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The Finnish Air Force

Ensuring Readiness and Leveraging High-End Air Capabilities while Integrating with NATO

By Major General Juha-Pekka Keränen, Commander of the Finnish Air Force

Introduction

The Finnish Air Force (FINAF) is recognized for its rich history, professionalism, capability, and commitment to securing and defending Finnish airspace, including the highest per capita ratio of fighter aces in WWII. The close proximity of Russia and its key strategic air defence areas in the Kola Peninsula and St. Petersburg significantly impact on the geopolitics and role of the Finnish Air Force. Thus, the FINAF's focus has maintained high readiness and developed a quality approach to modern air power. Today and in the future, the FINAF has a crucial role in constituting the backbone of security in the challenging Northern Eastern operational environment.

Finland proudly joined NATO as a full member on 4 April 2023. As a new NATO member, the FINAF strengthens NATO's readiness and credibility. Additionally, the FINAF provides modern and integrated air defence capabilities and forces into NATO's operational planning and force structure. It contributes to NATO's core tasks of deterrence and provides capable air power for NATO's defence in the Euro-Atlantic area. The speciality the FINAF can bring to the table is the knowledge of the Northern operational environment. This expertise particularly includes knowledge of the Russian Anti-Access/Area Denial (A2/AD) network and,





During the air operations exercise RUSKA21, FINAF F/A-18s taxi on one of the Road Bases. The primary objective of the exercise was to demonstrate the Air Force's mobile operational concept using a network of dispersed bases.

of course, the capability of adapting to a harsh climate: how to survive, fight, and maintain operational tempo within the Arctic zone.

The FINAF has evolved over the decades to fulfil its mission in a non-permissive operational environment. To fight within adversary weapon ranges and in contested airspace, the FINAF has created an exceptional fighting doctrine. The doctrine is based on dispersed operations, Agile Combat Employment (ACE), a fully Integrated Air Defence System (IADS), and a multi-domain approach to operations. As the war in Ukraine has emphasized, the significance of dispersed operations in modern air warfare cannot be underestimated; the FINAF has for decades successfully fostered this concept.

Today our Air Force is undergoing significant changes, with the most prominent developments being NATO integration and the F-35 Programme. The most significant capability development programmes are transitioning from F/A-18 to F-35, integration of ISR systems, and procurement of David's Sling high-altitude Surface Based Air and Missile Defence system (SBAMD). Likewise, Nordic cooperation, active participation in international exercises, and NATO's peacetime operations (Air Policing and Shielding) are key components of increasing collective deterrence and defence during peacetime.

Maintaining Readiness and Deterrence, the FINAF Operational Concept

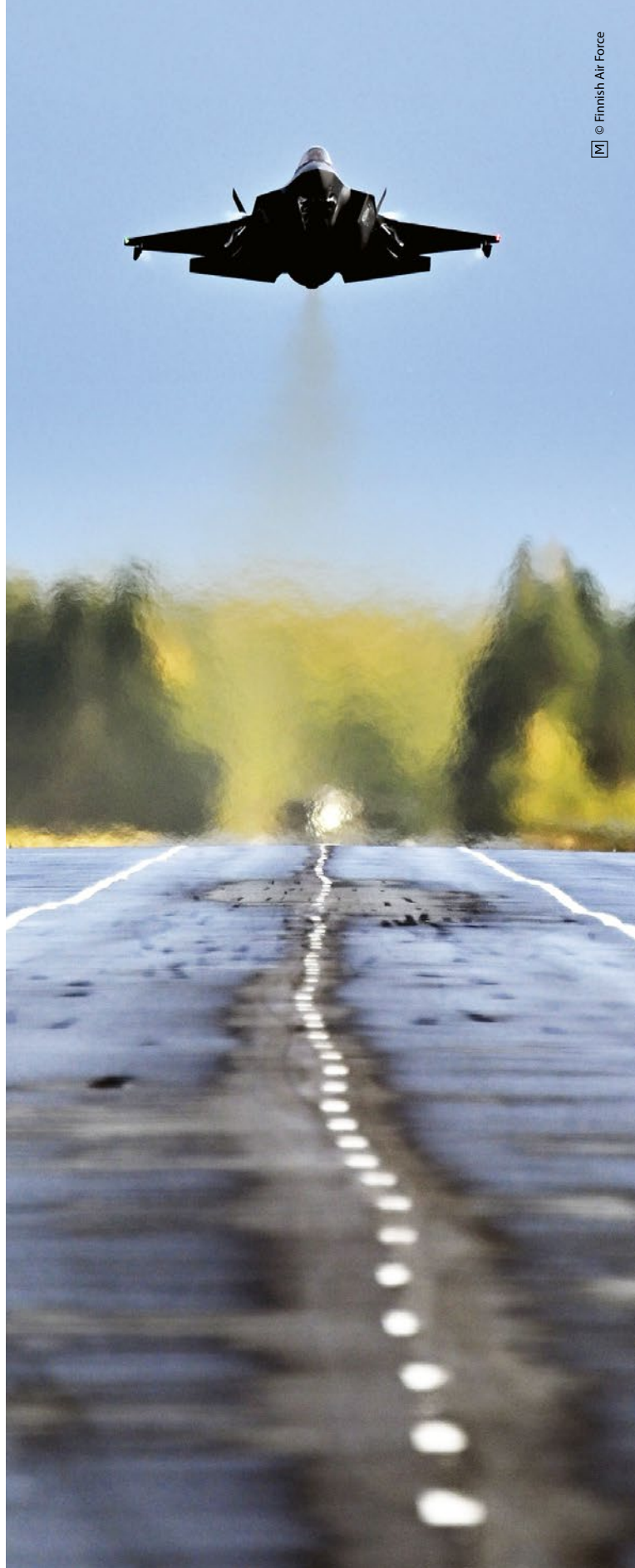
The FINAF places great emphasis on readiness and a prompt QRA (Quick Reaction Alert) response to any potential threats in, through, or from the air domain. In times of peace, the FINAF safeguards and protects the integrity of Finland's airspace on a 24/7 basis with F/A-18 Hornet multirole fighters. Air Force aircraft and units are normally located at the service's Main Operating Bases (Rovaniemi, Rissala, Pirkkala, and Tikkakoski). If a need arises to adjust the readiness level, either in peacetime or in the event of a crisis, aircraft will be dispersed to civilian airfields and road bases.

A recognized air picture compiled of data from mobile and fixed air surveillance radars and other sensors covers Finland's territory and adjacent areas and is the key enabler of the Air Force's air policing mission. Air policing is directed by the Air Operations Centre (AOC) of the Air Force Command Finland (AFCOMFIN), located at Tikkakoski Air Base. Surveillance data is fused and analysed under AOC direction. Integrating our national QRA and NATO's Air Policing assets in the Baltic Sea and High North areas is a vital task in the near future. Some of our F-18s will be tasked to Allied Air Command (AIRCOM) while others will stay in national control.

The operational environment in Finland differs significantly compared to some other Allies. We share more than 1,300 kilometres of a common border with Russia, and the majority of Finnish territory is within the reach of Russian Ground Based Air Defence and Surface to Surface Missile systems, so it is essential to maintain Freedom of Action and Freedom of Manoeuvre. Therefore, agility on the ground and in the air is necessary for our troops and Air Command and Control (AirC2). The conflict in Ukraine and the development of new weapons systems, from drones to hypersonic weapons, have highlighted the significance of dispersed operations, such as ACE, in modern air warfare. For decades, the FINAF has fostered these concepts, doctrines, and Tactics Techniques and Procedures (TTP) for homeland defence, which the Ukrainian Air Force has now demonstrated. The FINAF's resilience, operational agility, and ability to effectively counter the adversary's scheme-of-manoeuve and degrade their targeting cycle can also serve as valuable examples for other Allies and partners.

The Finnish Air Force's operational concept is based on centralized command and dispersed operations. We must optimize our tactics and procedures to counter the cruise and ballistic missile threat. Air Force operations and resources can be spread rapidly throughout the country. Also, AirC2 is duplicated and dispersed to have a redundant and combat-resistant command and control. In Finland, we can operate from over 30 airfields, which can be used as Main, Remote, or Forward operating bases. These airfields include civilian airports and even highway strips. To increase operational depth, airbases located in the Nordic region outside of Finland, will also be used during times of crisis. In addition to using multiple air bases, the operations within a single base are conducted by dispersing troops in the base area. Logistics, intelligence, and surveillance assets support the mobile and dispersed operational concept.

The annual Finnish Air Force road base exercise Baana allows us to test the capability of various road bases, train airmen, pilots, technicians, air traffic controllers and force protection. Additionally, the annual Air Defence Exercise Ruska provides the FINAF an excellent opportunity to test quick dispersal across the country



A Norwegian F-35 aircraft seen taking off from a Road Base as part of the annual road base exercise Baana 23.

and train the whole Air Force to survive, fight, and maintain an operational tempo against a challenging air adversary. This year's road base event in Tervo also demonstrated NATO allies' capability to operate from highway strips for the first time. The Royal Norwegian Air Force F-35s and Royal Air Force Typhoons made take-offs, landings, and turnarounds from the highway. A minimum logistical footprint and multi-capable airmen are prerequisites for the Finnish Air Force's agile operations during crises and wartime.

Finland's integrated air defence system links fighter operations and SBAMD systems seamlessly. Reducing vulnerability to enemy attacks and adopting dispersed operations will play a crucial role in ensuring success in future conflicts; the FINAF provides an ultimate example of the ability to disperse and operate from austere locations rapidly, and quickly transition between and inside bases.

Integrating the FINAF with NATO

Finland is currently undergoing full integration into NATO, showcasing its strong commitment to collective defence. The FINAF is working closely with new allies to incorporate Finland into NATO across various

levels, including the AirC2 structure, standard operating procedures, personnel, and daily activities. The FINAF aims to become a part of the NATO Integrated Air and Missile Defence System (NATINAMDS) and meet NATO's air-basing requirements. Finland's transformation from Partner to full member grants it enhanced defensive capabilities and a greater responsibility to actively engage in collective defence efforts. The FINAF plans to participate in Air Policing and Air Shielding rotations and has demonstrated its ability to seamlessly join NATO-led peacetime operations. Finnish compatibility with NATO systems allows for smooth integration and ensures connectivity in NATINAMDS.

Deepened cooperation with NATO enhances regional security and reaffirms Finland's commitment to collective defence. The next crucial step for the FINAF's integration is to establish zero-day connectivity and define responsibilities in NATO's Air Policing missions.

The FINAF demonstrates the ability and solidarity to contribute to NATO's deterrence through Air Shielding and Air Policing and preparing for air operations throughout NATO's operational areas. Defending the homeland with allies is a clear priority. We will assign troops to NATO's force structure at home and abroad as necessary and maintain their deployment and



Multiple aircraft formations actively engaged in the Arctic Challenge Exercise 2023, showcasing their skills and capabilities in this prestigious event.

combat readiness. Together with NATO, the FINAF will build main bases to meet NATO requirements and build national command and control links so that they can be linked to NATO's classified networks. Regarding NATO's operational and strategic planning, the FINAF incorporates NATO's identified needs into our national planning process.

Contributing to NATINAMDS by providing surveillance and interception capabilities for the Alliance is a high priority. The FINAF develops air power, air defence, JISR, and targeting to improve NATINAMDS as well as a Multi-Domain Operations capability. The Air Force's training, exercise, and operational concept will be renewed in 2025 so that our expertise and actions more broadly support the skillsets required by NATO's complex operational environment. Our national training programmes will be adjusted to complement NATO training events and exercises.

Training and Exercises: Strengthening Nordic and Multinational Cooperation

International cooperation forms a major part of the daily activities of the Air Force. The objective of cooperation is to share information and expertise with

key actors and create opportunities for cost-effective training. The Air Force has sought know-how and ideas outside Finland's borders in many different ways throughout its history. Through international connections, the Air Force gains a grandstand view of the global development of military aviation and an opportunity to practice its operations with the foremost air forces in the world. By participating in multinational training and exercises, the Air Force can adopt the best practices and operating procedures from around the world as a part of its activities and compare its capability to the international operating environment.

As a small country, Finland must concentrate efforts on education and training. The Finnish Air Force keeps its pilots, ground crew, and equipment at peak efficiency with an extensive national fighter pilot training programme, a versatile Training & Exercise (TR/EX) programme, and continuous modernization. Regular drills, exercises, and simulations (including Live, Virtual, Constructive (LVC) training) enable the FINAF to sharpen its skills and enhance its operational capabilities, ensuring a swift and effective response to potential security challenges. All these training events and exercises are now open to our partners and allies.

The Finnish Air Force trains and operates under demanding Arctic conditions due to the country's geographical location. Training in Arctic conditions is an integral part of Finland's annual TR/EX schedule; thus, it is part of normal operations rather than a training aim. Additionally, vast, sparsely populated areas for long-range Beyond Visual Range engagements and Joint Air Land Integration areas ensure the FINAF's attractiveness for multinational and joint all-domain cooperation. This also creates an excellent opportunity for Finland to host and lead training events for all of NATO under challenging arctic conditions.

Due to its strategic location and shared security concerns, Finland has strong, longstanding ties with neighbouring Nordic countries. They regularly conduct cost-effective weekly cross-border training, including Dissimilar Air Combat Training (DACT), small Composite Air Operations (COMAOs) and biennially organized flag-size Arctic Challenge Exercises, involving over 100 aircraft from Finland, Sweden, Norway,





The Air Chiefs of the Nordic Countries from left to right: Major General Rolf Folland of Norway, Major General Juha-Pekka Keränen of Finland, Major General Jan Dam of Denmark, and Major General Jonas Wikman of Sweden. The Nordic Cooperation Framework provides a platform for the Finnish Air Force to engage in collaborative efforts with other regional air forces, thereby enhancing security and stability in the region.

and Denmark. These Cross-Border Training missions (CBT) save on logistics costs by using home bases and often include participants from the US Air Forces in Europe. Along with fighter planes, AWACS and in-flight refuelling aircraft also take part in these missions.

The Nordic Cooperation Framework (NORDEFCO) serves as a platform for the FINAF to collaborate with other regional air forces, further strengthening security and stability. Also, the UK-led Joint Expeditionary Force has proven to be a valuable framework for training and collaboration with other air forces in the Baltic Sea and High North region.

The recently signed Nordic Air Commanders' vision aims to strengthen Nordic Air Forces' ability to conduct joint air operations from peacetime to full-scale air operations in wartime. The goal is a modern combat-

resilient Joint Air Command and Control system capable of planning, executing, and commanding air operations in contested air space. The noteworthy fact is that the Nordic Air Forces together have more than 250 modern 4th and 5th gen fighters. A strong, combined fighter fleet with a credible air and missile defence posture will holistically support air power use in the Nordic region and pave the way for seamless integration of Air Defence in the area. Simultaneously, Nordic Air Force cooperation strongly reinforces and contributes to NATO's Federated Mission Networking, peacetime Air Policing, and integrates NATO's operational plans. We take advantage of the increased operational depth and perform as a leading expert in dispersed operations. By doing this, we contribute to the effective command of the Nordic Air Forces and the development of air operations to meet the Alliance's collective security requirements.

Leveraging High-End Air Warfare Capabilities and Integration of F-35

The main contributors to Finland's air defence are the Air Forces F/A-18C and F/A-18D Hornet multirole fighters. To maintain a robust defensive capability, the Hornets have undergone a series of upgrades to enhance their air-to-air and air-to-ground capabilities. The goal is to use these upgraded Hornets until the introduction of fifth-generation F-35 multirole fighters. The F-35's cutting-edge technology, versatility, joint ISR, supportive capabilities, and increased multi-layered Air Defence will significantly bolster Finland's and NATO's north-eastern flank defence posture. Finland has selected the F-35 Lightning II as the future backbone of its air force for its advanced stealth, joint warfighting capabilities, and interoperability with NATO allies. The procurement process reflects Finland's commitment to maintaining a strong air force and aligning with NATO forces.

The F-35 Programme is making significant progress in Finland with plans for procurement, including 64 fighter jets, advanced weaponry options, training, and maintenance services until 2030. This system will replace the Hornet fleet in Finland by 2030, with optimized weapons procurement, including AMRAAM, Sidewinder, Small Diameter Bomb (SDB) I and II, Joint Direct Attack Munition, Advanced Anti-Radiation Guided Missile Extended Range (AARGM-ER) and Joint Air-to-Surface Standoff Missile Extended Range (JASSM-ER), ensuring maximum capability in their operating environment. A dedicated F-35 Programme organization has been established within the Air Force and Joint Logistic Command, while infrastructure construction and training preparations are ongoing at air force bases. Initial training for a select group of FINAF pilots and maintenance personnel will begin in the US in 2025, followed by operations in Finland starting in 2026. As the integration process takes several years, there will be a constant focus on developing operation tactics and techniques through training and advanced simulators. The Lapland Air Wing and Karelia Air Wing will house the F-35s at Rovaniemi and Rissala, respectively, highlighting their importance in enhancing the FINAF's fighting doctrine.

Lockheed Martin is making progress on the F-35 Programme, with production of the first Finnish F-35 fighter beginning in Texas, USA. In 2023 we received the ceremonial first part of this aircraft at the Turku Air Show, symbolizing an important step in the programme. The impact of the F-35 extends beyond the Air Force and influences the Finnish Defence Forces system. Cooperation and integration with other services are crucial, emphasizing a comprehensive, multi-domain approach. The F-35's design considers the operating principles of the Air Force and the joint capability requirements of the entire Defence Force. Joint war games have been conducted to assess how the F-35 supports the defence system, and Finland has successfully joined the global F-35 user community since February 2022.

The ongoing Pohjanmaa-class vessel programme of the Navy, the Finnish Army SBAMD Capability Replacement Programme, the Air Force Integrated Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance (C4ISR) System programme, and, of course, the F-35 programme will all have a significant impact on air defence and the entire defence system in the coming years. In spring 2023, a procurement decision was made on the all-altitude ground-based air and missile defence capability for the Army. The chosen system was the David's Sling missile system, providing a new aspect to air and missile defence. Furthermore, Finland's Integrated Air Defence-system seamlessly links fighter operations and ground-based air and missile defence operations together.

Whether procurement, technological integration, operational concept, or Human-Machine Interface, we have ensured that Finnish AirC2 structure and network are both state-of-the-art and interoperable. The layered nature and area coverage of ground-based air and missile defence capabilities will also be maintained, and the targeting capability will be developed. The Defence Forces will respond to the growing drone threat by improving its counter-drone capabilities. The integrated Intelligence, Surveillance, Target Acquisition, and Reconnaissance (ISTAR), and Command and Control (C2) system will be further developed to improve the prerequisites for commanding and controlling air operations. Furthermore, cyber and space capabilities significantly influence ISTAR and C2 system development.



The FINAF ground crew refuelling a Finnish F/A-18 at a road base in Joutsa, showcasing the capability to operate from highway strips.

Conclusion

The Finnish Air Force's steadfast commitment to readiness, air policing, advanced aircraft procurement, NATO integration, Nordic cooperation, and active participation in international exercises underscores its pivotal role in national defence and regional security. Through a combination of modernization efforts, strategic partnerships, and operational excellence, the FINAF remains prepared to safeguard Finnish and NATO airspace and contribute to international peace and stability.

In the future, the Finnish Air Force will be operating the F-35, David's Sling, National Advanced Surface-to-Air Missile System (NASAMS), and a variety of different modern air surveillance systems. All these will be integrated by design and interoperable by demand.

We are proud to join the Alliance and bring our value to the table, but we remain humble to keep ourselves up to date and on the edge! ●

ABOUT THE AUTHOR



Major General Juha-Pekka Keränen

Commander of the Finnish Air Force

Major General Juha-Pekka Keränen joined the Finnish Air Force in 1987. His first 20 years in the Finnish Air Force were primarily connected to fighter activities. His career progressed from fighter pilot duties to flight and squadron commanding. Major General Keränen has flown Hawk Mk51, MiG-21BIS and F/A-18C/D fighters, with the latter being his main aircraft. In 1996 he was trained at VFA-125 NAS Lemoore, receiving F/A-18 qualifications. He has over 3,000 hours of flight experience and he still flies the F/A-18.

Major General Keränen has worked in Defence Command Finland to represent the Commander of the Finnish Air Force in strategic and operational planning. He served as Commander of Satakunta Air Command in 2015, Deputy Chief of Staff of ACOMFIN in 2017 and Chief of Staff of ACOMFIN in 2021. Major General Keränen was also the Director of the Finnish Fighter Replacement (HX) Programme between 2017 and 2021. On 1 June 2022, Major General Keränen was appointed Commander of the Finnish Air Force.