



Ilmatorjuntamuseo

ANTI-AIRCRAFT BRANCH 100 YEARS IN FINLAND 1925-2025

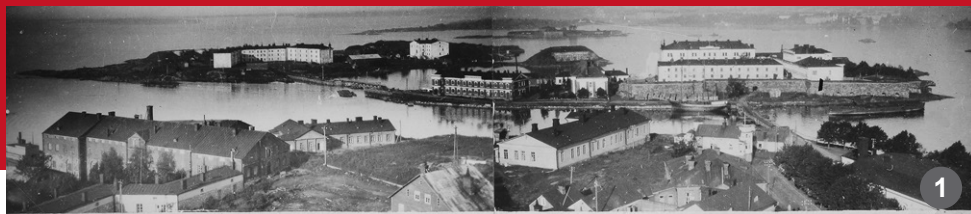
Images from 100 years of military history



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The first independent Finnish Anti-Aircraft unit was established on July 1st, 1925 in Suomenlinna fortress island. This date marks the birth of the AA branch in Finland.



Picture 1: The first garrison area of the AA branch was the building located at the southern tip of Länsi-Mustasaari, starting from June 25th, 1925. At the top of the panorama picture, you can see Länsi-Mustasaari Island. (The Finnish Anti-Aircraft Museum)

THE NEED FOR ANTI-AIRCRAFT WEAPONRY WAS REALIZED IN THE FIRST WORLD WAR

Looking at military history around the world, the Anti-Aircraft branch was born in various countries when Zeppelins and airplanes were first used as weapons during World War I. The Imperial Russian army had several AA weapons and units stationed in the Grand Duchy of Finland, including the Suomenlinna fortress, then known as Viapori. Another area heavily protected by AA weaponry was the railroad system, where several armored trains carried AA guns and machine guns. In May 1918, the Finns captured an armored train near Viipuri from the Russians and acquired two 76mm M/1914 Putilov AA guns, which eventually became the ceremonial guns of the AA branch.

The Finnish AA branch was born within the coastal artillery, but was later moved under the field artillery and the famous General Ne-nonen. The main military garrison of the AA branch in the 1930s was Viipuri. Weapons were purchased from Switzerland, Sweden and the United Kingdom. Before the Winter

War, the AA units were moved under the command of the Finnish Air Force.

From baptism of fire to decisive defense

The Anti-Aircraft branch of the Finnish armed forces received its baptism of fire on November 30th, 1939, when the first shots of the Winter War were fired. When the Soviet Red Army's massive invasion failed, the Soviets began bombing Finnish cities and towns during the war. Nearly 700 different areas suffered air attacks, and around 1,000 people were killed in the aerial bombing of towns and cities. Despite all this, the Finns did not surrender. The Finnish Air Force had only some fighters and interceptors in flying condition, and the AA branch lacked heavy weaponry. Despite this, nearly 700 Soviet airplanes were shot down over Finnish skies. The AA guns brought down over 400 of these confirmed kills. The field army won its defensive battles in the brutal winter conditions. During the Contin-





Picture 2: *The first Anti-Aircraft live firing with the Putilov guns in Suomenlinna, on Länsi-Mustasaari island on September 16th, 1927. (The Finnish Anti-Aircraft Museum)*

these purchases, the capabilities of the AA units reached their peak in the late Cold War era and early 1990s. Much of this equipment is still in either full-time or limited use today.

uation War starting in 1941, the Finnish Air Defense had much more credible defense capability and equipment, as more weapons and aircraft were purchased. Soviet bombing raids became much less frequent compared to the Winter War. In February 1944, The Soviet Union attempted to force Finland into a separate peace with massive terror bombings of Helsinki and other Finnish cities. Equipped with modern guns, tactics and radars, the Finnish Anti-Aircraft artillery units stopped most of the attacking planes and saved the city of Helsinki. In the crucial battles of summer 1944, the Anti-Aircraft units had the main responsibility for air defense of the frontlines, and hundreds of enemy close air support planes were shot down. The AA batteries and units were responsible for approximately 50% of all aircraft shot down (1,190 total). A decisive defensive victory was achieved.

The technological development of Anti-Aircraft weaponry slowed down during the Cold War

During the Cold War, the Finnish air defense faced serious challenges while caught between the geopolitics and alliances of the era. The threats were American and Soviet atomic bombers and cruise missiles that might fly over Finnish territory in case of war - Finland did not have the capability to stop these. The situation improved slightly in the 1960s, when the first modern jet interceptors, radars and AA-guns were bought from the British, Soviets and the Swiss. Getting AA-missiles was delayed due to issues with the 1947 Paris peace treaty and the Finnish-Soviet FCMA treaty. Both Soviets and Western countries had their doubts and interests regarding missile weaponry. The first AA-missiles were bought in the late 1970s. Because of

From Anti-Aircraft training camps to Air Defense Exercises - new threats on the horizon

Today, international cooperation continues because Finland is a member of NATO.

The AA training camps have evolved into multi-branch air defense exercises organized in Lohtaja during the ADEX Mallet Strike military exercises.

The war in Ukraine has shown us the importance and effectiveness of the AA branch in anti-aircraft and anti-missile roles. Defense against drones and various unmanned aerial devices and missiles has become crucial for protecting frontline units, rear areas and civilian populations.

The capabilities of the AA branch are based on the skills of personnel and the quality of equipment. For the equipment aspect, close cooperation with different defense manufacturers and businesses is essential.

The photo exhibition is produced by the Finnish Anti-Aircraft Museum. Funding for the exhibition is supported by the Foundation for the Support of National Defence (Maanpuolustuksen kannatusäätiö).

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A NEW ARMED FORCES BRANCH IS ESTABLISHED IN SUOMENLINNA

The State Committee review of 1923, also called the "Defense revision," pointed out the need to establish an AA branch for the new Finnish Defense Forces. The officers studying defense doctrines of the era were concerned about the superiority of rapidly developing aerial weapons. Captain Åke Törnroos started a series of experimental AA firing tests on Länsi-Mustasaari island of Suomenlinna in 1924. He was supported by the new coastal artillery commander, Lieutenant Colonel Väinö Valve (appointed on October 16th, 1924).

Professional AA training for soldiers began on July 1st, 1925. On that date, the coastal artillery school established the Air Defense School led by Jaeger Lieutenant Paavo Ottelin. It consisted of 1 officer, 2 NCOs and 25 conscripts.

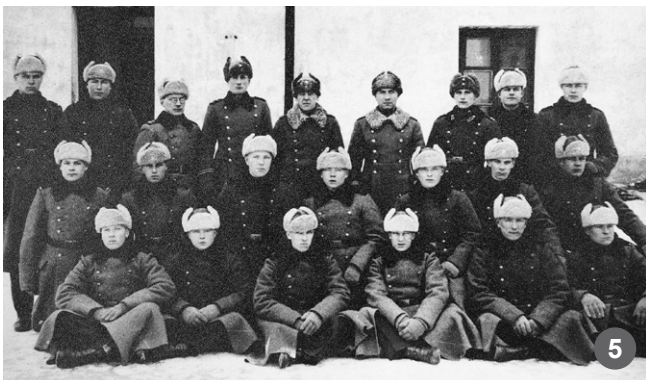
Picture 3: Captain Åke Törnroos (left) and the Chief of the Air Defense Committee Lieutenant Paavo Ottelin

Picture 4: Test firing with a Putilov gun on the Suomenlinna island of Länsi-Mustasaari during the 1920s. (The Finnish Anti-Aircraft Museum)



ESTABLISHMENT OF THE AA BATTERY AND THE FIRST ARTILLERY EXERCISES

The very first Anti-Aircraft battery was established on June 18th, 1926. Captain Ake Törnroos was appointed as its first commander. The weaponry consisted of two 76mm M/1914 Putilov guns taken from a Russian armored train. The unit was named "Air Defense battery," and from December 14th, 1926, "Permanent Air Defense battery." The two Putilov guns were the first AA guns used by the Finnish Defense Forces. The first AA live fire exercise was performed with them on September 16th, 1927, using a targeting calculation method developed by Captain Törnroos himself. Later AA exercises were also organized on the island of Santahamina.



Picture 5: The officers and NCOs of the Anti-Aircraft artillery battery in a group photo in Suomenlinna on January 20th, 1927. In the back row (starting from 3rd from the left): Sergeant Major Aarni, Lieutenant Baeckman, Captain Törnroos, Lieutenant Lahtinen and Sergeant Suomi.



Picture 6: Artillery calculation group in front of the fire support base table in Suomenlinna at the end of the 1920s.

Picture 7: Anti-Aircraft machine guns in exercise in Santahamina during the 1930s. (The Finnish Anti-Aircraft Museum)





Picture 8:
The map of the city of Viipuri. The AA garrison in Neitsytniemi is circled in yellow.

VIIPURI BECOMES THE MAIN MILITARY TRAINING CENTER FOR ANTI-AIRCRAFT ARTILLERY



After acquiring more modern weaponry, the training of AA units was greatly expanded and moved to the city of Viipuri in the 1930s. Training in Helsinki did not stop, however - it was moved under the jurisdiction of the Finnish Civil Guard. Field Artillery Regiment 2 was established in Viipuri, and under it the 2nd mobile permanent Anti-Aircraft battery was formed on June 15th, 1928. Coastal Regiment 1 had another AA battery in Suomenlinna, named the 1st permanent Anti-Aircraft battery. Combined operations were already being developed, and under military orders from the President of the Republic of Finland, these separate units were combined as the Anti-Aircraft battery on September 17th, 1930. The AA battery was reorganized as the Anti-Aircraft Regiment in 1934.

Picture 9: Panorama picture with the Neitsytniemi garrison area visible.

Picture 10: The main gate of Neitsytniemi garrison.

Picture 11: Latil tractors are towing 76mm Bofors guns in Viipuri. (The Finnish Anti-Aircraft Museum)



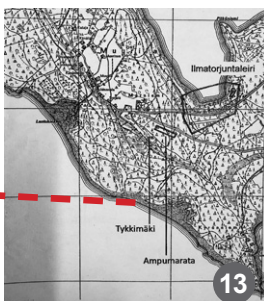
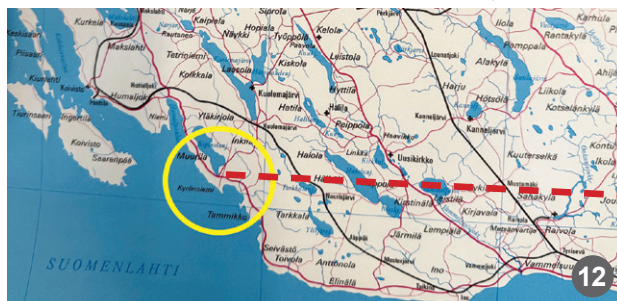
THE MUURILA TRAINING AREA AND MILITARY EXERCISES IN THE 1930S

Anti-Aircraft training was supervised and guided by the inspector of artillery, General Lieutenant Vilho Petteri Nenonen. After the failure of the Goerz predictor guided live fire exercises in summer 1929, Nenonen designed a brand new 3T fire control method for artillery.

To advance the training of AA crews and unify the various training methods, starting in 1930 the various AA units took part in joint military exercises at the Karelian isthmus in Muurila. This training ground housed the troops for three months. Despite the

chronic lack of equipment, many groups of conscripts, reservists and civil guardsmen of the young republic were trained during those summer months. Later, during the war years, the importance of this training was finally understood.

The first live fire exercises were held on Kyrönniemi beach. The beach full of fine sand was soon proven unsuitable, so a new live firing range was built closer to the troop encampment area. The AA units also took part in exercises with other branches of the Army at the Perkjärvi training area.



Pictures 12 and 13: Muurila training area was located on the shores of lake Kipinola.

Picture 14: General V. P. Nenonen observing the firing exercises.

Picture 15: Heavy guns in Anti-Aircraft exercises on Tykkimäki.



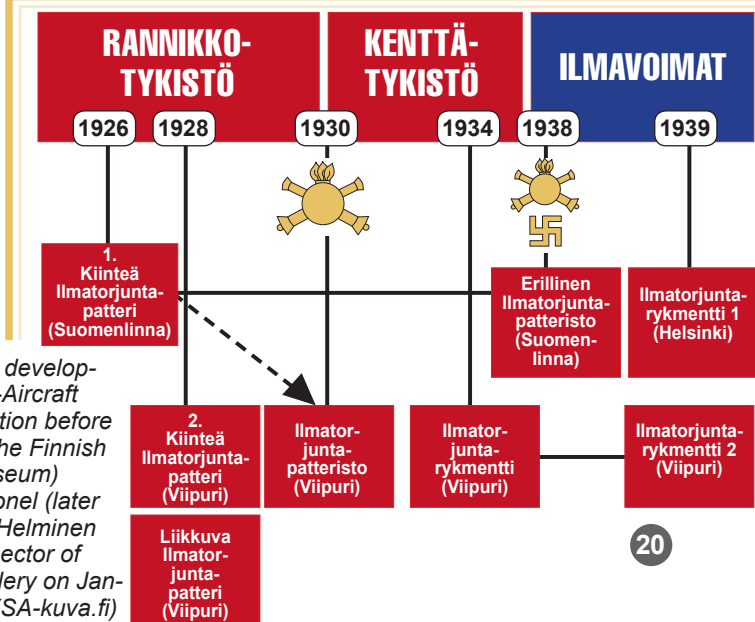
Picture 16: Unit taking part in Lutheran evening services at the Muurila training area on the so-called "Holy Road" crossing the encampment area.

Picture 17: The Civil Guard conducting an AA exercise in the Muurila training area.



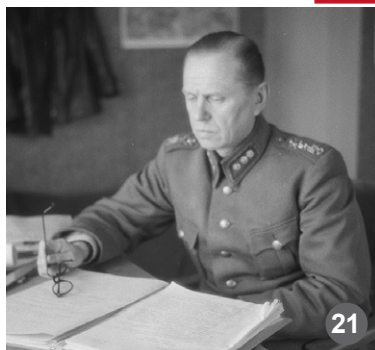
Picture 18: The encampment site of the Muurila training area.

Picture 19: Military use of searchlights under training at Perkjärvi artillery range. (The Finnish Anti-Aircraft Museum)



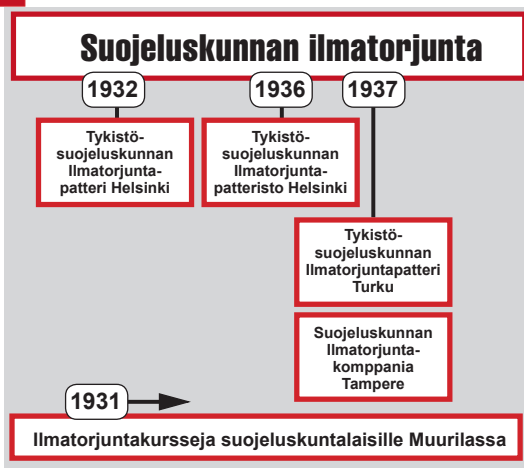
Picture 20: The development of the Anti-Aircraft branch organization before World War II. (The Finnish Anti-Aircraft Museum)

Picture 21: Colonel (later General) Frans Helminen was named inspector of Anti-Aircraft artillery on January 1st, 1939. (SA-kuva.fi)



ORGANIZATIONAL DEVELOPMENTS

On January 1st, 1938, the order of battle was reorganized among the Anti-Aircraft troops and the Separate Anti-Aircraft battery was established on Suomenlinna island. In the same reorganization of the branch, the AA units were moved under the command of the Finnish Air Force. Exactly one year later, on January 1st, 1939, the Separate AA battery was expanded into Anti-Aircraft Regiment 1 (Ilmatorjuntarykmentti 1) and the Viipuri AA battery was reorganized as Anti-Aircraft Regiment 2 (Ilmatorjuntarykmentti 2). Colonel Frans Helminen was appointed as chief inspector of the Anti-Aircraft branch on the same date. The chief inspector of the AA branch worked in the headquarters of the Finnish Air Force, and the chief inspector's office was commanded by Captain



Pekka Jokipalio.

The first regimental commanders were Lieutenant Colonel Torvald Ekman in Helsinki (ITR 1) and Lieutenant Colonel Henrik Schreck in Viipuri (ITR 2).

The basic acquisitions of the Defense Forces were only 0.5% of GDP in the 1920s. After the Defense revision of 1923, the recommended level was 2%, which was never reached. However, as the international political situation grew bleaker, the Parliament of Finland accepted the acquisition law of 1938 in the spring of that year. In addition to this reform in the late 1930s, major private companies and societies acquired personal defense and civil defense equipment.



Picture 22: A 40mm Bofors gun in winter camouflage at Kuhavuori.



Picture 23: The AA guns shot down an enemy bomber on December 1st, 1939 over Munkkivuori, Helsinki.



Picture 24: Finnish troops are examining a Soviet-made quadruple "church organ" Maxim machine gun, captured as war booty in Sortavala on January 7th, 1940.



Picture 25: The dual machine gun m/31 designed by Aimo Lahti in action on January 19th, 1940 at Märkäjärvi.



Picture 26: The AA machine guns protecting the Suistamo airfield shot down an enemy R-5 artillery reconnaissance plane. (SA-kuva.fi)

ANTI-AIRCRAFT OPERATIONS DURING THE WINTER WAR

At dawn on the first day of war, November 30th, 1939, Soviet bombers surprised the Finnish government, population and air defense units. The Anti-Aircraft branch received its baptism of fire, and in the first minutes of the war, the very first enemy plane was shot down. The Finnish cities of Viipuri, Kouvola, Riihimäki and Turku were bombed the most during the war. The most civilian casualties were suffered in Helsinki during the first days of bombing. During the Winter War, the AA units shot down over 400 enemy airplanes.



SWEDISH VOLUNTEERS STRENGTHENING THE NORTHERN FLANK

At the beginning of the Winter War, Northern Finland had no Anti-Aircraft units to speak of. All AA operations were based on infantry weaponry. More weapons for the troops were acquired as war booty and through purchase attempts. The Swedish volunteer corps, Svenska Frivilligkåren (SFK) arrived with their weapons to defend northern towns and ports starting in early February 1940.

Picture 27: *The Swedish volunteer AA unit has set up a 76mm Bofors gun ready to operate after arriving in the town of Tornio in February 1940.*

Picture 28: *A 40mm Bofors gun of the Swedish volunteers ready at battle stations in the town of Kemi.*

Picture 29: *A Degtyaryov DP-27 machine gun ("Emma") captured as war booty has been converted to an AA machine gun by the Finnish Defense Forces. (SA-kuva.fi)*





THE BIRTH OF THE ANTI-AIRCRAFT SCHOOL

During the interim peace of 1940–1941, the Anti-Aircraft branch was reorganized again. At the same time, more equipment was bought. The equipment and staff levels during the Winter War and immediately after the peace treaty led to the establishment of the Anti-Aircraft school in the Santahamina garrison area during 1940. The school held staff and career officer courses, reserve NCO training and reserve officer training courses.

Pictures 30 and 31:

The Anti-Aircraft School was established in Santahamina in 1940. In the pictures, the early staff is enjoying a festival ceremony and posing for a group photo.

Picture 32:

Troops undergoing training in Santahamina. (The Finnish Anti-Aircraft Museum)



COMMUNITIES AND PRIVATE INDUSTRY FUNDING WEAP- ON PURCHASES

The Finnish Defense Forces did not have enough equipment to defend all home area infrastructure and factories from air attacks. Because of this, the defense ministry sent a memorandum to certain major residential towns and private companies, after which a fundraiser was started to get defensive Anti-Aircraft weaponry to protect the home front in case of potential war. Several companies, including Alko Oy which bought four 40mm Bofors guns, and the city of Helsinki took active part in private purchases.



The funding campaign collected 222 million marks, and by the end of 1944 the funds were used to purchase 35 pieces of 75-76mm AA guns, 44 pieces of 40mm Bofors guns, 18 pieces of 20mm guns, and 40 pieces of 7.62mm machine guns. 90 million marks were left unused by the end of the war. These funds were used post-war to buy the first modern VRTTI radars (SEVERI) from Britain and one Contraves predictor/artillery calculator from Switzerland.

Pictures 33-34: During the Winter War, the Alko Oy factories in Rajamäki were bombed. The factory built its own AA towers and purchased 40mm Bofors guns to protect its assets during the interim peace of 1940-1941. (SA-kuva.fi)

THE ANTI-AIRCRAFT BRANCH PREPARES FOR THE CONTINUATION WAR

At the beginning of the Continuation War, Soviet air operations were not common over Finnish skies. Our own AA units had grown stronger and more prepared during the interim peace. In addition to Anti-Aircraft missions, some units served as fire support teams for attacking infantry and armor during summer 1941. During the attack phase of the Continuation War in summer and autumn 1941, the Soviets lost 762 airplanes. Anti-Aircraft units shot down 376 of

these. The armored division also received six Landsverk Anti II AA tanks from Sweden during this time. Finland was one of the first operators of this kind of rotating turret AA tank in the world.

The Navy and Air Force protected their own operations with local defense units and ship-based AA guns. The armored cruisers Ilmarinen and Väinämöinen were also used as floating Anti-Aircraft stations in Turku.



Picture 35: The Landsverk Anti-Aircraft tank with its crew (The Finnish Anti-Aircraft Museum)



Picture 36: A 40mm Bofors gun in a fire support mission near Iino during autumn 1941. (SA-kuva.fi)



Picture 37: A 20mm Breda gun supporting the attacking troops near Joutseno in July 1941. (SA-kuva.fi)

Picture 38: A 20mm Madsen gun on the deck of Finnish submarine Vesikko in July 1941. (SA-kuva.fi)





Picture 39: Separate AA battery 43 light 40mm Bofors gun ready for battle near Nokia during the Continuation War.

ANTI-AIRCRAFT UNITS ON THE HOME FRONT



Picture 40: A 75mm Skoda battery protecting the Vuoksenniska industrial sites on June 30th, 1943.



The Anti-Aircraft units also provided air cover for important population centers and industrial sites of the home front during the war years. Observation for enemy planes was mostly done by eye and sound.

Picture 41: A 7.62mm AA machine gun m/31 is defending the city center of Mikkeli on April 25th, 1944.

Picture 42: Air surveillance unit Lotta Ellen Kiuru observing the skies at Lahdenpohja observation tower on July 11th, 1942. (SA-kuva.fi)





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ARMORED TRAINS PROTECTING THE RAILWAY NETWORK

During World War II, Finland had two armored trains in use. The trains were used during battles like Kollaa during the Winter War.

At the beginning of the Continuation War, both trains were modified into Anti-Aircraft trains, which protected important train stations near the front lines and sometimes provided AA support for vital repair crews working to fix bombing and artillery damage. One of the trains was lost in the Aunus region after the rails were destroyed in 1944 and was blown up before being abandoned. The remaining train returned to Finland after the war ended.

All troop movements by rail were protected by Anti-Aircraft weapons placed in the train cars. In addition to this, all major stations and bridges were protected by local AA units.

Pictures 43-44: An armored train protecting railway transports and infrastructure (SA-kuva.fi)



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Picture 45: Fire control radar ("Irja") near the city of Kotka (SA-kuva.fi)

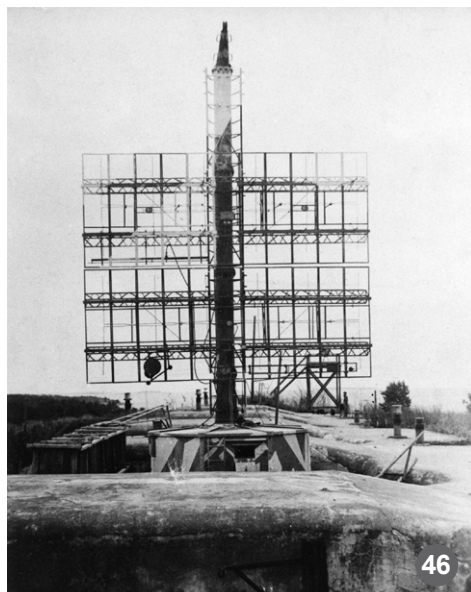
Picture 46: Observation radar ("Raija") operating in Kuninkaansaari (Finnish War Museum)

Picture 47: Three students from the Heiligensee radar course. Second Lieutenant Walter Breitenstein (left), Captain Pentti Paatero and Second Lieutenant Bo Lundqvist. (Lasse Kalervo)

Picture 48: The Finnish training unit with its German teachers in Berlin during 1943 (Lasse Kalervo)

SPECIALISTS UNDERGOING RADAR TRAINING IN GERMANY

During 1943, the first radars were bought for Finland from Nazi Germany. This acquisition had an important effect on the Soviet terror bombing campaign of February 1944 and its outcome. The first Finnish users were trained in January-March 1943 near Berlin in the barracks of Heiligensee training center, Flakartillerischule III.



THE DECISIVE DEFENSE VICTORIES OF 1944

In February 1944, the Soviet long-range aviation bombardment group ADD attacked Finland with a massive terror bombing campaign to force the Finnish government toward a separate peace. The main target of this operation was Helsinki, where the ADD attacked on three nights: February 6th-7th, February 16th-17th and February 26th-27th with altogether 2,000 aircraft each time. The efficient work of Anti-Aircraft Regiment 1 prevented the destruction of the capital city. Only around 4% of the over 16,000 bombs hit the city center. Helsinki was saved, but at a cost: 515 people died or were seriously wounded (0.2% of the population), and 434 different buildings (6% of all buildings) in Helsinki were damaged. The ADD also bombed Kotka during the night of February 10th-11th with the force of five aerial divisions. Anti-Aircraft Regiment 2 defended the city and its seaport with two "Irja" fire control radars and modern weapons. In total, only 3-4% of bombs dropped above Kotka hit their intended targets. Similarly successful was the 1st separate Anti-Aircraft battery in Turku, whose preventive barrages caused up to 97% of enemy bombs to be dropped outside of the city on the night of February 23rd-24th, when six aerial divisions of Soviet bombers attacked. In northern Finland, the ADD bombed Raahе, Oulu and Rovaniemi with the force of two divisions on the night of February 12th-13th. Due to minimal AA presence, especially Oulu, which only had one heavy Anti-Aircraft battery,

suffered serious damage. After this, the AA presence in the Oulu region was considerably increased, and on the night of February 27th-28th when an attack of 80 Soviet planes hit the city, the Finnish casualties were minimal. The field armies were also protected by Anti-Aircraft units through 1944, and they scored important victories during the decisive defense battles of summer 1944 on the Karelian isthmus and other fronts.

Picture 49: A bomb has struck near the front entrance of the Stockmann department store in Helsinki. (SA-kuva.fi)

Picture 50: Soldier boys are carrying ammunition to the AA guns on top of Taivaskallio, near Käpylä. (SA-kuva.fi)

Picture 51: An AA battery is shooting a barrage on top of Taivaskallio (SA-kuva.fi)

Picture 52: From this map drawing, the routes of attacking bombers are visible. The effects of well-organized AA barrages are visible: The planes had to change courses. (The Finnish Anti-Aircraft Museum)

Picture 53: The chart showing the percentage of dropped bombs by area shows the success of decisive defense: Only a small fraction of the bombs dropped hit the city center. (The Finnish Anti-Aircraft Museum)

Picture 54: Searchlight Lottas working during summer 1944. (SA-kuva.fi)



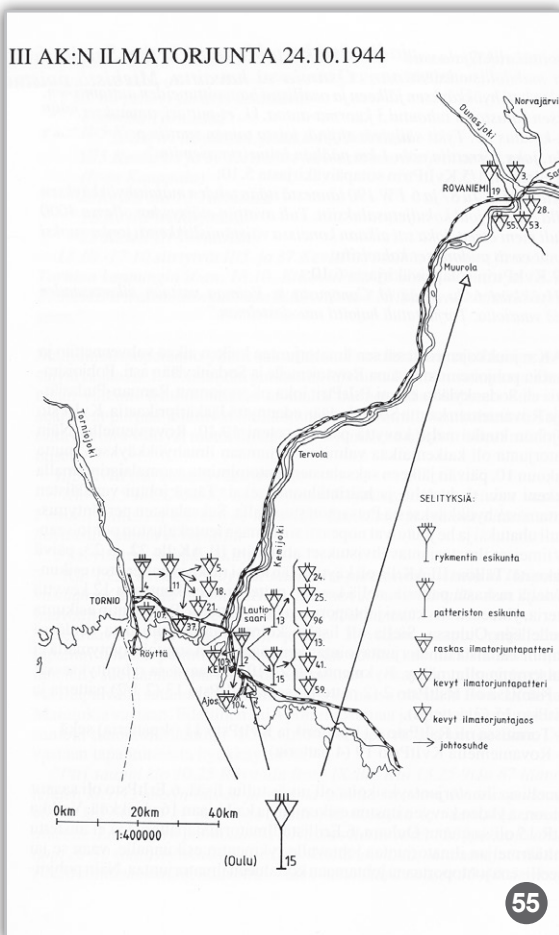
THE STRONG ANTI-AIRCRAFT PRESENCE IN THE LAPLAND WAR

The Finnish troops moving toward the north during the Lapland War were protected by a strong Anti-Aircraft element, but German aerial operations remained very limited due to weather and light conditions. The III Army Corps forcing the Germans to retreat toward Norway had six groups, four light and two heavy AA batteries for protection. The AA units did not engage any enemies north of Rovaniemi. The furthest advancement to the north by AA units was made by the Landsverk Anti II AA tank unit, with its two tanks, which advanced all the way to Tankavaara. The early winter and polar night of Lapland, strategic and tactical importance of the central European front, and the German complete retreat over the Norwegian border ended military action in Finland. The last German soldiers retreated on April 27th, 1945, and World War II ended for Finland.

Picture 55: III Army Corps Anti-Aircraft positions on October 24th, 1944 (The Finnish Anti-Aircraft Museum)

Picture 56: Anti-Aircraft gun being prepared for transport in Rovaniemi in September 1944. (SA-kuva.fi)

Picture 57: A 20mm BSW gun and a tractor have been captured as war booty in Karunki. (SA-kuva.fi)



The Anti-Aircraft Regiments organized their live firing exercises mostly on the island of Santahamina near Helsinki between 1945 and 1951. In 1952, the defense ministry of Finland received permission from the state council to purchase 1,380 hectares of land and 263 hectares of sea area from the municipality of Lohtaja, near Kokkola. The first training camp for soldiers began in autumn 1952. In the first training exercises, all soldiers were housed in tents, until supporting infrastructure including headquarters, service and housing barracks were built over the following years.



FIRING EXERCISES MOVE FROM SANTAHAMINA TO LOHTAJA IN 1952

Picture 58: The stone road at the Santahamina encampment area was a throwback to the "holy road" at Muurila from the 1920s and 1930s.

Picture 59: The 75mm Skoda guns on a live firing exercise in Santahamina in 1951.

Picture 60: The Lohtaja training ground was inaugurated in 1952. This picture is from the first training exercises on the grounds.

Picture 61: A Landsverk Anti II AA tank taking part in a firing exercise in Lohtaja in the late 1950s.

Picture 62: The Officer School AA battery on a firing exercise training camp in 1963.

Picture 63: Fouga Magister aircraft flying over the training ground while performing a target tug role in the 1960s. (The Finnish Anti-Aircraft Museum)





THE ANTI-AIRCRAFT REGIMENTS RECEIVE THEIR FLAGS, TRADITIONS AND CEREMONIAL SYMBOLS 64

Marssi” composed by Toivo Kuula (1883-1918) with lyrics by V.A. Koskenniemi (1885-1962) became the honorary march of the Anti-Aircraft regiments. The historical root for the date was the historical Viborg Bang, which happened on the same date in 1495. The Anti-Aircraft regiment situated in Viipuri before the war had already considered the date as their own birthday due to the connection to this military historical

event.

The regimental flags of 1958 were designed by heraldry expert Gustav von Numers. Their common theme was the winged artillery ammunition on each corner of the flag. In the center of the flag there was a heraldically themed symbol tied to the location of the regiment. The new flags were given to the regiments on defense forces day, June 4th, 1958, at Senate Square in Helsinki.

Picture 64: The regimental flags were given to the AA units on defense forces day on June 4th, 1958. (The Finnish War Museum)

Picture 65: The Anti-Aircraft branch symbols from 1930 to 1967. (The Finnish Anti-Aircraft Museum)

Ilmatorjunnan tunnuksen kehitys

Utvecklingen av luftvärnets emblem • History of the anti-aircraft emblem



1930-1938 ja
1945-1967



1938-1945



1967 ->

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Picture 66: *The VRTTI fire control radar (SEVERI)*



Picture 67: *AN TPS observation and target acquisition radar (TEPSU) in Lohtaja. (The Finnish War Museum)*

NEW RADARS FOR THE ANTI-AIRCRAFT UNITS

The radar equipment of the Anti-Aircraft forces was modernized in the early 1950s. The VRTTI radars were bought from Great Britain and became known as "SEVERI" in Finnish service. They replaced the German-made Wurzburg C radars still in use after the war.

In the late 1950s, the AN/TPS 1-E radars, originally purchased for the Air Force,

were tested in the AA units. After positive experiences in testing, the radar model was also purchased for the Anti-Aircraft units in the early 1960s. The AA units used "Tepsu" mostly with AA battery command centers. The Finnish Air Force used the radar for aerial surveillance and flight control and observation services.



THE ANTI-AIRCRAFT GUN SYSTEMS ARE MODERNIZED

The commander of the Finnish Defense Forces set up an AA weaponry committee on November 6th, 1959. The task of this committee was to develop modern ammunition and gun-based Anti-Aircraft units. At the turn of the decade, the acquisition of 35mm Oerlikon guns and Super-Fledermaus fire control devices was set in motion. Close-range air defense was enhanced by acquiring 30mm Hispano-Suiza automatic guns from Switzerland. The Landsverk Anti II tanks were replaced by Soviet-made ZSU 57-2 SPAAG units acquired in 1961. Close-range air defense got more weapons after 1968 when a considerable number of Soviet 23mm ZU-23-2 automatic guns, known as the 23 ItK 61 "Sergei" in Finland, were purchased. These guns were purchased in several batches until the early 1990s and are still in use.

The title of inspector of air defense, which had existed since 1939, was changed to the title of Anti-Aircraft inspector on February 4th, 1960. Under the leadership of the inspector, the Headquarters Anti-Aircraft department was also established. The time from 1960 until the late 1980s was full of command-and-control system innovation, organizational change and the building and redeploying of various regiments and other Anti-Aircraft assets.



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Picture 68: The ZSU 57-2 Self-Propelled Anti-Aircraft tank. (The Finnish Anti-Aircraft Museum)

Pictures 69-70: The Oerlikon Super Fledermaus fire control device and the Oerlikon 35mm twin cannon 35 ItK 58. (The Finnish Anti-Aircraft Museum)

Picture 71: ZU 23-2 gun known as the 23 ItK 61 Sergei in Finnish service conducting firing exercises in Lohtaja. (The Finnish Defense Forces)



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AUTOMATIC ANTI-AIRCRAFT GUN SYSTEM FROM THE SOVIET UNION

In the 1970s, various parliamentary defense committees increased the development of ammunition-based Anti-Aircraft units, as missiles were not yet acquired for the AA units and various World War II era weapons were nearing the end of their service life. During March 1975, the Turku region Anti-Aircraft battery received the 57mm S-60 automatic gun system made in the USSR. The Helsinki Anti-Aircraft regiment had received the same equipment complex from the USSR the previous June.

Pictures 72-73:

The Automatic Anti-Aircraft battery RPK "Repekka" fire control device and the S-60 57mm automatic guns "Nikolai." (The Finnish Anti-Aircraft Museum)



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Kuva 74: *In the early 1960s, the Helsinki Anti-Aircraft Regiment received new barracks in Hyrylä.*

THE MILITARY GARRISONS AND THEIR BUILDINGS ARE RENOVATED

In addition to developing and purchasing modern weapons and radar systems, military garrison infrastructure was developed starting in the mid-1950s. The Kokkola garrison received many new buildings at that time, and the Helsinki AA regiment garrison was also strongly developed. In the 1950s

it received the very first post-war garrison building, new kitchen facilities, workshop and staff residential areas. By 1960 the pace of development increased and even more staff housing, storage buildings, garages and other buildings were constructed.



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Picture 75: *The Reserve Officers School AA battery building in Hamina.*



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Picture 76: *The Ostrobothnian AA battery near Kokkola received a brand-new garrison area in the 1950s. The headquarters and hospital building in the background.*

ANTI-AIRCRAFT UNITS RECEIVE TARGET DRONES

Target practice training was developed further by purchasing target drones for the Finnish Defense Forces in 1967. The first model was called Maalilennokki 67 (Male 67). After this acquisition, several other domestic and foreign models have entered service. In 1982, the American BTT Radioplane drone, then manufactured by Northrop, was introduced as the Male 82. The JATO rockets used in the launch of the American drone were replaced by a Finnish-designed catapult system MC-83, introduced in 1984. The Male 82 could also do target towing and fly in adverse weather, and it was much cheaper to operate than a target tug aircraft. Male 82 was replaced by the British Meggitt Banshee 500 system, which is still in use as both piston and jet powered versions as of 2025.



Picture 77: AA Male 97 target drone is hand launched. (The Finnish Anti-Aircraft Museum)



Picture78: Northrop BTT Radioplane, known in Finland as Male 82, being launched with a JATO rocket. (The Finnish Anti-Aircraft Museum)

Picture 79: Male 82 target drone being prepared for launch from a Finnish MC-83 catapult. (The Finnish Anti-Aircraft Museum)

Picture 80: Meggitt Banshee target drone has been launched from a catapult. (The Finnish Defence Forces)





Picture 81: *Thunderbird Mk I missile being moved in Santahamina garrison in 1969-1970.*

Picture 82: *Finnish missile specialist under training in the USSR in the late 1970s.*

Picture 83: *AA missile 79 (Ito 79) or the S-125 Pechora being launched at the Lohtaja training ground.*

Picture 84: *AA missile 78 (Ito 78) or the Strela-2M live firing exercise at the Lohtaja training ground. (The Finnish Anti-Aircraft Museum) (Kuvat: Ilmatorjuntamuseo)*

ANTI-AIRCRAFT BRANCH ENTERS THE MISSILE AGE

The Finnish Anti-Aircraft branch of the Defense Forces had been left behind in the technological arms race of the Cold War era, mostly due to political reasons. The Paris peace treaty restrictions were eased on several occasions and missile weaponry was allowed for Finland starting in the early 1960s. Anti-Aircraft missile systems could have been purchased already at this point. In 1968, a used British Thunderbird Mk I system was purchased by Finland without any warheads or fuel. It was used as a training system for rocketry and missile systems and advanced electronics. The first Anti-Aircraft missile systems were Ilmatorjuntaohjus 78 or the Strela-2M and Ilmatorjuntaohjus 79 or Isayev S-125 Pechora bought in 1978 and 1979 respectively, from the USSR. The initial training for the weapons systems was received in the USSR as part of the weapons deal.





LAPLAND GETS AN ANTI-AIRCRAFT UNIT OF ITS OWN

The Ostrobothnian Anti-Aircraft battery was relocated in 1970 to Rovaniemi, Lapland, where new facilities and garrison buildings were constructed for AA units. The name of the unit was changed to the Rovaniemi Anti-Aircraft battery. The special expertise of the unit was operation under harsh arctic conditions.

Picture 85: *The Rovaniemi Anti-Aircraft battery was housed in a brand-new garrison building. (The Finnish Anti-Aircraft Museum)*

Picture 86: *Short-range Anti-Air missile team in the Lapland wilderness in 1985. (The Finnish Defence Forces)*



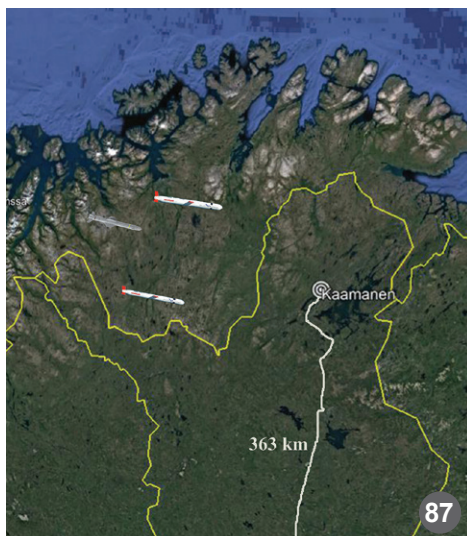
A SHOW OF FORCE IN THE HIGH NORTH

After the memorandum of the parliamentary defense committee of March 5th, 1981 reported that Anti-Aircraft missile defense might be needed in case of war to defend the far north of the country due to a lack of fighter or interceptor cover, the memorandum suggested the government purchase more Anti-Aircraft missile equipment.

In November 1984, a military training exercise was held in the northern Lapland region of Kaamanen by the Helsinki Anti-Aircraft regiment and the Rovaniemi Anti-Aircraft battery as a joint operation "KAAMOS 84." The exercises trained against possible overflights of cruise missiles, scout planes and atomic bombers over the skies of Lapland during a transition to war period or war-like situations. At the same time, the northern region's missile defense capabilities were increased by training the Rovaniemi staff to operate with Ito 79/S-125 equipment.

In August 1984, military exercises called "Ristipisto" were held. In these exercises, the effectiveness of close-range AA missiles against cruise missiles was tested. The Rovaniemi Anti-Aircraft battery and the Lapland Air Wing conducted a joint exercise when the Hawker Siddeley Mk. 51 Hawk Jet trainers posed as enemy cruise missiles. The results were considered excellent.

Pictures 87-90: The KAAMOS 84 military exercises were organized in Kaamanen, the extreme north of Lapland. In picture 90, a P-15 target acquisition radar is shown, and in the foreground are the exercise leader, LtCol Ahti Lappi (center), missile battery head training officer Maj Kalervo Sipi (left) and radar technician, TechLtn Jaarle Wilska. (The Finnish Anti-Aircraft Museum and the Personal archives of Kalervo Sipi and Keijo Tossavainen)



Picture 91: An RMB 88mm gun sitting inside its "Cold War readiness" bunker on the grounds of the Finnish Anti-Aircraft Museum. (The Finnish Anti-Aircraft Museum)

THE OPERATIVE TASKS OF PEACETIME ANTI-AIRCRAFT UNITS

The various Anti-Aircraft units of the Finnish Defense Forces have had several peacetime operative missions throughout the years. After the occupation of Czechoslovakia following the Prague Spring in 1968, the Finnish Defense Forces increased preparedness and developed doctrines against sneak and surprise attacks against the country. The Helsinki Anti-Aircraft regiment received a mission to prepare against airborne and paratrooper units invading the Helsinki-Vantaa airport. For this task, a battery of World War II era 88mm RMB guns

was set up on the base area to perform fire missions against the airport runway and infrastructure on short notice. The close-range AA missiles were also used in a "real situation" for the first time in 1985 when the 10-year anniversary of the ETYK 1975 meeting was in Helsinki. The follow-up meeting of 1992 was again protected against air threats by an Anti-Aircraft missile team. In the default situation of peacetime readiness, on the islands of Miessaari and Santahamina, two Ito 79/S-125 units were in operational readiness.



Picture 92: Close-range Anti-Aircraft missile team (Ito 86 IGLA) in position in the heart of Helsinki during the Conference on Security and Co-operation in Europe meeting in 1992. (The Finnish War Museum)



Picture 93: Ito 79 Isayev S-125 Pechora system at the high readiness post on the southern tip of Santahamina island in eastern Helsinki. (The Finnish Anti-Aircraft Museum)



Rauhan ajan patteristoista Ilmatorjuntarykmenteiksi

Tilanne 1950-luvulla		Uudet nimet 1956 joukko-osastoille	Siirrot uusille paikkakunnilla		Ilmatorjunta- rykmentit 1990-luvulla
1954 ItR Santahamina		Helsingin Ilmatorjuntarykmentti (HellTR)	1957 Hyrylään		Helsingin Ilmatorjunta- rykmentti
1. EriTPsto Kokkola		Pohjanmaan Ilmatorjuntapatteristo (PohmlTPsto)	1970 Rovaniemen Ilmatorjuntapatteristo (RovltTPsto)		1989 Lapin Ilmatorjunta- rykmentti
2. EriTPsto Turku		Turun Ilmatorjuntapatteristo (TurltTPsto)			1989 Varsinais-Suomen Ilmatorjunta- rykmentti
3. EriTPsto Lahti		Salpausselän Ilmatorjuntapatteristo (SalplTPsto)	1968 Kouvolaan		1990 Kymen Ilmatorjunta- rykmentti
4. EriTPsto Tampere		Tampereen Ilmatorjuntapatteristo (TamltTPsto)	1980 Oulun Ilmatorjuntapatteristo (OulltTPsto)		

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Picture 94: The development of Anti-Aircraft batteries into regiments from the 50s until the 90s. (The Finnish Anti-Aircraft Museum)

ORGANIZATIONAL CHANGES DURING THE WARS AND IN THE POST-WAR ERA

After the offensive phase of the Continuation War came to an end, the Air defense supreme commanding positions were re-organized. The commander of the Karelian Army Anti-Aircraft forces, colonel Frans Helminen, was named as the AA branch commander in the General Headquarters starting from July 1st, 1942. After this, the command structure of the field armies was reorganized and rationalized. The Air Defense regions and local defense centers were dismantled on November 24th, 1942. They were replaced by six separate Anti-Aircraft batteries: ITR 1 to Helsinki, ITR 2 to Kotka, ITR 3 to Viipuri, 1. EriTPsto to Turku, 2. EriTPsto to Tampere, 3. EriTPsto to Kouvola, 4. EriTPsto to Mikkeli and the 5. EriTPsto to Joensuu. The 6. EriTPsto was later formed in Oulu during 1944. Based on the experiences from the attack and offensive phase of summer 1941, the need for building local command structure between

separate AA units and the army headquarters units was discovered. Because of this, on July 30th, 1943, 21 light AA unit commands were established along with 74 different light AA batteries.

After the end of war between Finland and Soviet Union, the peacetime organization was hastily set up and started on December 4th, 1944. The supreme commander of the AA units and the Anti-Aircraft department under his command worked alongside the supreme command of the Finnish Air Force. The AA units were formed of two Anti-Aircraft regiments. ITR 1 headquarters was moved to Santahamina, Helsinki, and the units were assembled from the home area AA units. The ITR 2 headquarters was moved to Lahti and assembled from the field army AA units.

The next organizational revision was made in 1952, when the Anti-Aircraft artillery was moved under the jurisdiction of the

Army from the Air Force and the units were renamed and rehoused to new areas. The Armed Forces headquarters housed the Chief Inspector of Air Defense and the air defense section, which included the air defense office. The revision made part of the AA units to be under Army command while some of them were under the Chief Inspector of Air Defense.

The new Anti-Aircraft units were:

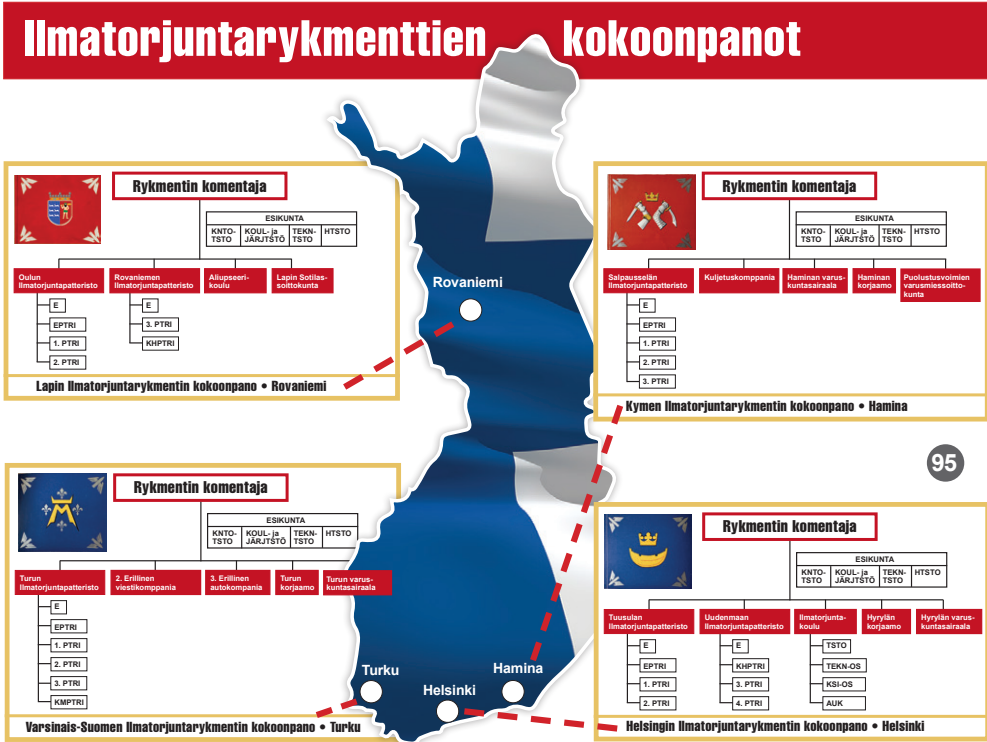
- Anti-Aircraft Regiment 1, whose headquarters was in Santahamina, Helsinki. I. battery was in Naarajärvi, II. battery and the repair workshop in Santahamina.
- 1st Separate Anti-Aircraft battery Lahti
- 2nd Separate Anti-Aircraft battery Turku
- 3rd Separate Anti-Aircraft battery Vesivehmaa
- 4th Separate Anti-Aircraft battery Tampere

The new names and regimental flags of 1956

The batteries received regimental titles and flags at the end of 1956. The regimental titles and new locations were:

- Helsinki Anti-Aircraft regiment, Tuusula
- Pohjanmaa Anti-Aircraft battery, Kokkola
- Turku Anti-Aircraft battery, Turku
- Salpausselkä Anti-Aircraft battery, Lahti
- Tampere Anti-Aircraft battery, Tampere

In the years 1989-1990, the units were reorganized into four separate AA regiments. They were the Helsinki AA regiment (Tuusula), Lapland AA regiment (Rovaniemi), Varsinais-Suomi AA regiment (Turku), and Kymi AA regiment (Hamina). This regimental organization lasted for 25 years. In the final organizational revision in the 2010s, the independent regiments were dismantled. In the 2020s, Anti-Aircraft weaponry training is being given to conscripts and reservists in the Armoured Brigade, Karelian Brigade, Jaeger Brigade and the Training center of the Air Force Academy.



Picture 95: The Anti-Aircraft regiment organization tables. (The Finnish Anti-Aircraft Museum)

DIGITAL TECHNOLOGY ARRIVES

Introduction of digital technology in the 1980s brought new options and capabilities to the Defense Forces and Anti-Aircraft units. Fire control and target acquisition as well as command systems could be developed into compatible systems. The command-and-control systems were substantially modernized by the introduction of Command center 87 and 90 (JOKE87, JOKE90) systems. The former included a target acquisition radar, communication system with encrypted communication and a fire control and target acquisition center. Something completely new was a touch screen-based device for following enemy targets, friendly aircraft and combat situations in real time.



Picture 97: Target Acquisition Center MOSKE87 was built into a terrain capable vehicle. (The Finnish Anti-Aircraft Museum)

Picture 98: Electronic equipment from inside of the MOSKE87. (The Finnish Anti-Aircraft Museum)

Picture 99: Sanomalaite 83, known as Sanla. (The Finnish Anti-Aircraft Museum)

Picture 100: Tuliasemapääte (TASP) was a touch screen device designed by NOKIA. (The Helsinki Anti-Aircraft Regiment archives)



Picture 96: The target acquisition radar 87 in combat readiness, under camouflage. (The Salpausselkä AA battery)



Picture 101: The modern TASP06 system. (The Helsinki Anti-Aircraft Regiment archives)

COMMAND AND CONTROL CENTERS AND RADARS BECOME MORE MOBILE



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Picture 102: Anti-Aircraft control center 2012 (Johtoporras 12) under camouflage netting. (The Helsinki Anti-Aircraft Regiment archives)



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Picture 103: Target acquisition radar 95 ready for operations. (The Helsinki Anti-Aircraft Regiment archives)

The Anti-Aircraft units' control centers and headquarters systems are placed inside easily movable containers.

The JOPO 11-ITR is a control and headquarters center system, which has capabilities to control, lead and organize all the parts of an AA regiment or detachment under combat conditions. If needed, the systems inside can also control and guide the Air Force fighter units to combat.

The JOPO 06-ITPSTO is an AA unit command center system, which can function as the command-and-control center for all Anti-Aircraft units on the unit and detachment level.

The JOPO 12-ITPSTO is a control center unit, which is meant to be the commander's main advisory asset to lead the operations of Anti-Aircraft missile batteries and other AA units in the operational area.

The Target acquisition radar 95, specially modified for AA use, can also be used for airspace observation by the Air Force.

OBSOLETE MISSILE SYSTEMS MODERNIZED AND NEW SYSTEMS ARE BOUGHT TO REPLACE OLD ONES

In 1996, the Russian Ito 96 BUK M1 system was taken into use by the Finnish Defense Forces. It replaced the Ito 79 Isayev S-125 Pechora system. Set on a tracked standard vehicle, the BUK system had good terrain capability and fast operational readiness from transport conditions to combat readiness. The introduction of tracked vehicles at Helsinki AA regiment required an increase in technical and doctrinal expertise including repair and maintenance knowledge and driving skills.

As a mid-range AA missile system, the French Thomson CSF designed Ito 90 Crotale NG was purchased. The Ito 90 system had the missile launcher and control systems installed inside a Finnish-built Sisu XA 181 wheeled armored vehicle. It was a modified version of the Sisu Pasi used by Finnish infantry as an APC since 1983. The Ito 90 system was modernized in 2010 and is now known as the Ito 90M. Finland was the first export customer of the Crotale NG system in the world.

Picture 104: The Ito 79/S-125 Pechora has been sent to the museum and Ito 96 Buk M1 has replaced it in the Helsinki AA regiment service. Men from both Ito 79 and 96 pose for a group picture together. (The Finnish Anti-Aircraft Museum)

Picture 105: The first Ito 96 Buk M1 live firing tests in Finland, on the Lohtaja training grounds in the spring of 2000. (The Finnish War Museum)

Picture 106: A Buk M1 missile launcher unit in the new workshop building in Hyrylä. (The Finnish Anti-Aircraft Museum)

Picture 107: The reloading of a BUK M1 missile launcher is being trained for soldiers in the Ruska joint exercises in the year 2000. (The Finnish Anti-Aircraft Museum)

Picture 108: A Sisu XA-181 armored vehicle offers good mobility for the Crotale missile system. (The Lapland AA regiment archives)

Picture 109: A camouflaged Crotale unit protecting an important asset under the north Finnish sky. (The Finnish War Museum)





Picture 110: *Modernisoitu Super Fledermaus 97-tulenjohtotutka (Kuva: Ilmatorjuntamuseo)*

Picture 111: *A modernized 35 ItK 88 gun, a development of the 35mm Oerlikon gun (The Finnish Defense Forces)*

Picture 112: *23 ItK 95 gun firing at a target on the Lohtaja training ground. (The Finnish Defense Forces)*

Picture 113: *A 12.7mm Itkk NSV firing at the Lohtaja training ground. (The Finnish Defense Forces)*

Picture 114: *IA Self-Propelled Anti-Aircraft Gun system ItPsv 90 Marksman on a Leopard A4 platform. (The Finnish Defense Forces) Puolustusvoimat)*

THE GUN-BASED AA SYSTEMS ARE MODERNIZED

Alongside the missile systems, the ammunition-based AA systems were also modernized and developed throughout the 1980s and 1990s. The 35mm automatic Oerlikon batteries were modernized in Switzerland and finished by the mid-1990s. The Soviet Su 57-2 SPAAG tanks from 1961 were replaced by the British-designed Marksman SPAAG system, sporting the same 35mm guns as the Oerlikon guns just recently modernized. The Marksman was originally fitted on Polish-made T-55 tracked

platforms, which were replaced in 2015 by Leopard A4 hulls.

The 23 ItK 61 guns were extensively modernized in Finland by adding night vision equipment and reducing the crew to one in 1995. From Russia, the Finnish Defense Forces acquired a substantial number of 12.7mm Anti-Aircraft machine guns, which were upgraded with a reflective sight designed by the Defense Forces and the Norwegian company Våpensmia AS.





Picture 115: Increasing the mobility of AA units was tested over the snowy terrain of northern Finland in 1986. The commander of Rovaniemi AA battery, LtCol Ahti Lappi standing next to a 23mm AA gun equipped with skis. (The Finnish Anti-Aircraft Museum)

RESEARCH AND DEVELOPMENT IN THE ANTI-AIRCRAFT BRANCH

In the development of various anti-aircraft weapons systems, research and development has always been a solid part of the innovation cycle ever since the beginning of its history. One goal was to utilize material already at hand in unconventional or new ways to increase the performance of AA weapons. A good example of this innovation is the addition of elektronmetal, a type of magnesium mixture to AA shells during the war, which increased the brightness of the exploding shell, affecting the night vision of attacking pilots and causing them psychological distress. Another Finnish project was the modernization of the 40mm Bofors gun with Italian Galileo ballistic computers and the automated 23 ItK 95 developed

from the Soviet AA gun originally from the 1950s. In the Anti-Aircraft School there was a special R&D bureau for the Anti-Aircraft troops, working under the command of the Inspector of the Anti-Aircraft branch. In the organizational changes of the 90s and 2000s this R&D bureau was disbanded. After this, the R&D assets have been split to the different regiments training AA weaponry to conscripts.



Picture 116: A 20mm Swiss-made Oerlikon experimental gun was fitted on top of a civilian truck on a ring mount. (The Finnish Defense Forces)

Picture 117: Swiss-made 20mm Diana dual AA gun being tested at the Lohtaja training ground in the 1980s. (The Finnish Anti-Aircraft Museum)

Picture 118: Close-range Anti-Aircraft missile operator has an enhanced view over forested terrain from a commercial lifting crane. (The Finnish Defense Forces)

THE NAVY AND THE AIR FORCE OPERATING ANTI-AIRCRAFT EQUIPMENT

The Finnish Navy and the Air Force use Anti-Aircraft weaponry to protect their vessels and air bases from enemy attacks. They have also acquired their own close-range AA systems and developed their own weapon configurations during the years since 1925.

Traditionally, Navy vessels have used various caliber ammunition and gun-based weapons as close-range AA protection. The infra-red seeking French Mistral missile, or the Ito 91, was the first missile system operated by Navy vessels in Finland. There was also a ground-based version of the system in use for base defense. The Umkhonto-IR missile system, or the Ito 04, is in use on the Hämeenmaa and Hamina class Navy vessels. The Rauma class ships being replaced by the modern Pohjanmaa-class corvettes have high-capacity sensor systems and more modern Anti-Aircraft missile systems. The newest vessels can operate in joint missions with the Army and the Air Force, feeding and receiving situational information from all branch command systems in real time from both Finnish and other NATO armies. The ships are currently being built and introduced to the Navy. They will form the core

of the Finnish Navy and the national coastal and marine operations until the 2050s.

Picture 119: *The Hämeenmaa class vessels are equipped with the Ito 04 Umkhonto system. (The Finnish Defense Forces)*

Picture 120: *A Rauma class Navy vessel shooting a target with its 40mm gun. (The Finnish Defense Forces)*

Picture 121: *A Rauma class Navy vessel target spotter at his battle station. (The Finnish Defense Forces)*

Picture 122: *The missile frigate Rauma firing an Ito 91 Mistral AA missile toward a target. (The Finnish Defense Forces)*

Picture 123: *A light 20mm AA gun protecting the Suulajärvi air base in 1943. (SA-kuva.fi)*

Picture 124: *A 40mm Vickers "pom-pom" gun protecting a Navy ship during the Continuation War. (SA-kuva.fi)*



Picture 125: An Ito 15 STINGER squad ready to fire their missile against enemy aircraft. (The Salpausselkä Anti-Aircraft battery archives)

Picture 126: An Ito 12 NASAMS II system being presented to the public at Senate Square in Helsinki. (The Finnish Defense Forces)

Picture 127: An Ito 05M system in launching position ready to fire. (The Finnish Defense Forces)

Picture 128: The Ito 05 system carried on a terrain capable truck. (The Finnish War Museum)



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MISSILE PURCHASES OF THE EARLY 2000S



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During the first years of the 21st century, new missile systems were acquired for the AA units. Short-range weapons were purchased for close-range AA defense in the form of the Swedish RBS 70, which got the name Ito 05 in Finnish service. The mid-range BUK M1 equipment was put to wartime reserves and replaced with the Norwegian-American NASAMS II system and the IGLA missiles were replaced by the American STINGER Man Portable Air Defense Missile System.



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Integroitu kokonaisuus, monikerroksinen, useita hakeutumis- menetelmiä. Määrällisesti ja laadullisesti vahva.

Picture 129: *The Anti-Aircraft systems in use in 2025 (The Finnish Anti-Aircraft Museum)*

THE FINNISH ANTI-AIRCRAFT WEAPONS BRANCH IN 2025

In the field of air defense, the integrated command and control (C2) system between all the armed forces branches used by Finland is unique among European countries. The Anti-Aircraft units have an especially strong close and mid-range defense capability. Measured in numbers of missiles, guns and soldiers, the AA units of Finland are also strong among European nations. The multi-layered structure of command and doctrine and several different target acquisition and aiming systems increase efficiency of the various systems. The flexible use of different missile and gun systems

makes total coverage encompassing the whole defense forces possible, instead of weapons branch specific limited systems. The various systems can operate where they are most needed in tactical and strategic situations, regardless of Army, Navy and Air Force boundaries or rivalries.

After a recent decision, a high-altitude long-range and anti-ballistic missile Anti-Aircraft missile system is being purchased in the near future. The Israeli-American David's Sling system was selected as a new missile system for the Finnish Defense Forces and is set to be introduced beginning in 2026.

THE MAIN TRAINING UNITS AND EQUIPMENT OF 2025



Picture 130: The main training units of Anti-Aircraft branch and their respective equipment in 2025 (The Finnish Anti-Aircraft Museum)

In 2020, all of the Finnish Defense Forces units with conscript training facilities moved to the "Training 2020" doctrine in conscript training. The Anti-Aircraft missile and artillery exercises were replaced with Air Defense exercises.

The specialist AA training for conscripts begins after the six weeks long basic training course has finished. In this specialist training phase, the conscripts take part in AA

branch combat exercises where operations as part of a bigger unit are trained. The final training event is the Air Defense Exercise organized at the end of the conscript training period. This Air Defense Exercise simulates a joint operation with all branches of the Defense Forces and trains the conscripts to work with their equipment in all conditions as part of any tactical or strategic command-and-control system.



FROM MILITARY TRAINING EXERCISES TO INTERNATIONAL AIR DEFENSE EXERCISES



Partnership with NATO and later the membership in NATO starting from 2023 have increased the amount of international cooperation in the Defense Forces in different conditions and all branches. ADEX Mallet Strike Air Defense Exercise gathers the Army, Navy and the Air Force AA units together at the Lohtaja training ground twice each year. The ADEX event makes it possible to conduct live firing exercises and missile launch training with all of the weaponry in use, and also train the radar and command center crews in real world situations. ADEX exercises are also often visited by other NATO countries. Finnish AA units have also taken part in international training abroad.

Picture 131: Soldiers from NATO countries taking part in the international "ADEX Mallet Strike" Air Defense Exercise posing in front of Patriot and NASAMS missile systems.



Picture 132: NATO soldiers following a 23 ItK 61 live fire exercise at the Lohtaja training ground.



Picture 133: Finnish Defense Forces have taken part in the Nordic Response exercises held in Norway for several years. (The Finnish Anti-Aircraft Magazine Ilmatorjunta)



Picture 140: American SkyRaider drones are used for reconnaissance and bomb delivery in several armed forces around the world. (USMC, Lance Corporal Jacqueline Parsons)

THE EVOLUTION OF AERIAL THREATS

The use of air and skies as a battlespace during combat has been an interest to armed forces and commanders since the early days of history. The Chinese utilized combat kites for observation already in their ancient historical battles. The first military hot air balloon was taken into use in 1792.

The development of aerial weaponry was kickstarted during World War I. Before World War II, technological advancement had brought the first early full metal monoplanes as fighters and bombers to the air forces of various nations.

The development of cruise missiles was started by the Germans during World War II as the V-1 missiles bombed Britain and France between 1941 and 1945. The first ballistic missiles, the V-2, were also launched against these targets during the last year-and-a-half of the war. Defeating

these missiles has since been one core point of missile-based Anti-Aircraft weapon development.

On the Cold War stage, the United States introduced jet-powered intercontinental atomic bomber aircraft. After their heyday in the 1950s, the Intercontinental Ballistic Missile took the role as the keeper of the nuclear balance between the superpowers. Technological advancement in missiles has introduced the short-range ballistic missiles (TBO), which further drove the need to develop anti-ballistic weapons as part of a credible Anti-Aircraft defense.

The development of helicopters as a weapon of war began during World War II but was perfected from the 1950s onwards. Combat and attack helicopters are still one of the important close-range AA targets on a modern battlefield.



Picture 134: During World War I, the aeroplane made its debut as a military weapon (Wikimedia Commons)



Picture 135: A German V1 missile was one of the first cruise missiles mass produced during World War II. (The City Museum of Antwerp archives / Wikimedia Commons)



Picture 136: The Ilyushin IL-4 bomber aircraft was the main Soviet bomber model during their attacks against Finland in the Continuation War. The aircraft in this picture was purchased by Finland from German war booty stocks and was photographed at the Luonetjärvi air base in the spring of 1944 (SA-kuva.fi)



Picture 137: A Su-25 Close Air Support aircraft. The model is still in use by the Russian Air Force. (Wikimedia Commons / defenseimagery.mil)



Picture 138: Ballistic missiles are a difficult, but defeatable, enemy to any Anti-Aircraft system in the 2020s. A Russian 9K720 Iskander missile on a launch vehicle. (Wikimedia Commons / Vitaly V Kuzmin CC BY-SA 4.0)

In order to spare expensive manned aircraft and to increase the lethality of close air support aircraft, so-called stand-off weapons were invented. They are often missiles that are launched beyond the range of enemy AA units and fighters. As small and fast targets, they are difficult for enemy AA to properly track and destroy. The Russo-Ukrainian war which began in 2022 has shown the world that a new serious threat for warring nations is the drone. Their fast and innovative development, cheap price and mostly commercial simple civilian components paired with innovations in AI and remote control mean that the defense industry has a high demand to develop solutions for anti-drone defense now



Picture 139: A Soviet-made twin engine Mil Mi-24 combat helicopter in use by the Polish Air Force. (Cezary Piwowarski Wikimedia Commons CC BY-SA 4.0)

and in the future. During the earlier years of Anti-Aircraft artillery and missiles, the AA units had a terror effect against the pilots and crews of manned aerial vehicles. This psychological effect has now been removed as robotics and remote-controlled devices become more common. In addition to this, the cheap drones can now easily overwhelm AA units and make the defense against other aerial targets unreliable and inefficient. A century ago, the military aeroplane was a new threat for the defender in an armed conflict, which needed new types of special methods to be countered properly in combat. Today, the drones have caused us to be in this same situation against an aerial weapon once again.



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ASSOCIATIONS AND THE MUSEUM AS SUPPORTERS OF THE ARMED FORCES BRANCH

An active network of associations supports the AA branch of the Finnish Defense Forces. The Anti-Aircraft Foundation of Finland, the Ilmatorjuntasäätiö sr established in 1957, supports the research functions, publishes books and hands out funding and manages the Anti-Aircraft Museum established in 1961.

The Anti-Aircraft Association of Finland, the Ilmatorjuntayhdistys, organizes yearly events with local and national cooperating local groups and other associations in the national defense field. The local groups all over Finland also organize their own events including group trips, shooting trips, seminars, art exhibitions and excursions to military museums in Finland and foreign countries. The Anti-Aircraft Association of Finland has over 1,000 members, comprised of conscripts, reservists, professional soldiers and other people interested in national defense. The most visible symbol of Ilmatorjuntayhdistys is the Ilmatorjunta magazine, the Finnish



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Anti-Aircraft review, which is published four times each year.

As the second oldest military branch museum in Finland, the Finnish Anti-Aircraft Museum in Tuusula curates, researches and displays objects, history, traditions and culture of the Finnish Anti-Aircraft troops from 1925 to the present day. It is also responsible for the local military historical artifacts and traditions of the Tuusula region.

Picture 141: The metal plaque of the Anti-Aircraft Museum being installed in Santa-hamina in 1961. (The Finnish Anti-Aircraft Museum)

Picture 142: The Museum has received new facilities in 1997-2005. (The Finnish Anti-Aircraft Museum)

Picture 143: The Finnish Anti-Aircraft review magazine Ilmatorjunta is being published by Ilmatorjuntayhdistys ry (the anti-aircraft association of Finland). (Ilmatorjunta magazine archives)



Ilmatorjuntamuseo

Klaavolantie 2, 04300 Tuusula.

ilmuseo@ilmatorjuntamuseo.fi • p. 040 314 3470

www.ilmatorjuntamuseo.fi



@ilmatorjuntamuseo