA "Future Wings" (Heliport Nākotne, Glūda airfield), SIA "GM Helicopters" (M Sola, Jumprava airfield), State Border Guard Aviation Administration "Jaunsmilgas" (Ludza AVP, Ludza airfield), SIA "Čiekuri-Shishki" (Čiekuri, Madona), SIA "Klauģu Muiža RE" (Klauģu Muiža, Madona County), SIA "Nogales īpašumi" (Nogale, Talsi County) (Civil Aviation Agency, 2022). The private airfield "Jurmala airport", which is currently not certified for civil aviation flights, has been reconstructed in the Tukums region. Daugavpils airport is not certified, but it would be important for ensuring civil aviation. The development of Daugavpils airport is necessary to promote the regional development of Latvia, where Liepāja, Ventspils, and Daugavpils would provide air traffic hub points of the Baltic Sea region with other capitals, forming them as airports of national importance. However, the reconstruction of Daugavpils airport requires large financial resources. After regaining independence, airfields were decentralised, and handed over to local

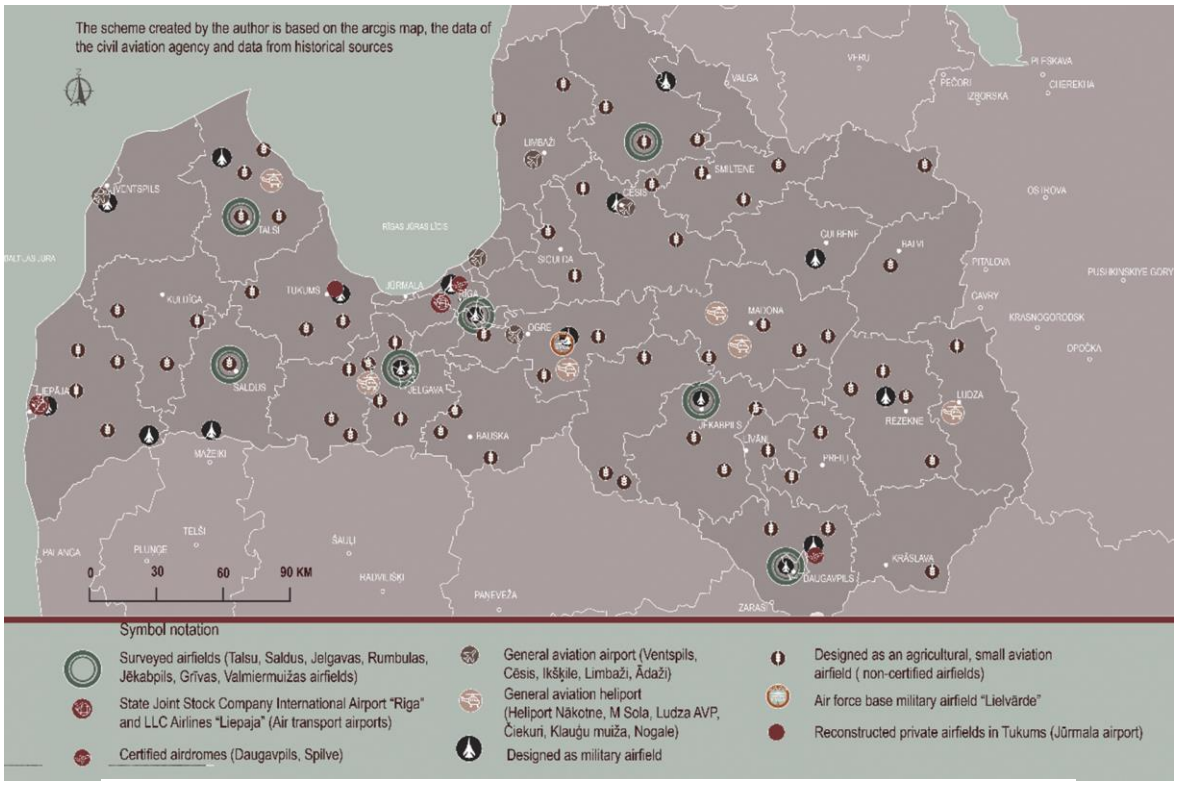

Fig. 9. Airfields formed over time [Visualisation created by the author, based on sources, 2022]

governments. This results in the fact that the development of airfields in Latvia is driven by local governments by determining the development of territories in regional planning documents [20]. Based on the materials available in the literature, as well as using *ArcGIS* mapping, a summarised map of Latvian airports was created, see Figure 9.

Conclusion

Looking at the history of Latvian aviation, several dozen airfield territories have been formed over time. Many of the airfields have adapted over time, but with the collapse of the USSR in 1990, both agricultural and military airfields were no longer used. In total, 97 airfields have been established throughout the territory of Latvia, of which 9 are certified (Ādaži, Cēsis, Ikšķile, Jūrmala, Liepāj, Limbaži, Riga, Spilve, Ventspils). This study is the first in Latvia to provide an insight into the development of airfields, assessing today's development opportunities and defining the resource that is available.

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