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№ 98 September – October 2025
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- Aero India
- F-35 - Lightning Fury
- Exercise: RAMSTEIN FLAG
- Su-22 *Fitter* at Malbork
- And much more ...

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Content

Cover: ***U.S. Army UH-60* Black Hawks during Exercise FALCON SPRING 2025** *Joris van Boven*
This page: **Polish Air Force Su-22UM3K at Malbork AB** *Ralf Jahnke*

THE AVIATION MAGAZINE

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THE AVIATION MAGAZINE is published six times a year by a team of volunteers interested in aviation. We are devoted to cover a wide range of aviation events ranging from air shows, air base visits, military exercises, civilian spotting, and pilot and veteran interviews – accentuated with exceptional photography. THE AVIATION MAGAZINE is a leader in the e-magazine format since 2009, bringing exclusive and fascinating reports to our global aviation enthusiasts digitally.

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FROM THE EDITOR

Dear Readers,

Welcome to the latest issue of **THE AVIATION MAGAZINE**.

At a time of rising geopolitical tensions and mounting challenges to democratic systems, multinational exercises have become crucial in strengthening the strategic readiness and operational coordination of allied air forces. This issue features several recent major exercises, including Dynamic Manta, Falcon Spring, Fire Blade and Iniochos, each of which demonstrates the importance of collaborative training across a range of mission profiles. We also continue our coverage of Ramstein Flag, NATO's largest and most significant exercise of the year.

Beyond the multinational training landscape, we highlight several notable events in global military aviation. South Korea has officially retired the iconic F-4 Phantom II, closing a historic chapter in its air defense legacy. Meanwhile, in Poland, the Su-22 Fitters, which are scheduled for decommissioning in September 2025, have been temporarily relocated to Malbork AB.

We conclude this issue with an exclusive photo report on the Chinooks of RAF Odiham.

Thank you for joining us and for downloading this 98th edition of **THE AVIATION MAGAZINE**.

Peter WALTER and the team of **THE AVIATION MAGAZINE**

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Ralf Peter Walter

AERO INDIA 2025

TEXT BY WOLFGANG JARISCH | **PHOTOS** BY THE AUTHOR UNLESS NOTED

The Sukhoi Su-30MKI is a twin-seat, multirole air superiority fighter operated by the Indian Air Force. Developed jointly by Russia and India, it features thrust vectoring, advanced avionics, and long-range capability. With over 260 units in service, it forms the backbone of India's combat aviation fleet

One of Asia's most significant aerospace trade fairs took place from 10 to 14 February at Yelahanka AB, near Bengaluru, India. Bengaluru, the capital of the southern Indian state of Karnataka, is also the hub of India's high-tech industry and is often referred to as the Silicon Valley of India.

Yelahanka AB was originally established as an RAF airfield during World War II. After India gained independence in 1947, the airfield was taken over by the Indian Air Force and has since been used primarily for pilot training.

From the main entrance to the exhibition halls and outdoor displays, the importance of the event was clear, highlighted by the slogan: "Aero India 2025 – The Runway to a Billion Opportunities." One prominent poster featured Prime Minister Narendra Modi in an aviator's uniform, underscoring the national significance of the event.

The exhibition was planned and organized by the Defense Exhibition Organization (DEO), under the Department of Defense Production and the Ministry of Defense. Key support also came from the Indian Air Force (IAF), the Defense Research and Development Organization (DRDO), Hindustan Aeronautics Limited (HAL), the Ministry of Civil Aviation (MOCA), and the Department of Space. The Indian Navy was strongly represented as well, given its extensive fleet of aircraft, helicopters, and drones.

More than 800 companies from 27 countries participated in the fair. In his opening address, Defense Minister Rajnath Singh emphasized the

role of security in maintaining peace, highlighted government investments in the defense sector, and projected substantial growth in domestic defense production and exports in the coming years.

From the very start, the host nation showcased its aviation capabilities with a spectacular flypast featuring 13 sequences. The display, described in detail by the event organizers, set the tone for an impressive and dynamic exhibition.

FLYPAST SEQUENCES – AERO INDIA 2025

Sequence 1 – AKASH

A spectacular display by the Akash Ganga skydiving team of the Indian Air Force, showcasing the national tricolor in midair. These brave skydivers were dropped from an indigenously overhauled An-32 aircraft at Kanpur, demonstrating impeccable professionalism. Eyes turned skyward as they dove through the clouds—where courage defies gravity and embraces freedom.

Sequence 2 – DHWAJ

Leading with the Indian flag, flanked by the IAF and Aero India flags, the DHWAJ formation featured three Mi-17 helicopters flying past from left to right at 200 feet Above Ground Level (AGL). These helicopters are equipped with an indigenous electronic warfare suite developed domestically, delivering precision and reliability in every mission.

Sequence 2 - DHWAJ with three Mi-17 *Hip* helicopters

Sequence 3 – TEJAS

A VIC formation of three LCA Mk-1A aircraft flew past the dais from the 12 o'clock position at 700 ft AGL. The Mk-1A is an upgraded version of India's first indigenously developed fighter jet and is equipped with the indigenous ASTRA Beyond Visual Range (BVR) missile system.

Sequence 4 – BHIM

Built to meet every challenge in the sky, the BHIM formation featured three indigenously developed Light Utility Helicopters (LUH) by HAL, flying in VIC formation at 200 ft AGL from left to right along the runway—reinforcing the spirit of Atmanirbharta (self-reliance).

Sequence 5 – RAKSHAK

The Rakshak formation, comprising three Do-228 aircraft of the Indian Coast Guard, flew from left to right along the audience. Named for their role in safeguarding India's vast maritime borders, these aircraft are equipped with indigenously developed avionics systems to support their critical missions.

Sequence 6 – DRONA

Led by one An-32 and flanked by two Do-228 aircraft, the Drona formation approached the dais diagonally from left to right at 700 ft AGL. Modernized with indigenous avionics, these aircraft represent the spectrum of transport capabilities within the IAF. The formation was led by a qualified female flying instructor, showcasing Nari Shakti (women's power).

Sequence 7 – YODHA

The YODHA formation, featuring four LCA Mk-1A aircraft in diamond formation, approached diagonally from the right at 700 ft AGL. This display highlighted India's pride, dedication, and technological advancements in aviation.

Sequence 8 – VARUNA

Representing the Indian Navy, the Varuna formation included one P-8I, flanked by two MiG-29K and two Hawk Mk 132 aircraft, flying in arrowhead formation from right to left at 700 ft AGL. Named after the 'Protector of the Seas,' these aircraft serve as aerial guardians of India's maritime domain.

Sequence 9 – SAARTHI

The Saarthi formation featured one C-130J and two C-295 transport aircraft of the IAF, flying at 700 ft AGL from right to left. The indigenous production of the C-295 within India stands as a testament to the nation's commitment to self-reliance.

Sequence 10 – ARJUN

The Arjun formation, consisting of five Jaguar Deep Penetration Strike Aircraft, approached diagonally from the left. These Jaguars, license-manufactured in India, are equipped with the latest indigenously

Sequence 6 - DRONA with two Dornier Do-228 flying behind an Antonov An-32

developed smart weapons and avionics systems.

Sequence 11 – NETRA

The Netra formation featured an Embraer-145 Airborne Early Warning and Control (AEW&C) aircraft in the lead, flanked by two Su-30 MKIs, flying past the audience from left to right at 700 ft AGL. The AEW&C platform, developed indigenously, showcases India's capability to design and operationalize complex airborne systems.

Sequence 12 – SHAKTHI

The Shakthi formation, led by one Rafale and flanked by two Su-30 MKIs, approached from the 12 o'clock position at 700 ft AGL. Piloted entirely by women, this formation – named after the primordial cosmic feminine – serves as a powerful symbol of gender equality, women's empowerment, and the strength of Bharatiya Nari Shakti.

Sequence 13 – TRISHUL

The flypast concluded with the Trishul formation, featuring three Su-30 MKIs approaching from behind the audience in VIC formation at 700 ft AGL. The aircraft broke into a 'Trishul' (trident) formation in front of the dais, delivering a dramatic and patriotic finale.

DAILY FLYING DISPLAY

As is typical for trade events of this nature, the flying display was kept relatively brief. Only on the

Sequence 10 - ARJUN was a flyby of five, in India license-built SEPECAT Jaguar 'deep penetratiion strike', low-flying fighter bombers

two public days were two display blocks scheduled instead of one.

There may be no other event in the world where East and West come face-to-face at such close range. The undeniable highlight was the juxtaposition of the American Lockheed F-35A and the Russian Sukhoi Su-57E *Felon* Both aircraft were featured consecutively in the flying display, offering spectators a rare opportunity to witness two fifth-generation fighters in action.

The author wishes to distance himself from media reports claiming that the Su-57 outshone the F-35. In his view, these aircraft are not directly comparable: the F-35A is a fully operational production aircraft, while the Su-57E is a demonstration platform optimized for airshow performances. That said, the Su-57's flight capabilities are undeniably impressive. The key distinction lies in their market status—while the F-35 has already achieved significant export success, Russia is still seeking international buyers for the Su-57. Even if a customer were to commit, questions remain about Russia's ability to deliver, given its domestic resource demands. According to unconfirmed reports, Algeria may become the first export customer for the Su-57.

International participation added further prestige to the flying display. The U.S. Air Force performed a flypast with a KC-135R *Stratotanker* and a Rockwell

Sequence 11 - NETRA presented an Embraer-145 Airborne Early Warning and Control (AEW&C) aircraft in the lead, flanked by two Su-30 MKIs

B-1B *Lancer*, reinforcing its strategic presence in the region. Naturally, the United States is keen to expand its defense partnerships with India, especially as India looks to modernize several systems. The Embraer KC-390 Millennium was spotted intermittently in the skies—likely during private demonstrations for interested delegations, particularly from the Indian Air Force, which is gradually renewing its transport fleet. However, the KC-390 *Millenium* was not part of the official flying display.

The majority of the aerial demonstrations were led by the host nation. The following aircraft and helicopters were featured on the apron and in the daily flying program:

- HAL HTT-40 (Hindustan Turbo Trainer-40): HAL showcased two HTT-40 aircraft, a state-of-the-art basic trainer designed to meet the Indian Air Force's pilot training needs. Robust, cost-effective, and versatile, the HTT-40 supports primary flight instruction, aerobatics, and instrument flying – laying a solid foundation for future fighter and transport pilots.
- IJT (Intermediate Jet Trainer) – HJT-36 *Sitara*: Another HAL development, the IJT plays a critical

The U.S. Air Force presented its 5th-generation F-35A *Lightning II*. The aircraft is in serial production since 2011. According to the manufacturer, about 1,150 aircraft were bulit so far and it is in service with the U.S. and 19 allied nations

Two diffent 5th-generation fighter aircraft were demonstrated in flight at Aero India 2025, the Lockheed Martin F-35A *Lightning II* (top) *and* the Sukhoi Su-57E *Felon* (above)

The Su-57E is a demonstration platform optimized for airshow performances. Other than the U.S. F-35, the Su-57Es still is seeking international buyers

The pilot of the Su-57E gave a very impressive demonstration of the aircraft's outstanding flight characteristics

U.S. Air Force/Tech. Sgt. Robert M. Trujillov

U.S. Air Force/2nd Lt. Alejandra Angarita

U.S. Air Force/Senior Airman Brittany Kenney

role in India's defense aviation self-reliance. It serves as a transitional platform for pilots moving from propeller-driven trainers to advanced jet fighters, bridging the gap between the HAL Kiran and high-performance aircraft like the Sukhoi-30 and Tejas.

- HAL HANSA-NG (Next Generation): This lightweight, two-seater trainer aircraft, developed by the National Aeronautical Laboratories (NAL), is tailored to meet India's growing demand for pilot training.
- Flight Test Bed Do-228 LRDE: A rare sight in the flying display, this specialized aircraft—developed by HAL for the DRDO—functions as a flying laboratory for testing advanced aerospace systems, sensors, and technologies. It has supported key projects such as the Tejas LCA and AEW&C systems.
- HAL Tejas LCA Mk 1A: A centerpiece of India's indigenous aerospace achievements, the Tejas Mk 1A exemplifies the country's commitment

Main: **A U.S. Air Force B-1B Lancer assigned to the 34th Expeditionary Bomb Squadron, Ellsworth Air Force Base, S.D., takes off in support of U.S. participation at the Aero India 2025 air show, at Andersen Air Force Base, Guam, 11 February 2025**

Insets: **The U.S. Air Force B-1B Lancer performs a flyover during the air show on 11 February 2025**

Main: **A U.S. Air Force KC-135 Stratotanker assigned to the 909th Air Refueling Squadron, Kadena Air Base, Japan, flies above the flight line during the Aero India 2025 air show on 11 Febuary 2025**
U.S. Air Force/Tech Sgt. Tarelle Walker
Inset: **The Embraer KC-390 Millennium also was at the Aero India but did not take part in the flying display**

to defense self-reliance. With over 50% of its components – including the airframe, avionics, and flight control systems – manufactured domesti-cally, it aligns strongly with the "Make in India" initiative.

- Sukhoi Su-30MKI: Representing raw power, the Su-30MKI is a cornerstone of the IAF's combat fleet. Though originally Russian in design, HAL has played a key role in its licensed production and integration of indigenous systems. The aircraft is celebrated for its agility, long-range strike capabilities, and versatility in both air-to-air and air-to-ground missions.
- LUH (Light Utility Helicopter): Three LUH models were present on the apron. Designed by HAL to replace aging Cheetah and Chetak helicopters, the LUH is optimized for reconnaissance, troop transport, casualty evacuation, and high-altitude operations – especially in rugged terrains like the Himalayas. Over 60% of its components are

The HAL HTT-40 (Hindustan Turbo Trainer-40) is an Indian training aircraft designed and built by Hindustan Aeronautics Limited (HAL)

The HAL HJT-36 *Yashas (Glory)* is a subsonic intermediate jet trainer aircraft designed and developed by Aircraft Research and Design Centre (ARDC). HAL is preparing to lease four HJT-36 *Yashas* to the Indian Air Force

domestically designed and manufactured.

- Surya Kiran Aerobatic Team (SKAT): Fans of aerial artistry were treated to performances by SKAT, the premier aerobatic display team of the IAF. Operating British-built Hawk Mk 132 advanced jet trainers, the team dazzled spectators with precision maneuvers in aircraft painted in the vibrant white, orange, and blue of the Indian flag. "Surya Kiran," meaning "Sun Rays," reflects the team's mission to light up the skies with skill and grace.

STATIC DISPLAY

The Indian Air Force (IAF) showcased an impressive lineup in the static display, featuring a Lockheed C-130J-30 Hercules, a Dornier Do-228 NG, a Dassault Rafale, a Sukhoi Su-30MKI, and a fully armed Jaguar Darin III. The Darin III variant is a Deep Penetration Strike Aircraft integral to the IAF's offensive capabilities. Also on display were a CASA C-295 and an Embraer-145 AEW&C (Airborne Early Warning and Control) aircraft, known as NETRA. The C-295, produced under a strategic partnership with Airbus, is expected to play a vital role in modernizing the

Dornier 228-201, registration KD-707, is a modified Dornier Do-228, serving as a flying testbed for the Defence Research and Development Organisation (DRDO) in India. Hindustan Aeronautics Limited (HAL) bulit 125 aircraft under license

Main and inset top: Indian Coast Guard (ICG) operates 36 Dornier 228-201 maritime surveillance, search and rescue, pollution control, and other coastal duties. Recent upgrades include advanced avionics (the aircraft are equipped with a modern glass cockpit), modern sensors, enhanced communication systems, and improved mission systems to boost the ICG's maritime security capabilities

Inset bottom: The Hindustan Aeronautics Limited (HAL)-built, multi-purpose light transport aircraft is operated by the Indian Air Forceand asssigned to 59 Squadron. India's Hindustan Aeronautics Limited (HAL) produces the Dornier 228 in India

The Tejas Light Combat Aircarft is a 4.5-generation all-weather, mulit-role combat aircraft, indigenously designed and developed by the Aeronautical Development Agency (ADA) and manufactured by Hindustan Aeronautics Limited (HAL) for the Indian Air Force and the Indian Navy

LT-5208 is the eighth of a total of 18 Tejas trainer aircraft ordered by the Indian Air Force. It made its first flight on 12 January 2025

LA-5021 is the first Full Operational Capability (FOC) standard LCA Tejas for the Indian Air Force. It's also referred to as the Tejas Mk 1A prototype

As of July 2025, the Indian Air Force has two operational Tejas Mark 1 squadrons: No. 45 Squadron *Flying Daggers* at Sulur AB an No. 18 Squadron *Flying Bullets* at Naliya AB

Display of the Tejas Mk.1A prototype

The Sukhoi Su-30MKI is the backbone of the Indian Air Force, serving as a multirole air superiority fighter. Co-developed by Russia and India, it features advanced avionics, thrust vectoring engines, and supermaneuverability. Powered by two AL-31FP turbofans, it reaches speeds of Mach 2 and has a range of 3,000 km. The IAF operates over 270 Su-30MKIs, equipped with modern radar, air-to-air missiles, and BrahMos cruise missiles for versatile combat roles

The An-32RE is a twin-engine turboprop transport aircraft used by the Indian Air Force for cargo and troop transport. Upgraded for better performance, it offers enhanced avionics, higher payload capacity, and improved engine power for high-altitude operations

The Airbus A321 in the Indian Air Force is primarily used for VIP and personnel transport missions. It features advanced avionics, efficient engines, and a range of around 5,950 km, making it ideal for long-haul flights. Operated by the Air Headquarters Communication Squadron, it offers enhanced passenger comfort and reliability. The aircraft supports strategic airlift roles and ensures safe, rapid movement of senior officials, contributing to the IAF's operational and administrative efficiency

The Hawk Mk132 RTOS is an advanced jet trainer for Stage-III fighter pilot training with the "Real Time Operating System" (RTOS) based Mission Computer upgrade

Indian Air Force helicopters Mi-17V-5 (left), SA316B (right), and another Mi-17V-5 (above)

The Indian Air Force Light Utility Helicopter LHU – prototypes PT-3 (main), PT-1 (left), PT-2 (right) – is an indigenous helicopter developed by HAL for high-altitude and utility roles. Designed for troop transport, reconnaissance, and logistics, it features a glass cockpit, advanced avionics, and powerful Shakti-1U engines. The prototypes underwent extensive trials in varied terrains, including the Himalayas. LUH ensures reliable performance in extreme conditions and is a key element in replacing aging Cheetah and Chetak fleets.

Indian Army (main) and Indian Air Force (insets) Light Utility Helicopter (LUH

IAF's transport fleet.

The Indian Coast Guard was represented with a Dornier Do-228. This twin turboprop aircraft is equipped with advanced avionics and sensors for reconnaissance and search-and-rescue missions. It features 360° radar scanning, pollution detection and response capabilities, and can be configured as a mobile air ambulance. Designed for maritime operations, the aircraft is built with contributions from 75 Indian companies, with 60% of its components manufactured domestically.

The Indian Navy's presence included the rarely seen MiG-29K, displayed with folded wings and full armament, including the prominent BrahMos cruise missile mounted beneath the fuselage. The MiG-29K is undergoing a weapons upgrade in collaboration with HAL and other Indian aerospace partners. New integrations include precision strike weapons such as Rampage missiles and laser-guided bombs—shown publicly for the first time at Aero India. Additional upgrades in progress include the Astra Mk I/Mk II, SAT SAAW, and the Naval Anti-Ship Missile in both Medium Range (NASM-MR) and Short Range (NASM-SR) variants.

Another highlight was the Kamov KM-31 AEW helicopter, the Indian Navy's only shipborne airborne early warning platform. It plays a critical role in fleet air defense, providing real-time targeting data to surface combatants via tactical data links. Also on display was the Westland Sea King Mk42 helicopter, a legacy platform operated in two variants—42B and 42C—which have served the Navy's rotary-wing fleet for over four decades. Representing the latest addition to the fleet was the Sikorsky MH-60R, a modern multi-role naval helicopter.

HAL (Hindustan Aeronautics Limited) showcased a wide range of indigenous products. The Indian Navy's LCA (Light Combat Aircraft) technology demonstrator was presented with full armament. The first prototype (NP1) flew on 27 April 2012, followed by the fighter version (NP2) on 7 February 2015. The aircraft has successfully demonstrated arrested landings and ski-jump takeoffs from both INS Vikramaditya and INS Vikrant in 2020 and 2023, respectively.

Also featured were the HTT-40 turboprop trainer and the HJT-36 jet trainer, both essential to modernizing India's pilot training fleet. HAL's

Indian Air Force Rafale EH (left) and Indian Air Force Jaguar IS (right)

rotorcraft lineup included the DRUV-NG, LUH (Light Utility Helicopter), and the LCH Prachand (Light Combat Helicopter) – all expected to receive substantial orders due to the push for domestic production.

Foreign exhibitors were relatively few. The U.S. Air Force was present with an F-16C from Osan and an F-35A, though both were positioned off to the side and not accessible to visitors. These aircraft complemented the USAF's flying display, which included the B-1B Lancer and KC-135R Stratotanker. Airbus was represented with the H-125 helicopter, the A-400M Atlas (presented by the German Air Force), and the A330 MRTT. Embraer, riding a wave of export success, showcased the KC-390 Millennium – potentially a strong contender for India's transport fleet modernization.

Unmanned systems were widely represented across the exhibition halls and outdoor areas. Notable entries included HAL's Hawks-Eye flying wing UAS with AI capabilities, developed under the CATS (Combat Air Training System) program; the AKSHI-7, India's version of the Hermes 650, produced by Adani; and the CargoMax 20KHC by Scandron, India's largest drone to date, with a payload capacity of 200 kg.

The entire spectrum of Indian industry – from steel and electronics to defense and high-tech firms – seized the opportunity to showcase their capabilities and position themselves for future contracts. True to the event's motto, Runway to a Billion Opportunities, Aero India continues to serve as a vital platform for innovation, collaboration, and strategic growth.

As a premier aerospace showcase in Asia, Aero India is assuming an increasingly influential role in the region. With the government's "Make in India" initiative at its core, the event is poised to significantly boost domestic industries and elevate Indian products onto the global stage.

Indian Air Force CASA C-295 (top right), Embraer-145 AEW&C (Airborne Early Warning and Control) aircraft, known as NETRA (left), and C-130J *Hercules* (right)

Among international particpants in Aero India were a Germany Air Force A400M *Atlas* *(top)* and a Royal Netherlands Air Force A330 MRTT *(above)*

1, 2 The LCH Prachand is India's first indigenous light combat helicopter, designed for high-altitude warfare. Developed by Hindustan Aeronautics Limited, it features stealth, advanced avionics, and versatile weaponry. Inducted into the Indian Air Force in 2022, it operates effectively in extreme terrain like Siachen

3, 4 The Kamov Ka-31 is a further development of the Ka-27 anti-submarine warfare helicopter

5, 6 The Indian Navy's LCA is a carrier-capable, single-engine light combat aircraft designed for maritime operations, featuring reinforced landing gear and tailhook for deck landings

▲▼ Indian Navy Sea King Mk42B

Indian Navy MH-60R ▲▼

Indian Air Force Aerobatics Demonstration Team «SURYA KIRAN» flying the BAe Hawk Mk.132

LIGHTNING FURY

THE U.S. NAVY'S STEALTH REVOLUTION

TEXT BY PATRICK ROEGIES AND BEN GORSKI
PHOTOS AS STATED

AMERICA'S NAVY™

A VFA-125 *Rough Raiders* F-35A *Lightning II* performs a touch and go during Fleet Replacement Squadron Carrier Qualifications at USS Nimitz (CVN-68) off the Californian Coast in 2022 *Patrick Roegies*

THE NAVY'S STEALTH REVOLUTION

The United States Marine Corps (USMC) and the United States Navy (USN) versions of the Lockheed Martin F-35 *Lightning II* differ significantly from the F-35A of the United States Air Force (USAF). The USMC F-35B version is specifically designed for short take-off and vertical landing (STOVL) capabilities and the F-35C version used by both the USMC and USN is the first low-observable carrier-based naval aviation platform. The F-35 is nicknamed 'Fat Amy' because of the shape of its fuselage, where the weapons are stored internally.

Another nickname is Battle Penguin for having relatively small wings compared to its length, resembling a penguin. The F-35 has been acquired by the USMC to replace the aging Boeing AV-8B *Harrier II* and the Boeing F/A-18C/D *Legacy Hornet*, while the USN is incorporating its 5th Generation technologies into its carrier strike groups, where - so far - it has replaced single squadrons of F/A-18E *Super Hornets* in some carrier air wings (CVWs). Patrick Roegies, Paul Gross, and Mike Crutch assess the successful implementation of the F-35C in the operational Strike Fighter Squadrons.

A streamlined carrier aircraft

The USMC and USN F-35C carrier variants have larger wings and a modified, more robust landing gear compared to the F-35A, making it suitable for catapult launches and arrested landings aboard aircraft carriers. The wings fold to allow more room aboard the ship's deck. The F-35C has the greatest internal fuel capacity of all the F-35 designs, and, like the F-35B, the C-variant uses probe and drogue refueling.

The first flight of the F-35C took place on 6 June 2010, and the first production example (BuNo 168733) was delivered to the Navy on 22 June 2013.

Fleet Replacement preparations – Training Lightning "nuggets"

The recipient of that first fleet F-35C was Strike Fighter Squadron (VFA)-101 *Grim Reapers*. Having previously been in existence as Fighter Squadron (VF)-101, the *Grim Reapers* was the Navy's last Fleet Replacement Squadron (FRS) for the F-14 Tomcat until its deactivation on 30 September 2005.

On 1 May 2012, the squadron was reactivated at Eglin AFB, Florida - home to the initial tri-service training center for all F-35s under the USAF's 33rd Fighter Wing - and redesignated from a Fighter Squadron to a Strike Fighter Squadron.

The Fleet Replacement Squadron (FRS) stationed on the U.S. East Coast was VF-101 *Grim Reapers*. The squadron was disbanded and the aircraft were transferred to VFA-125 *Rough Raiders* *Jaap van den Berg*

The inaugural F-35C pilot training course for VFA-101's future instructor pilots concluded in January 2013, which led to a second course launching in June 2013. The first official VFA-101 sortie (using BuNo 168734) launched from Eglin AFB on 14 August 2013, and the squadron was officially re-constituted in a ceremony at the Florida base on 1 October 2013.

VFA-125 *Rough Raiders* had served as the legacy F/A-18 Hornet FRS at Naval Air Station (NAS) Lemoore, CA until deactivation on 1 October 2010, with the remaining *Hornet* training incorporated into the *Super Hornet* FRS, VFA-122 *Flying Eagles*. On 12 January 2017, VFA-125 was re-activated at NAS Lemoore as the second F-35C *Lightning II* FRS and received their first batch of four aircraft from VFA-101 on 25 January 2017.

On 10 September 2018, the Chief of Naval Operations, Admiral John M. Richardson, promulgated a notice to deactivate VFA-101, which was completed on 23 May 2019. This meant, despite its success, the mission of VFA-101 came to an end as all F-35C operations, training, and maintenance were to be centralized at Naval Air Station Lemoore, California.

During the fall and winter of 2018, the two squadrons worked together multiple times as an integrated FRS team, and CDR Adan Covarrubias, commanding officer of VFA-101, assumed command of VFA-125 Rough Raiders. "We integrated VFA-125 maintenance practices into what we were doing, and then vice versa, VFA-101 into 125. We kind of took the best of everything, figured out what worked for everybody, and then came up with the best process."

VFA-101 trained its last pilot in March and April 2019 and has slowly been sending its aircraft and gear out to Lemoore," Covarrubias said. The last two jets remaining in the squadron flew off the Eglin AFB flight line for the last time on 23 May 2019, headed for California.

Capt. Max McCoy, commodore of the Joint Strike Fighter Wing at NAS Lemoore, explained ahead of VFA-101's deactivation ceremony that setting up early F-35C efforts alongside the Air Force at Eglin proved to be a very smart decision. The service had already learned a lot about maintaining the new jets and had established a collaboration with Lockheed Martin experts on the base.

The first squadrons to start their transition to the F-35C were Strike Fighter Squadron VFA-147 *Argonauts.*

The Fleet Replacement Squadron also provided the conversion training for the United States Marine Corps squadrons that completed or are in the process of completing their transition to the F-35C. Marine Fighter Attack Squadron 314 *Black Knights*, operating the aging F/A-18A++ *Legacy Hornet*, started their conversion to the F-35C *Lightning II* in June 2019 and was the runner-up after Strike Fighter Squadron VFA-147 achieved their Safe for Flight status. On 21 June 2019, the squadron

VFA-125 is the Fleet Replacement Squadron for the Joint Strike Fighter Wing and based at Naval Air Station Lemoore. The squadron is responsible for all conversion training for the units transitioning to the F-35C *Lightning II* *Patrick Roegies*

retired the F/A-18A++ and began training on the F-35C. The *Black Knights* conversion training was provided by Strike Fighter Squadron VFA-125 *Rough Raiders* based at NAS Lemoore, California. VMFA-314 received their first factory fresh aircraft on 1 January 2020 and was based at MCAS Miramar.

Marine Attack Squadron VMA-311 was de-commissioned at MCAS Yuma on 15 October 2020, with the AV-8B Harrier IIs being relinquished and moved to 309th AMARG for long term storage. VMFA-311 Tomcats was reactivated on 14 April 2023 to start their conversion training as the second Marine Fighter Attack Squadron to the F-35C. VMFA-311 *Tomcats* assigned to Marine Aircraft Group MAG 11, 3rd Marine Aircraft Wing (MAW), declared initial operational capability on 31 July 2024.

Marine Fighter Attack Squadron VMFA-251 *Thunderbolts* is the first East Coast-based squadron to start their conversion, trading their F/A-18C/D Legacy Hornet for the F-35C. The squadron received its first aircraft, bureau number 170501, which was the 93rd F-35C to come off the Fort Worth production line, on 17 September 2024. The Thunderbolts are assigned to Marines Aircraft Group 2nd Marines Aircraft Wing (MAW). Col. Benjamin Grant, commanding officer, MAG-14, commented. "The one-two punch provided by the F-35C's increased range and the F-35B's STOVL capability will give MAG-14 and the MAGTF a significant advantage in the future fight". Upon completion of the conversion process, VMFA-251 will be assigned to CVW-8 in due course, and its first cruise will be aboard the USS John F. Kennedy (CVN-79) in 2028.

UNITED STATES NAVY

First Deployable Lightning Strike Fighter Squadron

Initially, the first Strike Fighter Squadron planned to transfer to the F-35C, which was initially VFA-97 *Warhawks* planned for January 2018. Due to operational obligations of VFA-97, however, this initial plan changed, and VFA-147 *Argonauts* became the first Strike Fighter Squadron, starting their conversion in January 2018. Prior to the conversion, the *Argonauts* completed their deployment with Carrier Air Wing (CVW-)11 embarked on USS Nimitz (CVN-68) and returned to their home base at Naval Air Station Lemoore in December 2017 after a six-month deployment operating the F/A-18E *Super Hornet*.

Almost immediately after returning home, the

Top: **Besides the United States Naval Aviation Squadrons VFA-125 also trains the United States Marine Corps squadrons transitioning to the F-35C. The conversion training takes approximately nine months to one year** *Patrick Roegies*

Above: **As the F-35C has no dual-seat trainer version, the basic training is completed via simulators which are all implemented at NAS Lemoore. Pilots perform regular landings and LSO-simulated landings to gain experience in landing this sophisticated aircraft** *Patrick Roegies*

Argonauts started the conversion process to the F-35C *Lightning II*. Although some level of training took place at Eglin AFB, most of the training of the maintainers and pilots took place at NAS Lemoore. The VFA-147 personnel worked with the Fleet Replacement Squadron VFA-125 to complete the required qualifications and syllabus events to gain hands-on experience with the aircraft. Additionally, maintaining this new platform required additional space, and as a result, a hangar was remodeled and assigned to the *Argonauts*.

A mixture of F-35Cs from VFA-101 *Grim Reapers*, VFA-125 *Rough Raiders*, and eventually VFA-147 *Argonauts*, all assigned to the Commander, Joint Strike Fighter Wing (JSFW), were used to facilitate the training and certification of the first operational F-35C squadron. VFA-147 received its first aircraft on the books in September 2018. Since the F-35C does not have a two-seat trainer variant, the basic training principles were provided using the full-mission simulator. For training purposes, several simulators are implemented at NAS Lemoore with additional simulator assets scheduled for delivery as the program evolved at NAS Lemoore. AT Chief Joseph Walter of VFA-125 stated in October 2018 "the simulator is very accurate and resembles the real-time situation to a very high detail." After almost three months of simulator training, on 18 April 2018, VFA-147 personnel conducted their first flight on the F-35C.

On 19 October 2018, Capt. McCoy issued the *Argonauts* the interim safe-for-flight operations certification status. The finalization of the safe-for-flight operations certification process ensures that the squadron has sufficient qualified personnel to implement safety and maintenance programs in support of fleet operations. Once the squadron had independently completed carrier operations, they received the full safe for flight operations certification.

The following step in the implementation process was the successful integration of the aircraft into the operational Fleet. This was scheduled to start in February 2019, preparing for the first actual deployment of the *Argonauts* in 2021, embarked on USS Carl Vinson (CVN-70). On 1 March 2019, it was announced that VFA-147 was to transfer from CVW-11 to CVW-2 to be embarked on USS Carl Vinson's next deployment. USS Carl Vinson left Naval Air Station North Island for their deployment on 2 August 2021 returning on 14 February 2022. This deployment was referred to as the "Air Wing of the Future" (AWOTF) cruise as the CVW had the latest state-of-the-art technology in their operational inventory.

VFA-86 *Sidewinders* assigned to Carrier Air Wing 2 has taken the place of VFA-147 *Argonauts* which have transferred to Carrier Air Wing 5 and moved to MCAS Iwakuni in Japan *Patrick Roegies*

Paint Problems and a Crash

While embarked on USS Carl Vinson, VFA-147's jets developed a reddish-brown coloring across large areas of the airframe; the noted effect raised questions concerning the maintainability of the stealth-enhancing paint coating in an aggressive maritime environment, coupled with jet efflux and extreme weather conditions on the flight deck.

A report was filed by the US Government Accountability Office (GAO) on 16 December 2010. This report was produced as the House Armed Services Committee expressed their concerns that the lessons learned regarding the prevention and management of corrosion in the F-22 *Raptor* had not been fully applied to the development and acquisition of the F-35 *Joint Strike Fighter*. Although the conclusions are not clear, including the actions taken.

The first F-35C deployment was also marred by a landing mishap. On 24 January 2022, an F-35C, BuNo 169304/NE-406, crashed onto the flight deck of USS Carl Vinson, which was operating in the South China Sea. The pilot safely ejected, and the aircraft skidded off the flight deck and into the sea.

This accident was the result of a pilot error. The pilot attempted an expedited recovery breaking overhead the carrier, an approved and common maneuver, but the pilot had never performed this maneuver before and it reduced the amount of time to configure the aircraft and conduct landing checks. As a result of the compressed timeline and the pilot's lack of familiarity with the maneuver, the pilot lost situational awareness and failed to complete his landing checklist. Specifically, the pilot remained in manual mode when he should have been (and thought he was) in an automated command mode designed to reduce pilot workload during landings. On 2 March 2022, the F-35C was recovered, and the root cause of the accident was further investigated.

Takin' it to the Fleet

In September 2019, the next squadron to perform the conversion to the F-35C was announced. Strike Fighter Squadron VFA-97 *Warhawks* had been selected as the next squadron to start their conversion to the F-35C *Lightning II* in February 2021. VFA-97 performed its last F/A-18E mission from NAS Lemoore, California, on 26 February 2021, and started its F-35 conversion

A year later, on 18 February 2022, VFA-97 Warhawks achieved their safe-for-flight operations cCertification (SFFOC) status, completing their conversion to the F-35C Lightning II. The squadron received their first F-35Cs in October 2021 and were reassigned to Carrier Air Wing (CVW-)2. The Warhawks, under the leadership of Commander Thomas R. Bock, successfully completed a high-paced training cycle to prepare for deployment in less than half the time available. The completion of Composite Training Unit Exercise (COMPTUEX) marked the last training evolution for the squadron prior to their deployment to the Indo-Pacific.

The *Warhawks* excelled in each step of their training during four separate exercises. Two training cycles were completed at the Naval Aviation Warfighting Development Center (NAWDC) at NAS Fallon, Nevada, and two embarked training evolutions on USS Carl Vinson. For their first deployment, the *Warhawks* were embarked on USS Carl Vinson as well, assigned to CVW-2 between 12 October 2023 and 23 February 2024 for a WestPac cruise. For their second training cycle between 12 June and 15 August 2024, the *Warhawks* conducted RIMPAC 2024 in the Hawaiian Operating Areas while embarked on USS Carl Vinson, still assigned to CVW-2.

The *Warhawks* quickly took the place of VFA-147 *Argonauts* previously assigned to CVW-2, to prepare

An F-35C *Lightning II* from the *Sidewinders* of Strike Fighter Squadron (VFA) 86 prepares to make an arrested landing on the flight deck of the aircraft carrier USS Nimitz (CVN 68) in the Pacific Ocean in July 2024
U.S. Navy/Mass Communication Specialist 2nd Class Carson Croom

the *Argonauts* for their planned homeport change to Marine Corps Air Station MCAS Iwakuni, Japan, while maintaining noteworthy Mission Capable rates. The squadron further executed previously planned Joint Strike Fighter Wing Lightning Sustainment Inspections (LSI) and readily adopted and executed the new F-35 fleet-wide Tier 2 Corrosion Production Aircraft Inspection Requirement (PAIR) that was based on the LSI.

Currently, VFA-97 *Warhawks* are deployed on USS Carl Vinson as a part of Carrier Strike Group ONE (CSG-1). Their deployment to the US 5th and 7th Fleet area of operations (AOR) started on 18 November 2024 and is currently still underway.

A growing Lighting community

In 2022, VFA-86 *Sidewinders* - after eleven years of operating the F/A-18E *Super Hornet - was selected to be the third and next squadron* to start their conversion to the F-35C *Lightning II*.

In 2023, VFA-86 *Sidewinders* completed their conversion to the F-35C. In total, 200 personnel completed their conversion training at Eglin AFB and NAS Lemoore, while nine pilots were in the process of completing their flight syllabus with VFA-125 *Rough Raiders*, while simultaneously executing tactical training events with NAWDC (including TOPGUN) at NAS Fallon.

After completing these key milestones, including the Conventional Weapons Technical Proficiency Inspection and the Maintenance Program Assist inspection, VFA-86 earned its interim safe-for-flight certification in June 2024. In July, they conducted their first embarked operations aboard USS Nimitz (CVN-68), culminating in full safe-for-flight certification. The Sidewinders achieved their full safe-for-flight certification in October 2024.

Upon completion of their conversion training, VFA-86 remained with Commander Joint Strike Fighter Wing (CJSFW) pending assignment to CVW-11 and will deploy aboard USS Theodore Roosevelt (CVN-71) in 2026.

With the relocation of Strike Fighter Squadron VFA-147 *Argonauts* to Marine Corps Air Station (MCAS) Iwakuni, Japan, in October 2024, changing places with VFA-115 Eagles, which moved to NAS Lemoore, California in July 2024. VFA-115 was initially based at NAF Atsugi, Japan since December 2009, later relocated to MCAS Iwakuni since 28 November 2017, assigned to CVW-5. They performed their 'last ride' with CVW-5 aboard USS Ronald Reagan over May-July 2024 as the carrier itself also returned to the USA for replacement in Japan by USS George Washington (CVN-73).

VFA-115 Eagles ended F/A-18E *Super Hornet* operations on 7 January 2025 and will be the fourth Navy squadron to start their conversion to F-35Cs, which will be of production Lot 17 standard. VFA-115 will be the first CVW-17 F-35C squadron and will deploy aboard USS Ronald Reagan (CVN-76) in 2027.

A hundred Lightning bolts

The integration of the F-35C *Lightning II* into the operational carrier air wings continues to define new benchmarks, showcasing the evolution of United States Naval Aviation. These developments are supporting the vision and mission in which the F-35C's growing role in maintaining air superiority at sea is

Left: The Fleet Replacement Carrier Qualifications includes the successful completion of ten day time traps and eight night time traps. Prior to starting the traps the pilot performs a touch and go on the flight deck *Patrick Roegies*

Right: Each trap is rated by the Landing Systems Officer (LSO) and the pilot is allowed one "bolter" during the qualifications. If the tail hook is bounced off the deck just before catching the arresting cable but has to be witnessed and scored by the LSO otherwise the qualification has failed *Patrick Roegies*

Main: When VFA-147 *Argonauts* completed their conversion training to the F-35C, the squadron was assigned to Carrier Air Wing 11 (CVW-11) with tail code NH applied to the aircraft *Patrick Roegies*

Left: The *Argonauts* transferred from CVW-11 to CVW- 2 and completed the maiden F-35C deployment embarked on USS Carl Vinson (CVN-70) *Patrick Roegies*

Right: For a very brief period VFA-147 *Argonauts* was assigned to CVW-7 with tail code AG applied. In this period, the squadron was not deployed embarked on a carrier *Patrick Roegies*

progressing at a steady pace.

On 17 December 2024, Lockheed Martin announced the delivery of the 100th F-35C *Lightning II* fifth-generation fighter jet, marking a new milestone for the program. The aircraft manufactured under construction number CF-100, USN BuNo 170543, was noted during a test flight at Fort Worth, Texas, on 16 November 2024, and its delivery took place in December 2024 to VFA-125 at Lemoore. Although that's officially the hundredth F-35C built, they are not always delivered in the same order of manufacture. This milestone followed the earlier delivery of the thousandth F-35 across all variants earlier in the year. The Navy plans to acquire 273 F-35Cs to complement its F/A-18E/F Super Hornets and has completed the replacement of its older F/A-18C/D models. Meanwhile, the USMC has a program of record for 67 F-35Cs.

The F-35C program's recent milestones underscore its strategic importance to the Navy's future. With its advanced avionics, stealth capabilities, and adaptability for carrier operations, the F-35C continues to redefine what is possible for naval aviation. As additional squadrons will start their transition and deployments become more routine, the aircraft solidifies its place as a cornerstone of modern maritime defense.

Just prior to being transferred to carrier Air Wing 5 the *Argonauts* jets had the NJ tailcode, which were applied only briefly *Patrick Roegies*

Base	Wing	Squadron	Type	Modex	Emblem
Eglin AFB, Florida	Commander Strike Fighter Wing Pacific COMSTRKFIGHTWINGPAC, to Commander Joint Strike Fighter Wing (CJSFW) October 1, 2018 Fleet Replacement Squadron	Strike Fighter Squadron VFA-101 *Grim Reapers* Deactivated 1 July 2019 (ceremony on 23 May 2019)	F-35C	NJ-1xx	
NAS Lemoore, California	Commander Strike Fighter Wing PacificCOMSTRKFIGHTWINGPAC, to Commander Joint Strike Fighter Wing (CJSFW) October 1, 2018 Fleet Replacement Squadron	Strike Fighter Squadron VFA-125 *Rough Raiders*	F-35C	NJ-4xx	
MCAS Iwakuni, Japan	CVW-5	Strike Fighter Squadron VFA-147 *Argonauts*	F-35C	NF-3xx	
NAS Lemoore, California	CVW-2	Strike Fighter Squadron VFA-97 *Warhawks*	F-35C	NE-4xx	
NAS Lemoore, California	Commander Joint Strike Fighter Wing (CJSFW)	Strike Fighter Squadron VFA-86 *Sidewinders*	F-35C	NJ-3xx	
NAS Lemoore, California	Commander Joint Strike Fighter Wing (CJSFW)	Strike Fighter Squadron VFA-115 *Eagles*	F-35C	NJ-*xxx*	
NAS Patuxent River, Maryland	Naval Air Systems Command	Air Test and Evaluation Squadron VX-23	F-35B/C	SD-6x	
NAWS China Lake, California	Commander, Operational Test and Evaluation Force (COMOPTEVFOR)	Air Test and Evaluation Squadron VX-9	F-35C	XE-1xx	
NAS Fallon, Nevada	Naval Aviation Warfighting Development Center (NAWDC)	NAWDC	F-35C	2xx	

Top: **An F-35C *Lightning II* from the *Rough Raiders* of Strike Fighter Squadron (VFA) 125 prepares to launch from the flight deck of the aircraft carrier USS Nimitz (CVN 68) in the Pacific Ocean in July 2024** *U.S. Navy/Mass Communication Specialist 2nd Class Carson Croom*

Bottom: **The F-35C features the Magic Carpet System, which allows the pilot to land the aircraft in automatic mode. This means that several tasks have been automated, taking away some of the stress for the pilot to manage a variety of parameters during landing** *Patrick Roegies*

RAMSTEIN FLAG 2025

PART TWO

AIR-TO-AIR REFUELING

TEXT BY JORS VAN BOVEN AND ALEX VAN NOIJE
PHOTOS AS STATED

Two Finnish F-18 *Hornets* go through refueling operations alongside the Canadian CC-150 *Polaris* *Corporal Luke Barrie, 8 Wing Imaging, RCAF*

REFUELLING FIHTER AIRCRAFT

Multi MRTT Unit tanker operations

One of the units supporting the RAMSTEIN FLAG 2025 exercise is the MMU at Eindhoven Air Base. The MMU (Multi-MRTT Unit) operates the Airbus A330 MRTT, a multi-role tanker and transport aircraft. The unit is currently led by the German Colonel Ludger Bette (OF-5). He is a member of the Luftwaffe (German Air Force) and is the highest-ranking commander of the MMU. The colonel took over the command of this unit two years ago and will serve a total period of three years as the commander of this unit. His successor next year is already known and will be a Belgian OF-5 officer who will take over at the end of March 2026. Bette joined the German Air Force in 1981 and flew the C-160 Transall and converted later to the Airbus A400M. He was also the base commander of Wunstorf AB for a while. The German transport wing is called Air Transport Wing 62 (LTG 62). Bette arrived in this unit with the arrival of the first A400M: "I see similar issues and see similar challenges when I compare the A330 program to the A400M program. I think it was a good start in Wunstorf with the A400M program and then continue here with the A330 MRTT." Bette has almost 4,500 flying hours. He is currently flying the A330 as a co-pilot in the MMU. Also, Major Benjamin is a pilot on the A330 MRTT. He's the head of the integrated planning team; therefore, he's

Col. Ludger Bette
Commander MMU

Maj. Benjamin
German Air Force

Main: **Two Finnish F/A-18 *Hornets* fly alongside the Canadian CC-150 Polaris** *Corporal Luke Barrie, 8 Wing Imaging, RCAF*

Left: **A Finnish F-18 *Hornet* recieves fuel from the Canadian CC-150 *Polaris*** *Corporal Luke Barrie, 8 Wing Imaging, RCAF*

Right: **A Finnish F/A-18 *Hornet* approaches the CC-150 *Polaris* with its refueling probe extended, maintaining formation in the pre-contact position until cleared by the tanker to move forward to engage with the "basket" and start to receive fuel** *via NATO ACC*

preparing all the flights for the A330 MRTT, especially related to RAMSTEIN FLAG 2025. For the team, this is an excellent opportunity to assess their readiness and ensure that all members have the necessary tools in their toolbox. Bette: "My management gave me the important task to be ready for a major large-scale conflict in Europe not later than 2029."

Mission Planning & Objectives

Currently, six nations are "MMU nations," and they havw built a steering group in which they're giving guidance to the commander of the MMU, Bette explains. RAMSTEIN FLAG (RAFL25) is a high-end exercise with a lot of nations that requires a lot of skills to cope with. "We are happy to have this opportunity and to show you the opportunity of what we are doing with regard to RAMSTEIN FLAG 2025. The involved nations decided to transfer operational control to the European Air Transport Command (EATC). This means that all the assets are transferred to the commander of the European Air Transport Command, they execute operational control, and the MMU is tasked by the EATC on a daily basis during RAMSTEIN FLAG

A Spanish F-18 Hornet prepares to recieve fuel from the Canadian CC-150 Polaris over the Netherlands *Corporal Luke Barrie, 8 Wing Imaging, RCAF*

2025. Benjamin is continuing the story: "The air task order (ATO)is made in Leeuwarden by the planning team there. We have two liaison officers over there; they prepare the ATO, inform us accordingly, and the EATC is just giving us a framework. They're giving us a mission order, preparing all the details, and then, on a technical level, we get the tasking from the planning cell at Leeuwarden AB. I am responsible for picking this part of the planning on our side." Basically, the MMU received the first request to participate in RAMSTEIN FLAG second half last year, around August or September. It all starts with a request for how much support the unit can deliver, how many assets are available, and which nation will be involved. One of the nations will place a so-called air transport request, and based on that, the EATC will see what the best asset is for that particular request. For air-to-air refueling, the EATC comes mostly to the MMU with the request. It also takes into account all the other priorities the unit has, like all the other ongoing missions. Within the given framework, it was concluded to execute two missions per day with one aircraft, and that's what the unit is doing currently.

Benjamin continues: "Our liaisons in Leeuwarden will give us the last-minute details a few hours prior to the actual flight, then we have the actual receiver types and specifications available for actual planning. We do our own mission planning, but as I said we get the details from the liaison team in Leeuwarden, so every unit has probably a liaison

A Spanish F-18 *Hornet* flies alongside the tanker with its air refueling probe extended *Corporal Luke Barrie, 8 Wing Imaging, RCAF*

officer over there. They plan together the sorties, they also define which tanker goes into which area and at which altitude, and which receivers are expected. We only have to fine-tune the details before we take off from here to be ready for our customers." To make the mission picture complete, the unit needs to consider also changes in flight. If there is a tanker not available for whatever reason, the current assets might expect re-tasking in flight; for this part, the members of the team need to have the skills available in their personal toolbox. The major explains a situation: "We had earlier a tanker from RAF Mildenhall which was not available for whatever reason, and they re-tasked us to replace the U.S. Air Force tanker in that tanker cell, in that tanker area. This is something you have to expect as well, and the crews have to be ready to deal with this. That's an aspect of this whole exercise, to get flexible on scene and to act accordingly." The main objective for the MMU is to see if the unit is ready to handle a major conflict in Europe. The team will evaluate the lessons learned, and many lessons will also be identified as processes in place. Every captain of a tanker writes a report after the mission. Based on this report, they can see what to improve on the next flight. Colonel Bette says: "From my experience, after 45 years in the forces, there is always room for improvement. We are always looking to see if we have to adjust our training, if we have to look into the availability or the reliability of aircraft systems in the plane, on the ground, and if we made mistakes in the planning process. There is always room for improvement." The crews of the MMU are fully multinational and integrated. There is a lot of new incoming personnel this year in the MMU; therefore, this training is ideal for the team. Therefore, it's always good to have an experienced type rating instructor to learn from. This person will share his experience and will transfer his experience and knowledge to the younger colleague. To participate in the exercise, the youngest pilots need to have at least 150 flight hours of experience to play a decent role.

Right: **Swedish and French jets fly nearby as a Swedish JAS-39 Gripen gets fuel from the Canadian CC-150 *Polaris*** *Corporal Luke Barrie, 8 Wing Imaging, RCAF*

Left: **A Royal Netherlands Air Force A330 MRTT, assigned to the MMU, is about to refuel two Hellenic Air Force F-16 *Fighting Falcons*** *NATO ACC*

All insets NATO ACC

Joris van Boven

The Unique MMU Concept

The MMU is an example of a multinational corporation sharing a common capacity. This is the best example in NATO or in Europe of sharing a capability. Bette: "Speaking about today's times and the threat situation in Europe, I think it's a brilliant example of pooling and sharing assets, and I think we Europeans have to work together after all. And the MMU is an example for pooling and sharing in Europe. We are open to more partner nations, and I can tell you already that a lot of Scandinavian countries are interested to join the MMU. We will soon see more partners on board of the MMU program; the result is that the organization needs more planes for this". Every nation in the MMU is committed to flying hours. The aircraft are registered in the Netherlands; therefore, the unit is audited by the Dutch military authorities. The unit is working in a Dutch framework, and the aircraft are owned by NATO and the nations that committed to these flight hours. The procurement agency calculated that for every 1,100 flying hours per year one aircraft for the MMU is needed. Currently, there are nine aircraft in the fleet. The MMU will receive aircraft number ten in 2026. If the unit gets more nations on board in the future, they will receive, for every additional 1,100 flying hours a new aircraft for the fleet. That is how the MMU works at this moment.

At this moment, the Germans came up to the conclusion that they need 5,500 flying hours per year and therefore, five planes of the fleet are paid for by the German government in this fleet. Now also many Scandinavian countries are also interested in the

A Royal Netherlands Air Force Airbus A330 MRTT, assigned to the MMU is sitting on the ramp at the end of a busy day (main), enroute to the airspace reserved for air-to-air refueling (left), refueling some F-35 *Lightning II*s (middle), and flying alongside a German Air Force EF2000 (right)

MMU; it is likely that also a third forward operating base will be introduced in the north. The Norwegians are already members of the MMU, and countries like Denmark, Finland, and Sweden are eagerly looking into these capabilities. It is logical to have a base in the north at that point. The colonel gives a practical example of how this benefits the unit's capabilities: "If we have to serve Norwegian receivers, for example, you burn a lot of fuel to go to Norway. It's almost two hours flight time to the refueling area, then you also must fly the same distance back to Eindhoven. We burn at least four hours of time to serve the Norwegian receivers, and this is expensive. Therefore, it would be logical to have a forward operating base of the MMU in the Scandinavian area; it would be beneficial for the Scandinavian customers."

Almost 50% of all positions are German positions. This is how the unit is working, and this applies to money investments as well. If the MMU has to spend one euro, 50% comes from Germany. Right now, four aircraft are based in Cologne. But they are also all Dutch-registered. Bette explains the unique concept of the MMU in practice: "The aircraft have no fixed base; we just switch tails between the locations if necessary. Currently, we're coming close to the maximum capacity of both Eindhoven and Cologne. Therefore, if we get aircraft number ten, we will have six aircraft here in Eindhoven and four in Cologne. And as long as the special mission wing in Cologne has not moved to Berlin, we have no more parking space than for a maximum of four aircraft in Cologne. Eindhoven has the same issue, but the airbase will be reconfigured from 2027 on. Eindhoven will be closed for almost six months in that period, and I think it will be hard to relocate all the aircraft in that period. But after this reconstruction, we have space for more aircraft, that's for sure". The MMU is growing, and it is a typical symbol for air forces in Europe working together on the same mission.

Touch-down of a Royal Netherlands Air Force Airbus A330 MRTT at Eindhoven AB *EATC*

NATO ACC

Ralf Jahnke

Ralf Jahnke

Italian Air Force KC-767 tanker

The Refueling Process

The A330 MRTT is the state-of-the-art tanker in Europe. MRTT is the abbreviation for Multi-Role Tanker Transport. Bette says, "We don't have to reconfigure the aircraft for refueling or transport. The plane can have passengers on board, it can have cargo on board, and simultaneously, it can refuel aircraft. There are no additional tanks in or on the aircraft, and we can take 109 metric tons of fuel onboard. And we can offload the entire fuel capacity minus the amount for our own flight. The A330 is using about six tons per hour; the rest can be offloaded to receivers. The average fighter has a capacity of around 6 metric tons of fuel. The A330 is therefore able to serve many aircraft in one refueling flight, which makes the aircraft an excellent refueller in NATO." There are two ways to offload fuel to receivers. The first one is with a hose and drogue system. The system is mounted on the pylons under both wings. The maximum fuel flow for this system is about 1.5 metric tons per minute. Types of receivers that are hose-and-drogue capable are the EF2000 Eurofighter, the Dassault

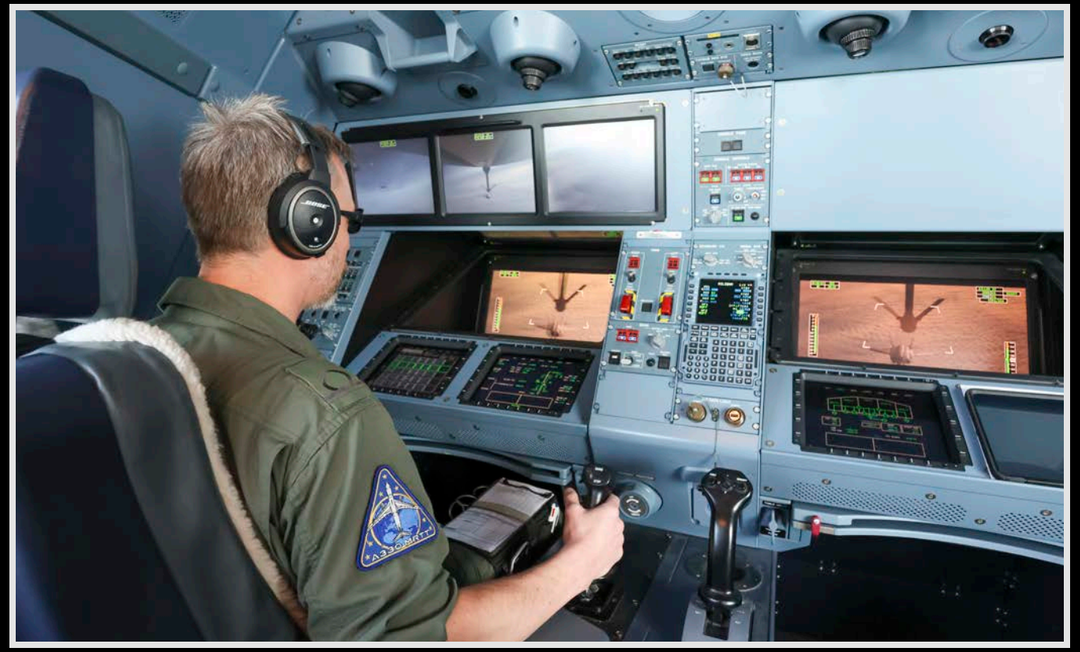
A Swedish Air Force JAS-39 receives fuel from a Canadian CC-150 *Polaris*
Corporal Luke Barrie, 8 Wing Imaging, RCAF

All insets NATO ACC

Corporal Luke Barrie, 8 Wing Imaging, RCAF

Swedish Air Force JAS-39 *Gripen* during air-to-air refueling seen from the persective of the tanker (main) and from the *Gripen* pilot (insets)

U.S. Air Force/Senior Airman Christopher Campbell



NATO ACC

Rafale, and the F/A-18 Hornet, for example. The second system onboard is the "boom". The maximum fuel flow here is 3.5 metric tons per minute. The MMU refuels mainly the fighters of the fourth and fifth generation with this system, for example the F-35A *Lightning II* and the F-16C *Fighting Falcon*." There is a specific speed for each and every receiver to offload fuel according to the Colonel: "For example, the German Eurofighter has an optimal speed of 280 knots, and you can refuel these planes from 2,000 feet till flight level 300. You cannot refuel these aircraft in icing conditions; this is a showstopper for us. If the receiver hasn't had the tanker in sight, then it's a challenge to find the tanker; pilots can do this by radar, but that is not always tactically wise. To join the tanker, pilots need at least some visibility. Once the receiver has the tanker visually in sight, the pilot can join the tanker. The only things holding us back are icing and thunderstorms. The most challenging situation that can happen is if there are technical failures. When system failures are popping up, you have to disconnect the receiver from the tanker to stay safe, we have to separate both aircraft to avoid any conflict or dangerous situation." Operations at night are not really different than operations at day light time. According to Bette it's easy for the tanker crew: "We have to switch off some lights during night, and we have to switch on some other lights during night. We have the easier part of refueling during nighttime. For the receivers, it's more complex and it requires more training skills of the pilot to contact the hose-and-drogue system at night". Refueling at night requires more skills from the receiver pilot; the challenge for night operations is therefore mainly on the fighter pilot side. From the receiver side, it is more difficult in night, because pilots need to judge the attitude of the aircraft and of the tanker. This is difficult because at night, pilots only see the silhouettes of the aircraft. Therefore, for them, it gets more difficult to judge where the aircraft is heading to, where the wings are, and what the speed difference is between the aircraft. This is basically the main difference for the receivers at night. There are a lot of lights on the refueller's fuselage. Pilots have at night more a 2D image of the situation, making it hard to couple to the probe, but they will manage to connect.

In the boom and receptacle method, the tanker aircraft is equipped with a rigid, telescoping boom operated by a boom operator (right). The receiver aircraft has an air refueling receptacle, typically located on the upper fuselage (above)

Royal Netherlands Air Force F-35 *Lightning II* assigned to 322 Squadron *Joris van Boven*

All images this page page NATO ACC/Arnaud Chamberlin

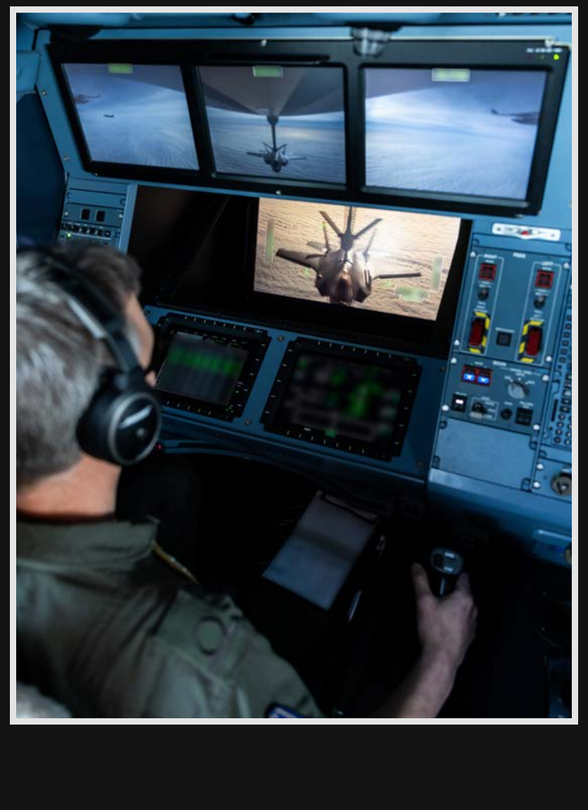
Italian Air Force F-35 *Lightning II* assigned to 102° Gruppo *Joris van Boven*

Royal Netherlands Air Force F-35 *Lightning II*s flying alongside an Airbus A330 MRTT during the Media Flight on 2 April 2025 *Alex van Noije*

NATO ACC/Arnaud Chamberlin

NATO ACC/Arnaud Chamberlin

Robert Rydendahl



NATO ACC/Arnaud Chamberlin

Top left and bottom right: The AAR (air-to-air refueling) operator controls the fuel transfer process with the advanced Air Refueling console located on the flight deck. The Enhanced Vision System (EVS) and its set of 2D/3D high definition digital cameras, allows the AAR operator to refuel other aircraft at day and night and adverse weather conditions

Top right and bottom left: Royal Netherlands Air Force F-35A *Lightning II* s hold in formation next to the MRTT, waiting for their turn to take fuel from the tanker's boom

Typhoons from Scotland

During RAMSTEIN FLAG 2025, the RAF participated with Typhoons from Scotland, which are based at RAF Lossiemouth in the far north. The aircraft involved in the exercise flew daily missions during the scenarios and flew directly from their home base, which is by far the most remote location used during RAMSTEIN FLAG next to RAF Fairford in the far south of the UK. One of the pilots who participated in the exercise is Flight Lieutenant Dan Hall. He joined the Typhoon squadron straight out of the UK Flying Training when he was 27 years old. Hall attended the Tactical Leadership Program (TLP) in Albacete, Spain, in November 2024. He was also working very closely with other NATO allies. This young fighter pilot is assigned to the No. 1(Fighter) Squadron at RAF Lossiemouth, which is the oldest airborne fighting unit in the world. The Flt Lt spoke excitedly about the exercise: "We played numerous roles in the exercise RAMSTEIN FLAG, my first mission was as 'Red Air', playing the enemy during the mission. In my second mission, I was part of the Strike package, tasked with striking simulated ground targets whilst being escorted by other NATO fast jets. Exercise is very important for us, as we very rarely have the chance to work so closely with our NATO allies with the whole squadron in the RAF. With NATO becoming ever more vital in the modern world, No. 1(F) Squadron and the RAF have taken a great deal from it."

For the British, adding value by embracing the tactics and procedures of their NATO allies can lead to a whole package's success, according to Hall. This way of working is already deeply nested in the British mentality. For the RAF crews, it was a great

Three Royal Air Force Typhoon FGR4s, assigned to No. 1(F) Squadron at RAF Lossiemouth flying alongside the MRTT, waiting for their turn to refuel *Alex van Noije*

The Royal Air Foce Typhoon FGR4 has plugged into the hose and fuel is being transferred
Joris van Boven

opportunity to integrate with other nations' support assets like the air-to-air Refueling (AAR) assets, for example. Hall explains the lessons which others can learn from the RAF participation: "We strive to achieve ultimate professionalism, especially on a European stage like exercise RAFL25. I like to think we brought our knowledge and experience of Large Force Exercises and the professional communication discipline, which is required during such a busy exercise to communicate crucial information at the right time to the right involved persons." Next to bringing tactics and experiences, the RAF also had great learning opportunities during this exercise. The Flight Lieutenant was really pleased to learn these lessons from other very experienced allies: "We learned a great lesson from one of the air-to-air refueling assets being proactive during these exercises, which will in real-life scenarios benefit everyone. During one mission, our AAR asset became unavailable for the crucial fuel we needed to allow us to travel the 400 nautical miles back to RAF Lossiemouth. Without this action from the AAR crew, we had to divert to a location that is closer. Whilst working out what the best plan was to be, another AAR asset appeared on our frequency offering to help, avoiding a four-jet diversion and subsequent knock-on impacts to the exercise. This crew offered us in action, the fuel we needed to make the flight

back home as planned." As Hall described, it is very important for crews to improvise when a tanker for some reason is not available; in this case, another tanker took initiative to take over the task to make sure the mission goes on. This is exactly the situation describing the power of interoperability in NATO.

Where tanker crews refueling the aircraft is an easy job, it can be difficult for fighter pilots during the missions. Especially at night, the challenge of refueling is mainly on the receiver's side. Flt Lt Hall explains how refueling works on the receiver's side during the missions. Hall: "Air-to-air Refuelling is one of the more difficult skills for a fighter pilot, but after plenty of practice on operations, it becomes a welcome break from a busy mission, where you can have ten minutes of tranquility during the intense missions, especially in busy exercise airspace like RAMSTEIN FLAG this is the case. What has been great on RAFL25 has been working with other nations' AAR assets. All procedures are ultimately standardized, but working with other nations builds your experience and flexibility in situations you may not have seen before." During RAFL25, Hall received fuel from multiple assets like the A330 MRTT of the MMU and the Canadian CC-150 *Polaris*, for example. Especially at night, the procedures help the pilots to find and connect safely and smoothly to the tanker. According to Hall, several items are important here: "Refueling at night presents a lot of challenges to a fighter pilot, firstly, you are more reliant on your aircraft systems to position yourself behind the tanker, as you can't see it anywhere near as well. Then you must move the aircraft more smoothly around the tanker to avoid becoming disoriented. After that, depending on the cloud and ambient light from the moon, the usual references to line up into the basket can either be very clear or almost non-existent at all. Therefore, it can take every bit of calm you can muster to keep level-headed behind the tanker. There is a saying that definitely applies with night refueling: "slow is smooth, smooth is fast". This is how it's done the fastest and most safely." For Hall, the refuelers played a vital role during these engagements in the exercise as they had to fly a huge distance every mission from and to Lossiemouth. Therefore, the tankers are assets that are a must during these scenarios.

Canadian Tanker Operations

During RAMSTEIN FLAG 2025, Canada was present with a CC-150 *Polaris* tanker. This aircraft is the Canadian version of the Airbus A310 MRTT tanker, which was also in use by the German Air Force and Spanish Air Force in the past. The Canadian tankers are assigned to the 437 (Transport) Squadron, 8 Wing at CFB Trenton. Major Scott Woods is currently the commander of the Canadian Air Task Force (ATF) during the deployment in the Netherlands. "Currently, I'm in charge of the air-to-air refueling detachment, the C2 contingent, and also the ENT officers. Our main goal here is to integrate with our NATO allies and provide the best service we can to make the missions operational and therefore successful with maximum efficiency as well. We brought our CC-150 *Polaris* to Eindhoven AB, and we've been able to participate in every single mission where our support was required. We are currently operating at 100% capacity, and we have delivered over 400,000 pounds of fuel to our allies". According to the Major, the Canadians can further enhance their skill set: "We don't have many opportunities back home to be integrated into such a large force exercise. Most of our AAR exercises take place in Canadian/American airspace with Canadian and American assets. The airspaces themselves aren't necessarily over land, and there is no mention of the assets therein. Gaining the experience here allows us to qualify our junior members, get some much-valued experience, and therefore we can roll that into our future plans, which allows us to integrate even more efficiently in the future".

Lieutenant Alex Campbell was part of Canada's participation in Exercise RAMSTEIN FLAG 2025. Campbell is a Flight Refueling Specialist (FRS) in the 437 Squadron and is currently deployed to the

The Royal Canadian Air Force operates two CC-150 *Polaris* aircraft, the Canadian designation for the Airbus A310 MRTT, in a tanker configuration. These aircraft are currently in the process of being replaced by the CC-330 *Husky*, the Canadian designation for the Airbus A330 MRTT
Corporal Luke Barrie, 8 Wing Imaging, RCAF

Netherlands in support of NATO's multinational aerial operations. Operating onboard the CC-150 *Polaris* tanker, Lt. Campbell plays a key role in enabling sustained air operations through aerial refueling missions during the RAFL25 missions. "I'm Lieutenant Alex Campbell, Flight Refueling Specialist. I've been qualified on the CC-150 *Polaris* since June of last year, and I currently have approximately 110 flight hours." Canada's contribution to the exercise includes the deployment of two full flight crews along with support personnel and maintenance engineers, representing a forward footprint of approximately 20 personnel. In total, the Canadian contingent includes over 40 members, with additional teams deployed across multiple locations, including air battle managers in Nieuw Milligen and command staff embedded with exercise control. Lt. Campbell emphasizes the scale and complexity during RAMSTEIN FLAG in comparison to other exercises he joined: "Most of our previous exercises are conducted within Canada or the United States. RAMSTEIN FLAG represents a broader, NATO-level operation involving multiple partner nations, which significantly expands the operational environment." The exercise involves multiple international aircraft types. So far, Lt. Campbell and his team have provided aerial refueling support to Spanish EF-18 *Hornets*, Swedish JAS-39 *Gripens*, French Rafales B/C, and Finnish F/A-18 *Hornets*, utilizing the CC-150 *Polaris*'s proven drogue refueling system.

How Canada Prepared Their Deployment

The planning phase for RAMSTEIN FLAG 2025 began in summer 2024, with representatives from 437 Squadron attending key planning and coordination conferences. Campbell explains: "We were involved in the main planning conference and the final coordination conference. I can't confirm whether we attended the initial planning session, but operational-level involvement has been ongoing for at least ten months." Preparation for the exercise did not require

All photos NATO ACC/Arnaud Chamberlin

A Rafale fighter from the French Air and Space Force prepares to take on fuel *NATO*

major deviations from standard training programs, as the squadron maintains standard NATO procedures and clearance protocols with all current receiving nations. Additionally, Campbell adds how they approach new receiver types: "All the aircraft we are supporting have been previously refueled in past operations. For new receivers, we follow an established clearance process." Although the exercise is operational in nature, it also serves as a training platform: "Personnel recently qualified on the CC-150 will participate during this deployment. Any member who is still under training is paired with a qualified instructor. This ensures operational integrity while supporting capability development." Exercise coordination is supported by the presence of liaison officers from each participating unit like the MMU here in Eindhoven. Canada currently has two liaison officers assigned to the exercise control center to ensure real-time communication and synchronization between tankers, fighters, and command elements: "These officers interface directly with their multinational counterparts, then relay operational updates to flight crews in the field."

Lt. Campbell confirmed that the CC-150 Polaris is supported by deployed Aircraft Maintenance Engineers (AME), with contingency options in place: "Our engineers are capable of addressing a wide range of technical issues on location. If the aircraft cannot be repaired in theater, additional assets from home can be deployed. Aerial refueling is a critical component of the exercise, and we make every effort to ensure continuity of air-to-air refueling (AAR), but of course, we can only ensure this to the best of our ability." Following the conclusion of RAMSTEIN FLAG, the squadron will engage in a structured review process. Finally, Campbell added his first conclusion: "We conduct verbal debriefs throughout the exercise and compile a comprehensive 'lessons learned' report upon completion. This is shared with the Air Force Command and used internally for continuous improvement." Lieutenant Campbell's experience at RAMSTEIN FLAG 2025 underscores the operational readiness, interoperability, and professionalism of the Royal Canadian Air Force in NATO operations. With effective planning, multinational coordination, and the integration of both seasoned and developing personnel, Canada continues to demonstrate its capability and commitment to collective defense.

From *Polaris* to *Husky*

In the upcoming years, the CC-150 *Polaris* will be replaced by the CC-330 *Husky*, which is the Canadian version of the Airbus A330 MRTT, which is also in use at the colleagues of the MMU at Eindhoven AB and Cologne AB. Major Woods and Lieutenant Campbell, and the rest of the crew, saw the A330 MRTT in action when they flew together with the colleagues of the MMU in the tanker cells during RAMSTEIN FLAG. This corporation showed how well the Canadian forces are integrated into the European theater of operations. Major Woods cannot wait until the CC-330 Husky is fully integrated in the Canadian Air Force: "Well, about the A330 MRTT, it is a very capable aircraft, and the Australians use it as well, and we're quite close to them. Therefore, we are learning from what their experience has been. Next to this, we had during RAMSTEIN FLAG also a great opportunity to learn from our MMU colleagues who use a large fleet of these tankers nowadays." The first airframes are already delivered to the Canadian fleet, and one even showed up at Eindhoven already to support the mission as a transport plane. The unit is still in the buildup phase with this type, according to Woods: "We are still processing and building our standard operating procedures, but we will be relying on how they've done their job before. It allows us to best integrate as quickly as possible to utilize this magnificent aircraft. And the main thing, the Polaris just now is only a probe-and-drogue tanker. We are only able to service the aircraft that are compatible at this time. The new aircraft is going to be probe-and-drogue and boom capable. After integrating the Husky in our fleet, we will be able to service any possible aircraft type that's out there in NATO and further. This is a real step forward for the Canadian forces."

The future looks bright for the Canadian tanker fleet. A new very capable aircraft is entering service with which the RCAF can continue its mission together with the dedication of their highly motivated personnel. Major Woods concluded that RAFL25 was a great success for the Canadian Forces in cooperation with the MMU: "The support provided was outstanding and allowed us to participate in two scenarios per day. We were the only tanker in the whole exercise that flew twice a day." During RAFL25, the Canadian offloaded 665,000 lbs of fuel to other assets, which is a huge achievement.

All images this page Corporal Luke Barrie, 8 Wing Imaging, RCAF

Top: While the basic cockpit design dates back to the early 1980s, it underwent a significant avionics upgrade in 2013. As a result, the core cockpit layout is approximately 42 years old, but the avionics hardware and systems are about 12 years old and meet modern standards for navigation, communication, and air traffic management

Bottom: The CC-150 Polaris offers a functional but legacy-level AAR operator station – adequate for manual operations but lacking automation, advanced vision, or digital interface

French Air Force Rafala B assigned to Escadron de Chasse et d'Expérimentation 1/30 *Côte d'Argent* (ECE 01.030) based at BA 118 Mont-de-Marsan *NATO ACC/Arnaud Chamberlin*

A Rafale B fighter from the French Air Force's ECE 01.030 *Côte d'Argent* takes on fuel *NATO ACC/Arnaud Chamberlin*

Turkish Tanker Operations

During RAMSTEIN FLAG 2025, the Turkish Air Force deployed a Boeing KC-135 to RAF Mildenhall AB, England, UK. Major Hüseyin ÖZDEMİR of the 101st Air-to-Air Refueling Squadron from Adana İncirlik AB, flies as an Instructor Pilot on the KC-135R tanker aircraft during the exercise. With over 19 years of operational flying experience and approximately 4,200 flight hours, he has been involved in numerous missions, training programs, and international operations. The Turkish tanker detachment consisted of eleven persons, of whom six were KC-135 pilots.

The role of the Turkish KC-135 was to serve as a critical enabler, providing air-to-air refueling support to all airborne assets. This capability is essential to extend the operational range, enhance the mobility, and improve the forward-area operational effectiveness of the participating aircraft. By facilitating extended missions, they ensure the sustainability and strategic flexibility required to achieve mission success across a wide operational theatre.

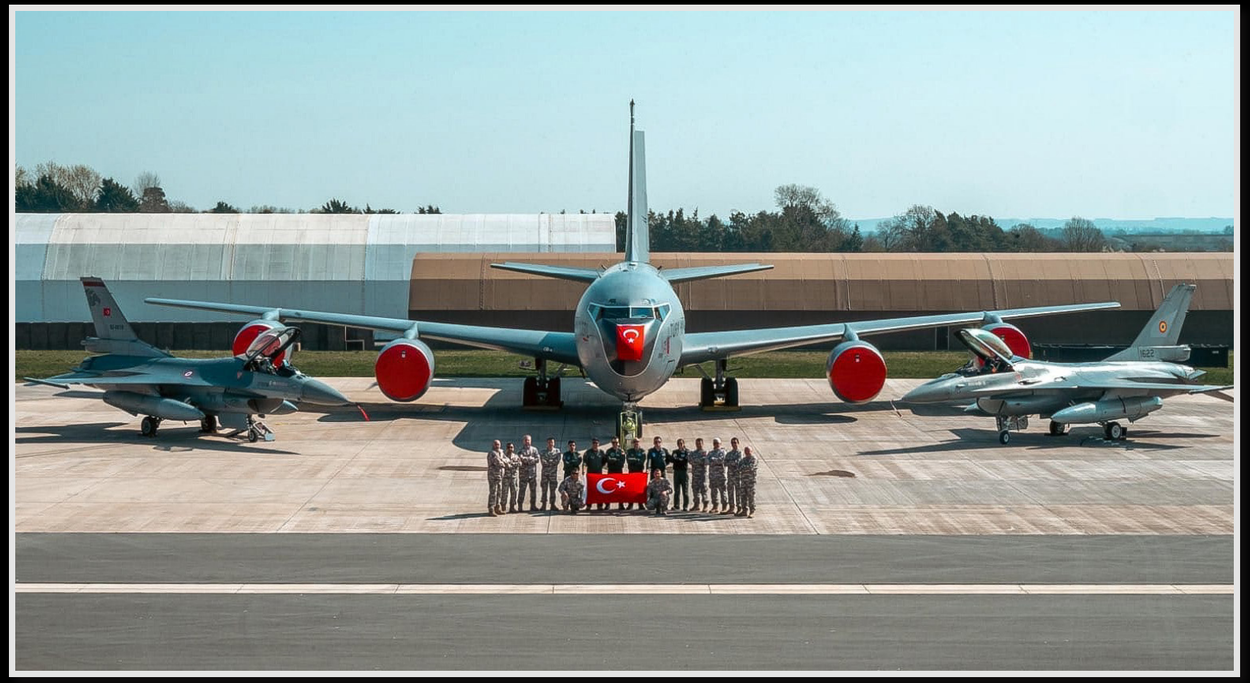
In this exercise, the Turkish KC-135 has several key objectives, but the most critical aspect is ensuring the mission readiness across all facets of our personnel. This includes the operational readiness of our ground planners, maintenance teams, boom operators, and pilots. The exercise commences with a complex planning phase, followed by meticulous execution, making the coordination and preparation of all involved personnel essential for mission success. Everyone's training and preparedness are vital to the overall effectiveness of the operation. Additionally, one of the significant milestones of this exercise is the successful integration of the Danish F-35 aircraft, which follows an extensive clearance process. This represents a crucial development for the Turkish Air Force to continue to enhance interoperability with allied forces. Looking ahead, they aim to expand this exercise further by integrating aircraft from other nations, fostering a broader range of multinational cooperation and operational experience.

Major ÖZDEMİR explains the lessons learned during this exercise: "I believe that all of us participating in this exercise have gained invaluable lessons that will contribute to our personal and professional development. Given that every phase of the operation is time-sensitive, all personnel have learned to effectively manage their responsibilities and organize themselves under pressure. This experience has underscored the importance of adaptability, coordination, and efficiency in high-stakes environments. I am confident that the insights and skills acquired during this exercise will not only enhance the overall readiness and performance of our squadron in future missions but also serve to strengthen the legacy and operational excellence of both our squadron and the broader Air Force. The lessons learned here will undoubtedly shape the continued success of our unit for years to come, ensuring its preparedness for increasingly complex and dynamic challenges." Major ÖZDEMİR also explained the knowledge that he brought into the exercise: "During this training, I brought several key elements of knowledge and experience to share with my colleagues. First and foremost, I emphasized the importance of thorough preparation. A well-prepared team is essential for executing complex operations smoothly, and I made sure to highlight the critical steps in planning and executing every mission. Additionally, I shared effective briefing techniques, ensuring that communication during missions is clear, concise, and precise. This is crucial for the success of operations, especially when coordinating with multiple team members or units under high-pressure conditions. Another important aspect I contributed to was how to effectively work with personnel from different countries and cultures. Understanding how to communicate and collaborate across language barriers and diverse operational approaches is vital for the success of multinational exercises. I shared strategies for adapting to these differences and fostering effective teamwork despite the challenges. Finally, I encouraged the team to think beyond just the technical aspects of flying by adopting the concept of 'flying beyond the aircraft.' This involves planning each step and preparing checklists in advance, ensuring a broader understanding of the mission and the roles of each team member. This approach enhances situational awareness, adaptability, and mission success." As an air-air-refueling specialist, Major ÖZDEMİR explains the refueling from the refueler perspective: "From a tanker pilot perspective, the refueling procedure may appear straightforward, but in reality, it carries significant complexity and responsibility. While it may seem like a simple process from a high-level viewpoint – where the jet is fueled and can continue its mission – there is much more that we, as tanker pilots, must manage. Our role is not only to ensure that the aircraft is refueled efficiently but also to enhance the operational capabilities of the receiving aircraft, thereby contributing to the overall mission success. The pressure on our shoulders is always constant."

And as a large part of the RamsteinFlag exercise was held after sunset, he explained the night refueling difficulties compared to daytime refueling: "Air-to-air refueling, whether conducted during the

The Turkish Air Force KC-135R, assigned to 101 Filo at Incirlik AB, was deployed to RAF Mildenhall for RAMSTEIN FLAG 2025 *U.S. Air Force photo by Tech. Sgt. Jessica Avallone*

day or at night, is an essential part of our operations. However, night refueling introduces specific challenges, particularly when it comes to maintaining situational awareness. Unlike daytime operations, where visual cues from the environment are more readily available, night refueling often occurs in conditions where it is more difficult to maintain a clear understanding of position and orientation, especially in areas with minimal light or over open water. The risk of losing situational awareness or experiencing disorientation, such as vertigo, is heightened under these circumstances. Pilots must rely heavily on instruments and their training to ensure the tanker and receiving aircraft are properly aligned. At night, especially in a starry sky or dark environments, it becomes even more critical to stay focused on every step of the procedure to ensure both aircraft remain properly positioned. The cockpit becomes the focal point for all, as pilots must guide the receiving aircraft into alignment, relying on their training and instruments to avoid any loss of orientation. In exercises like RAMSTEIN FLAG, where night operations are a primary focus, these challenges are especially significant, demanding the utmost precision and heightened awareness to successfully complete the mission." In the end, Major ÖZDEMİR summarizes his remarks about the exercise: "I believe that all Allies participating in RAMSTEIN FLAG have successfully met their training objectives. This exercise has provided an excellent platform for enhancing interoperability, refining tactics, and improving the operational readiness of all involved units. The collaborative environment fostered during the exercise is invaluable for strengthening partnerships and ensuring that each nation is better prepared for future multinational missions. Looking ahead, I sincerely hope we will have the opportunity to participate in future exercises together. To ensure even greater success and achieve even more from these exercises, it is crucial that we execute operations with assets positioned closer to the area of activity. This proximity will allow for more efficient coordination and more effective execution, ultimately improving the overall success of the mission. The lessons learned here will undoubtedly contribute to our collective readiness for future challenges."



Insets: A Royal Danish Air Force F-35A *Lightning II* approaches the Turkish Air Force KC-135R and moves into contact position directly beneath the tanker's boom. The boom operator then extends and guides the boom into the receptacle, establishing a secure connection. Fuel transfer begins once the connection is confirmed, with the boom operator monitoring hose alignment, receptacle engagement, and fuel flow throughout the process *NATO ACC*

Right: Im addition to the KC-135R, the Turkish Air also participated in RAMSTEIN FLAG with F-16 *Fighting Falcon* fighter aircraft, deployed to RAF Fairford *Turkish Air Force*

Main: U.S. Air Force KC-135R, assigned to 351 ARS/100 ARW a RAF Mildenhall. This particular aircraft entered service with the U.S. Air Force back in 1957

Left: Flght deck of the KC-135R

Right: Compared to moder tanker aircraft, the boom operator has direct visual contact to the recceiving aircraft

All images this page U.S. Air Force/Senior Airman Christopher Campbell

Main: **A Turkish Air Force F-16D *Fighting Falcon* descends after receiving fuel from a U.S. Air Force KC-135R *Stratotanker* from the 100th Air Refueling Wing (100 ARW), RAF Mildenhall**

Inset: **A Turkish Air Force F-16C *Fighting Falcon* flies alongside a KC-135R from 100 ARW**

All images this page U.S. Air Force/Senior Airman Christopher Campbell

U.S. Air Force/Senior Airman Christopher Campbell

NATO ACC/Arnaud Chamberlin

U.S. Air Force/Senior Airman Christopher Campbell

Above left: A Romanian Air Force F-16AM *Fighting Falcon*, assigned to Escadrila 48 Vânatoare, approaches a KC-135 *Stratotanker* from 100 ARW, RAF Mildenhall, England, for aerial refueling

Right and above: Romanian Air Force F-16AM *Fighting Falcon*(s), assigned to Escadrila 48 Vânatoare, flying alongside a KC-135 Stratotanker from 100 ARW

Hellennic Air Force F-16C *Fighting Falcon* assignd to 343 Mira at Souda AB. The aircraft is updated to the latest Block 72V standard and is shown here with conformal fuel tanks (CFT) attached to the upper wing *NATO ACC/Arnaud Chamberlin*

Above: The Hellenic Air Force participated with the F-16C/D *Fighting Falcon* in RAMSTEIN FLAG out of Skrydstrup AB in Denmark. All F-16's are updated to Block 72V

Left: The F-16C is loaded with one IR-guided AIM-9 *Sidewinder* air-to-air missile at each wing-tip and two RADAR-guided AIM-120 AMRAAMs (Advanced Medium-Range Air-to-Air Missile) under the wings

Right: F-16D *Fighting Falcon* with conformal fuel tanks (CFT) and an additonal fuel tank with a capacity of 410gal (1,552 liter) attached under the fuselage

All images this page NATO ACC/Arnaud Chamberlin

All images this page NATO ACC/Arnaud Chamberlin

The Royal Danish Air Force participated for the first time with the F-35A *Lightning II* in an international exercise. The aircraft were operating out of their home base at Skrydstrup and are here photographed flying alongside a U.S. Air Force KC-135R tanker of 100 ARW

NATO ACC/Arnaud Chamberlin

Another participant in Exercise RAMSTEIN FLAG 2025 with the 5th-generation F-35A *Lightning II* fighter aircraft was the U.S. Air Force with its RAF Lakenheath based 48th Fighter Wing *U.S. Air Force/Tech. Sgt. Jesenia Landaverde*

A U.S. Air Force F-35 *Lightning II* from the 48th FW receives fuel from a KC-135R *Stratotanker* from the 100th ARW *U.S. Air Force/Tech. Sgt. Jesenia Landaverde*

A Royal Netherlands Air Force F-35 *Lightning II* receives fuel from a U.S. Air Force KC-135 *Stratotanker* from the 100th Air Refueling Wing *U.S. Air Force/Tech. Sgt. Jesenia Landaverde*

RAMSTEIN FLAG 2025

PART THREE

SKRYDSTRUP AIRBASE

ARTICLE BY RALF JAHNKE WITH **INTERVIEWS** BY JOIS VAN BOVEN AND ALEX VAN NOIJE | **PHOTOS** BY RALF JAHNKE UNLESS NOTED

During Exercise RAMSTEIN FLAG 2025, Fighter Wing Skrydstrup hosted the Italian and Hungarian contingents. This also marked a significant milestone for the Royal Danish Air Force, which participated for the first time with its F-35A *Lightning II* fighter aircraft in a NATO exercise. A four-ship formation of Danish F-35As returns to Skrydstrup AB after having successfully completed a tactical sortie to the training area over the North Sea

Between 31 March and 11 April 2025, the NATO exercise RAMSTEIN FLAG 2025 took place in Northern Europe. The Netherlands hosted the exercise at its base in Leeuwarden. More than 90 participating aircraft were distributed across twelve bases throughout Europe, including the Danish F-35A base at Skrydstrup.

The Italian Air Force (Aeronautica Militare) deployed some very interesting aircraft to Skrydstrup AB. The 6th Wing (6° Stormo) from Ghedi, Northern Italy, sent three F-35A *Lightning II* 5th-generation fighter aircraft. An E-550A CAEW (Conformal Airborne Early Warning) from Pratica di Mare AB provided surveillance of the exercise area. Personnel and material transport were handled by a KC-767A and a C-130J *Hercules*.

The Hungarian Air Force (Magyar Légierő) deployed five JAS-39C/D *Gripen* fighter jets from 101 Squadron, Kecskemét. During the first week, the *Gripens* also conducted daytime sorties together with the Royal Danish Air Force (RDAF). Support assets included a KC-390 *Millenium*, an A-319, and a Falcon X7.

Two to three waves of aircraft were launched each day from Denmark, including night operations. Fighter Wing Skrydstrup deployed four of its F-35A *Lightning II* aircraft per wave. This also marked the first time that the Danish F-35s participated in a major exercise. During the large-scale NATO exercise RAMSTEIN FLAG participating nations simulated various threat scenarios.

In October 2023, the RDAF received its first four F-35A *Lightning II* fighters to replace its aging F-16AM/BM fleet. Unfortunately, the F-35 delivery program stalled due to issues with Technology Refresh 3 updates. The squadron currently operates eleven F-35As. Further deliveries, totaling eight additional F-35As, are expected within this year. Since April, the F-35A has taken over 24/7 QRA (Quick Reaction Alert) duties from the F-16.

In parallel, the transfer of F-16 aircraft to Ukraine is ongoing. According to Defense Minister Poulsen, twelve F-16AM/BMs have already been handed over to the Ukrainian Air Force. In total, the RDAF plans to transfer nineteen of these aircraft. Additionally, Fighter Wing Skrydstrup has provided training for Ukrainian pilots and aircraft technicians, with these training programs now successfully completed.

The remaining twenty-four F-16s have been approved by the United States for sale to the Fuerza Aérea Argentina for USD 941 million. However, delivery to South America will not begin until 2026. One F-16BM, serial number ET-210, was already picked up last year by the Argentine delegation using a C-130 in Aalborg. This two-seater aircraft is now being used for training purposes and was formally presented to the public in February at Tandil AB, south of Buenos Aires.

Top: **The F-35A L-003 takes off into the skies of Denmark. Missile carriers are mounted on the outboard stations. This mounting certainly compromises the new fighter's stealth capabilities, but it allows for the use of the Fighting Falcon's existing missile inventory**

Bottom: **A low takeoff of the L-008 from Skrydstrup Air Base. The F-35A is equipped with several powerful sensors, data links, and user interfaces. The combined capabilities of these technologies are designed to detect and engage enemy forces at great distances, even before the F-35 itself is detected. This provides a decisive advantage when engaging with the enemy, especially over the Baltic Sea**

Main: The 727th Squadron currently operates 15 F-35A 5th-generation fighter aircraft. More aircraft are scheduled to be delivered this year from the Lockheed Martin facility in Fort Worth, Texas. Four aircraft participated in RAMSTEIN FLAG 25 daily, in two rounds

Top: Landing of the L-010 shortly before sunset. This aircraft is equipped with external weapon pylons mounted under the wings

Bottom: Landing of L-004 late in the evening. This F-35A arrived at Skrydstrup AB from Luke AFB just three months earlier

Danish Host and Sharing Knowledge

Interview with Col. Kim "IME" Jensen, Royal Danish AF

Colonel Kim "IME" Jensen is a former LockheedMartin F-16 pilot who started to fly the F-16 in 1997, and in 2023, he converted to the LockheedMartin F-35C Lightning II. He has been the Wing Commander at Skrydstrup AB in Denmark since 2022. Before becoming the Skrydstrup Wing Commander, he flew in various squadrons in Denmark and in the US. Skrydstrup AB hosted both Italian F-35s and an E-550A (a modified Gulfstream 550 business jet) as well as Hungarian Gripen, so the Danish Air Force have played a huge role in the Host Nation Support part of the exercise. Besides that, the Danish F-35s have participated in the exercise, which is the first major exercise for the Danish F-35s. As the Danish Air Force is still in the build up phase with the F-35 Lightning II, it is really important for them to show that they now have the capability to integrate and operate their F-35s with the allies in NATO. At the same time, they have trained the Host Nation Support capabilities, and they have been put to the test during this exercise. The Danish Air Force was happy with the outcome. The Danish Air Force has a long history with exercises with NATO Allies flying the the F-16, so learning how to take that knowledge and do the same in a new way with the F-35s has been a huge step in the Danish implementation of the F-35 Lightning II.

Colonel Jensen explains the knowledge that the Danish Air Force brought to the exercise: "We hope that our guests here on the base have benefited from the Danish way of providing Host Nation Support. Even though the F-35 is still a fairly new platform for us, we are able to integrate the huge fighter experience and large force employment knowledge we have with the operational goals for the exercise. It has been great watching how the Italians have deployed with their F-35s. We will take notes on this and bring it back to our own planning when we have our first deployment with our F-35s." On the question of explaining the differences between the F-16 and the F-35, Colonel Jensen said: "The obvious difference is the age and modernization of the two jets. We often use the old-car-new-car analogy when explaining the difference. The F-16 is like your first car, a lot of the systems are analog, and as a pilot, you have to put together the whole pictures from different elements the jets are giving you. The F-35 is like the newest electric car, it's simpler and everything in the jet works together to give the pilot the most put together picture of the situation. The F-35 is a great platform for communication with everything from maritime units to ground units and other airborne units. Exercising the Fighter Integration between 4th generation and 5th generation aircraft has been an emphasis during the exercise. Even though they are very different platforms, they complement each other very well." A last remark about the Ramstein Flag exercise by Colonel Jensen: "It has been great having a big exercise at Skrydstrup again, and it has been an honor to show what we as Danes and the Air Force can offer our allies in NATO." A final quote by Colonel Jensen: "Stronger Together"

A close-up of the underside of a Royal Danish Air Force F-35A reveals national insignia rendered in full color – a distinctive feature that sets it apart from the typically subdued markings found across NATO's F-35 fleet. This design choice was a deliberate request by the Danish Ministry of Defence during the aircraft's procurement from the United States

The aircraft is equipped with the Electro-Optical Targeting System (EOTS), an advanced sensor suite that enables precision targeting for both air-to-air and air-to-ground engagements. Seamlessly embedded ahead of the nose landing gear bay, the low-observable EOTS is shielded by a durable sapphire window and integrated via a high-speed fiber-optic interface with the aircraft's central mission computer

This system provides pilots with real-time target acquisition, reconnaissance capabilities, and precision guidance for laser- and GPS-aided munitions, enhancing situational awareness and lethality across a broad spectrum of operational scenarios

An Italian Air Force G-550A CAEW aircraft arrived from Pratica Di Mare AB to monitor the training area

The CAEW aircraft (Conformal Airborne Early Warning) is the most advanced multi-sensor system with functions of airborne surveillance, command, control, and communications in service with European air forces

Take-off of G-550A MM62293/14-11 for a surveillance mission during RAMSTEIN FLAG 2025. In each mission cycle, the aircraft was the first to depart and the last to return. Since 2016, the 14th Stormo has had two CAEW aircraft

Top:: The Italian Air Force has deployed three F-35A *Lightning II* aircraft assined to 6° Stormo at Ghedi AB to Skrydstrup in Denmark. Aircraft MM7371, with the tail number 6-06, was seen taking off from the Skrydstrup AB as part of the deployment. 102° Gruppo, which is also stationed at Ghedi AB, is currently transitioning from the Tornado IDS strike aircraft to the fifth-generation F-35A *Lightning II*

Left: During final approach to Runway 28, F-35A MM7371, tail number 6-06, executed a go-around maneuver. The landing gear was promptly retracted as the aircraft repositioned for the next traffic pattern

Right: F-35A *Lightning II* MM7371, tail number 6-06, conducted its final approach during the late evening

F-35A Lightning II MM7367/6-02 departed for a mission to the exercise area. The aircraft is assigned to 102° Gruppo of 6° Stormo, based at Ghedi AB. The 6° Stormo's emblem is the Red Devil, adorned with a lightning bolt. This symbolises the unit's aggressive spirit and operational readiness

Lightning II MM7366/6-01 on final approach. The Italians took part in two flying sessions per day: one in the late afternoon and one at night

Four KC-767As of the Aeronautica Militare are assigned to the 8th Gruppo of the 14th Stormo, based in Pratica di Mare. MM62228/14-03 transported the Italian deployment personnel to Denmark.

Hungary as a Small but Lethal Force

Interview with Lt. Col. Ványik, Hungarian Air Force

Lieutenant Colonel Attila Ványik (OF-4) is a JAS-39 Gripen instructor and maintenance test pilot in the Hungarian Defense Forces (HDF). Attila is the Commanding Officer of the Tactical Training Squadron of the 101st Aviation Wing at Kecskemét AB. Over the course of his service, he accumulated more than 2,500 flight hours across a variety of aircraft. "My flying experience includes piston engine trainers such as the Yak-52, several jet trainer aircraft, including the Aero L-39ZO Albatross and the BAE CT-155 Hawk, which I flew during my training at the NATO Flying Training in Canada (NFTC) program. I completed my conversion training on the JAS-39A/B Gripen in Sweden. Currently, I fly and instruct on the JAS39 C/D Gripen in Hungary." Attila himself was also flying during the exercise, and as a commanding officer, he could give a broad view of the Hungarian interests. The Hungarian detachment was deployed to Skrydstrup in Denmark and consisted of 49 personnel, including 13 Gripen pilots. The Hungarian Defense Forces (HDF) also provided one Liaison Officer delegated to Leeuwarden AB. The HDF participated with five JAS-39C/D Gripen tactical fighter jets in the exercise. During the training event, they flew sorties in multinational formations and even conducted missions together with 5th-generation fighters like the F-35A. The role of the Hungarian Gripens was primarily focused on flying air-to-air missions, of which most were conducted as part of Composite Air Operations (COMAO). According to Attila, air-to-air training was the main focus throughout the exercise: "The air-to-air role is the primary mission of the fighter force of the Hungarian Air Force. Our training included counter A2/AD (Anti-Access/Area Denial) operations, as well as APCLO missions, which means contributing air power to support counter-land operations. RAMSTEIN FLAG is more than a simple training; it is a strong demonstration of NATO's collective will, flexibility, and air deterrence posture".

The exercise provided an ideal training environment for the fighter community to cooperate and exchange ideas, manage tactical concerns, in order to produce effective tactical plans in the scope of NATO. Attila was very happy to see how many valuable lessons his crew learned during the exercise: "During the exercise, our detachment gained valuable experience in planning and executing COMAO missions according to NATO standards and procedures. Operating in an international environment also strengthened our

The Gripen fighter jet is considered particularly easy to maintain and can operate from temporary runways. This Hungarian Air Force JAS-39C *Gripen*, No. 36, is on its final approach to land shortly before sunset

Main: Arrival of a pair of Gripen fighter aircraft, Nos. 30 and 43. Note the painted cockpit silhouette under the front part of the fuselage

Inset: The Hungarian Air Force provided the largest contingent at Skrydstrup AB. A total of four JAS-39Cs and one JAS-39D *Gripen* assigned to the 1st Tactical Air Squadron *Puma* at Kecskemét AB were deployed to Denmark

ability to work effectively as a team for a common goal. We had numerous opportunities to become familiar with the latest NATO standards, which are essential for maintaining interoperability. Additionally, the exercise allowed us to reflect on our performance, and we were able to learn from our weaknesses while we were also building up on our strengths." Next to learning objectives, the Hungarian also brought knowledge. As a small country, they rely internally, they rely on a strong cooperation and tactical leadership, says Attila: "Our four-ship cooperation is a good example of NATO's wide tactical execution spectrum given to its multinational composition. We always emphasize the importance of mutual support with tactical flexibility within the elements. One of the key takeaways for our unit was observing how 5th generation fighters are integrated into operations alongside 4+ generation assets like the Hungarian Gripens. This kind of cooperation offers a mutual learning opportunity for all involved. Additionally, training in an environment that includes real-time ground-based air defense emitters provided a realistic and challenging operational tempo. We also recognized that in the area of Integrated Planning and Employment, we still have room for improvement, particularly after several years of relying on NATO's "4T" planning method. These insights will be instrumental in refining our procedures and capabilities for the future. RAMSTEIN FLAG is an essential exercise for all NATO member states, as it provides a rare opportunity to train together in a complex and realistic multinational environment. It not only develops our tactical skills but also enhances cooperation and interoperability across allied forces. I truly hope we can continue this collaboration in future exercises, as it benefits all participating nations. For this exercise, I would say; "We are stronger together!". When it comes to the traditional motto of our Puma Squadron, "Led by courage, escorted by luck".

Main: **The twin-seat JAS-39D Gripen was operated with a single crew member during the mission. Although designated as a trainer variant, the JAS-39D is fully combat-capable and can perform operational roles equivalent to the single-seat Gripen fighters. The Hungarian Air Force maintains only two of these training-configured aircraft in its fleet**

Inset: **Approach of two *Gripen* fighter jets in different configurations**

Main: Circuit with break to initiate landing at Skrydstrup. The Hungarian Air Force will expand its Gripen fleet with four additional JAS-39C fighter aircraft starting in 2026

Left & middle: Arrival at Skrydstrup AB of a single-seater JAS-39C, no.34, and a two-seater JAS-39D, no. 43, on the day of deployment

Right: Hungarian Air Foce JAS-39C no. 35 returning to Skrydstrup from a RAMSTEIN FLAG mission

Main: Following the transfer of 19 F-16AM/BMs to the Ukrainian Air Force, the RDAF still has a remaining inventory of 24 Fighting Falcons. Two F-16AMs, numbered E-604 and E-609, are in the new Have Glass V, carrying a full weapons load livery and operating in the air circuit with full towing capacity

Inset: Final approach of F-16AM No. E-604 and E-609 after a mission over the Baltic Sea

F-16AMs, E-024, ▲ and E-016 ▼ are outfitted with provisional markings applied as adhesive decals rather than permanent painted insignia. Such markings are commonly seen on aircraft in transitional phases, either en route to operational deployment or pending formal handover to a new air force, in ths case the Urkainian Air Force

Two-seat F-16BM no. ET-198 during a takeoff ▲
F-16AM E-598, designated for delivery to Ukraine, was observed with temporary adhesive markings, which are already beginning to peel. This aircraft is part of the ongoing transfer program and reflects the rapid operational preparation underway for integration into Ukrainian Air Force service ▼

During the RAMSTEIN FLAG Exercise, the hosts performed a solo demonstration flight with their F-16AM No. E-006 in a special livery. Demonstration pilot Captain Troels "TEO" Vang demonstrated the *Fighting Falcon*'s impressive capabilities to guests from Italy and Hungary

Left: Pilot "TEO" showcased the full performance envelope of his F-16AM during the aerial demonstration. With the afterburner engaged and visible vapor trails - forming in humid air and under high-G maneuvers - the display delivered a visually striking and dynamic performance

Right: This year, there will be four official demonstrations in the United Kingdom, Norway, and Denmark. Due to the sale of the remaining 24 F-16AM/BMs to the Argentine Air Force, this will be the final demonstration season. The handover is scheduled to be officially completed in 2027

F-16AM Block 20, No. E-006, was given this new Dannebrog livery in 2024, becoming a symbol of Danish national pride. In addition to the Dannebrog livery, the design also features the Falcon's half-century anniversary on the underside and tail. A very successful combination in a special livery. The aircraft won the 'Best Livery Trophy' at this year's RIAT in Fairford!

Pilot "TEO," as he is called, comes in for a landing with his colorful F-16AM after the solo display over Skrydstrup AB

RAMSTEIN FLAG 2025

PART FOUR

RAF FAIRFORD

ARTICLE BY RALF PETER WATLER
INTERVIEWS BY JOIS VAN BOVEN AND ALEX VAN NOIJE
PHOTOS AS NOTED

RAF Fairford, located in Gloucestershire, United Kingdom, played an important role for Exercise RAMSTEIN FLAG 2025 (RAFL25) in hosting tactical fighter deployments and aerial refueling assets.

Among the RAFL25 participnat were the Turkish Air Force and the Romanian Air Force, both of which deployed multi-role fighter aircraft and support platforms to Fairford, enhancing NATO's operational diversity and tactical flexibility.

The Turkish Air Force deployed four F-16C *Fighting Falcon*s and one F-16D, supported by an A400M *Atlas* transport aircraft and a KC-135R *Stratotanker*. Turkish pilots executed a wide range of missions including defensive counter-air (DCA), suppression of enemy air defenses (SEAD), and joint strike operations. Their KC-135R provided critical aerial refueling support to both Turkish and allied aircraft, enabling extended sortie durations and increased mission tempo. Turkish ground crews worked in close coordination with U.S. and NATO personnel, demonstrating high levels of technical proficiency and logistical integration.

The Romanian Air Force contributed three F-16AM fighters, a C-130H *Hercules*, and a C-27J *Spartan*. Romanian F-16s participated in composite air operations (COMAO), close air support (CAS), and dynamic targeting missions. Their transport aircraft supported intra-theater lift and resupply operations, ensuring sustained logistics flow between forward operating bases. Romanian airmen showcased strong interoperability, particularly in mission planning and sortie generation alongside U.S., Turkish, and British counterparts.

In preparation for RAFL25, RAF Fairford underwent significant infrastructure upgrades to meet NATO fighter operation standards. Most notably, the Mobile Aircraft Arresting System (MAAS) was installed and certified for the first time at the base. The MAAS, deployed by the 435th Construction and Training Squadron from Ramstein AB with support from the 501st Combat Support Wing, provides emergency

landing capability for tailhook-equipped aircraft. Its installation was essential for enabling fighter operations and ensuring RAF Fairford's role as a diversion airfield during contingencies.

The exercise also marked a shift in RAF Fairford's operational profile. Traditionally used for U.S. Air Force bomber deployments – including B-52 *Stratofortress* missions from Minot AFB – the base transitioned to support tactical fighter operations for the first time since 2008. This required coordinated efforts from the 420th Air Base Squadron, the 100th and 48th Civil Engineer Squadrons, and NATO logistics teams to ensure full mission capability.

Throughout RAFL25, allied maintainers and aircrew demonstrated high levels of interoperability, conducting joint refueling, sortie generation, and mission planning. Romanian and Turkish personnel worked side-by-side with U.S. forces to service aircraft, manage flight operations, and execute coordinated air missions. The exercise validated NATO's ability to rapidly deploy and sustain multi-national airpower under realistic combat conditions.

In conclusion, Exercise RAMSTEIN FLAG 2025 at RAF Fairford showcased the strategic flexibility of NATO's air forces and the operational readiness of its infrastructure. The successful integration of fighter assets, support aircraft, and emergency systems underscored the alliance's commitment to collective defense and rapid response capabilities across the European theater.

Main: **Three Romanian Air Force F-16AM *Fighting Falcons* taxi on the flight line at RAF Fairford**
Insets: **Romanian Air Force F-16AM *Fighting Falcons* prepare to land at RAF Fairford**
U.S. Air Force/Tech. Sgt. Jessica Avallone

A Romanian Air Force F-16AM *Fighting Falcon* taxis on the flight line at RAF Fairford
U.S. Air Force/Tech. Sgt. Jessica Avallone

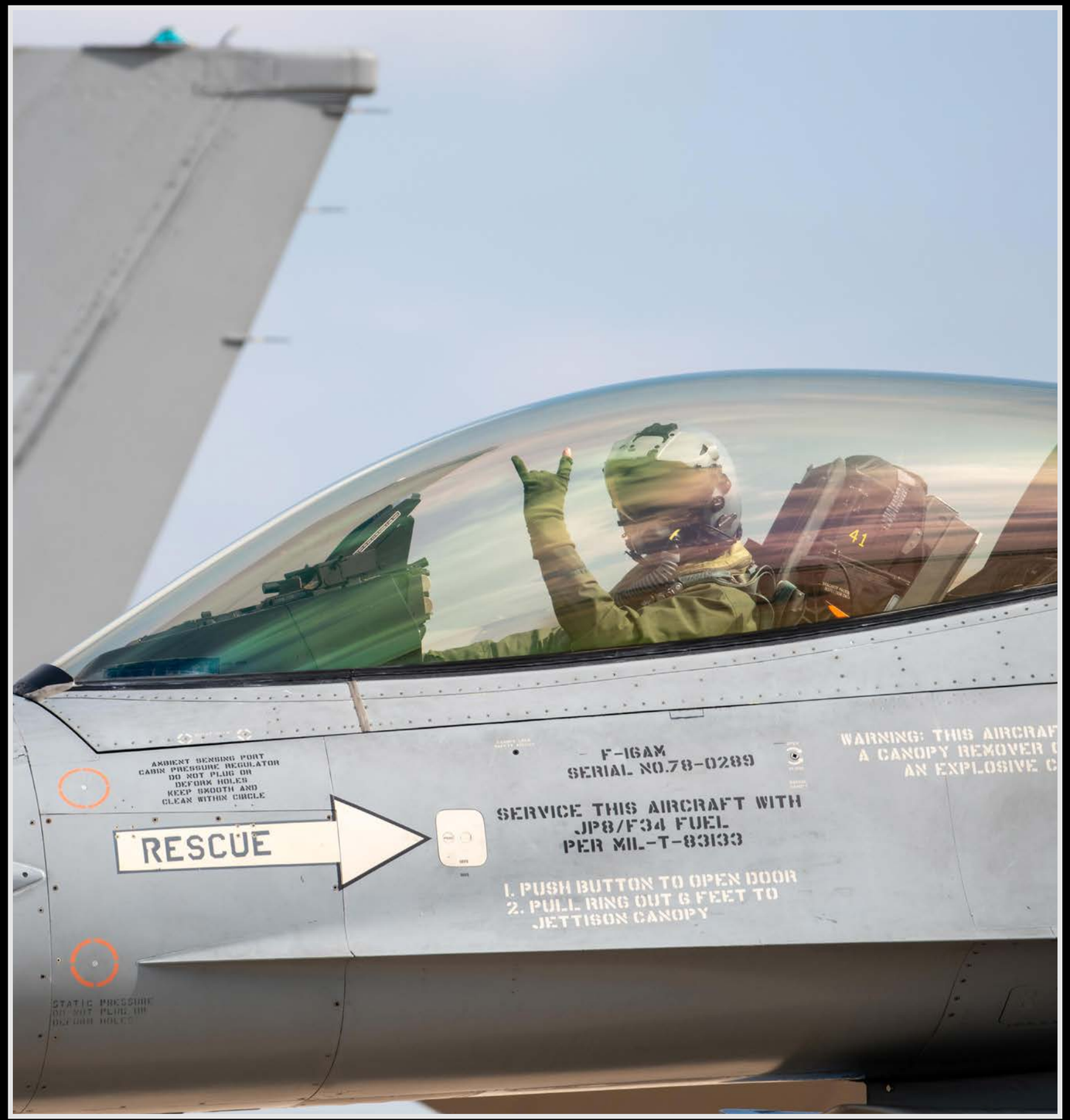
First Romanian Deployment Abroa

Interview with Col. Cachit "PISHTA" Alin, Romanian AF

During the RAMSTEIN FLAG 2025 exercise, the Romanian Air Force practiced its first foreign deployment with their new F-16. Squadron Commander Colonel Cachit Alin (callsign "PISHTA") of the 48th Fighter squadron "SKYLORDS" (Escadrila 48 Vânătoare) and Detachment Commander of the Romanian detachment for the RAMSTEIN FLAG 2025 exercise explains more about this exercise. Colonel Cachit Alin is a former Romanian MiG-21 pilot with more than 1,300 hours on jet fighters and some 800 flying hours on the new LockheedMartin F-16 aircraft. The 48th Fighter squadron is based at Câmpia Turzii air base (71st Air Base "General Emanoil Ionescu" (Baza 71 Aeriană "General Emanoil Ionescu"). The task of the squadron is twofold: one task is to defend the north-western part of Romanian airspace, and the other task is to be ready for crisis situations. The 48th Fighter Squadron has a heritage that dates back to the Second World War, when it was known as the "Blue Section" (Secțiunea Albastră), distinguished by blue markings on its planes. The 48th squadron received former Norwegian F-16s in 2024 and reestablished itself at the Câmpia Turzii AB. With the 16th F-16 being delivered in January of 2025, the very first Romanian deployment abroad was established for the RAMSTEIN FLAG exercise. As the squadron is not yet fully operational, this RAMSTEIN FLAG exercise was a very good step into the full operational direction. Some 40 people (pilots, maintenance, and logistics personnel) were deployed to RAF Fairford AB in the United Kingdom. Colonel Cachit Alin explained: "During the exercise, we performed air-to-air (A/A) and air-to-ground (A/G) missions, being part of the RED FORCES, for day flying only. During those flights, we were integrated into the COMAO packages, simulating different air platforms, with different A/A missiles and a variety of A/G ammunition."

"This exercise is the first deployment of the 48th Squadron outside of Romania. It is not only about flying in a different environment, but also about deploying jets and equipment to a different location, about integrating our own forces into host nation forces and location, and working together." He would like to thank the RAF Fairford team for their support and integration. "They were present every time we needed help, providing ground support equipment, communication facilities, etc., making us feel at home. I hope at one point we can return this favor". Colonel Cachit Alincis very positive about the cooperation with the Turkish F-16s detachment based at RAF Fairford as well during the exercise: "Also, at RAF Fairford we were deployed alongside the Turkish detachment, with whom we had the opportunity to share and benefit from the gained experience, thus, enhancing the interoperability between our air forces." Colonel Cachit Alin reflects on the lessons learned from the exercise:" I would say that working together on the ground, and in the air with our NATO partners has proven that we are reliable, flexible, open to learn, and to become more proficient in this kind of environment. Some examples would be the visiting ground support teams who worked together to solve maintenance issues, also firefighters and the hydrazine crew integrated into the host nation emergency response team. Furthermore, flying in such a busy airspace was a first timer for our SQN. Going in and out of the exercise airspace, talking to different control agencies, AAR procedures, then flying for the exercise with more than 50 jets, tankers, being aware of different ground assets, and undergoing communication jamming were challenging, but the learning experience was much appreciated." During the exercise, the Romanian F-16s performed daytime AAR with different tankers from many nations. From a flying perspective, it is a very precise flight, with no room for errors. You need to keep the jet stable, to follow the visual and audio guidance from the tanker, and to be sure that the next in line for tanking can still do the procedure. Again, there is no room for errors. "The RAMSTEIN FLAG 2025 exercise is a great opportunity to see exactly where we stand in the process of becoming a fully operational squadron. Moreover, the integration with 5th generation jets is a first step into understanding the need for this kind of platform that we will be operating in the future." Colonel Cachit Alin: "Integration and Corporation are Key to Success"

Three Romanian Air Force F-16AM *Fighting Falcon*s sit parked on the flight line at RAF
U.S. Air Force/Tech. Sgt. Jessica Avallone



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Left: Romanian Air Force pilots waiting in their F16AM *Fighting Falcons* for their taxi-clearance
Right: A Romanian Air Force F-16AM *Fighting Falcon* pilot gives a rocker hand gesture to the crew chief

Turkish Vipers in the United Kingdom

Interview with Major Yusuf " ONLER" Serhat, Turkish AF

The Turkish Air Force deployed one Boeing KC-135 refueling aircraft and five Lockheed Martin F-16s to RAF Fairford to support RAMSTEIN FLAG 2025. The F-16s are assigned to the 151st Squadron (151 Filo) at Merzifon AB. This unit is specialized in the Suppression of Enemy Air Defences (SEAD) role and the pilots are capable of executing advanced SEAD operations in the tactical level at all times, including both day and night. Major Yusuf Serhat (callsign ONLER) explains the Turkish participation during the exercise. Major Serhat has been flying the F-16 for five years and has some 700 flying hours on the F-16. He also has a background in flight test engineering. Five Turkish F-16s were deployed to the United Kingdom with 14 pilots and four NCOs to support the squadron's mission planning, life support, etcetera. During the RAMSTEIN FLAG exercise, these SEAD F-16s played the RED force role to conduct a number of high-end missions within realistic combat scenarios, contributing to the success of the overall exercise. Major Serhat tells more about the importance of the exercise: "The RAMSTEIN FLAG 25 exercise, like all other NATO exercises, contributes a lot to both our squadron and the Turkish Air Force as a really great training opportunity, not only for performing multi-domain composite air operations with other Allies but also getting to know each other and our capabilities. As you know, we are stronger together."

Valuable lessons were obtained by the Turkish crews: "During the exercise, we had seamless experiences about the significant importance of every individual's role in the overall big picture and game plan. In highly complex arenas in the exercise environment, you need to take into account all inputs from friendly and hostile units with all details in terms of the success and lessons learned of the exercise. And of course, everyone should conduct their own part of the responsibility in the fight effectively. As a result of a dispersed frame of the exercise, we are stationed in different bases than the BLUE forces. That means we could only be in touch with BLUE forces via VTC on digital platforms to conduct our mission briefings and debriefings. We have noticed that as NATO units and forces, we are capable of planning and executing any kind of operations in a short period in close coordination and cooperation of Allied Forces, even if we are located in different geolocations. It does not matter wherever we are; all we need is a connection and communication between our units." The major explains about the knowledge that the SEAD pilots brought to the exercise: "As I have already mentioned before, we are playing opponent RED forces in the exercise. So we always consider it to be more and more challenging to BLUE forces as we are tasked for. Because it is always better to train yourselves for the worst-case scenario. "

Major Serhat explains more about the air-to-air refueling: "Air-to-air refueling is basically a standard procedure for all participants. Thanks to NATO standards defined in advance to provide interoperability between all participants easily and rapidly. We haven't experienced any problems or difficulties in terms of our standard procedures. It is so valuable for us to refuel our aircraft in different parts of NATO Airspace over NATO European territory with another Allies' tanker. This will be a really seamless experience and unforgettable memory for all of the team. We always maintain our high combat readiness level by flying at all times, covering day and night periods in our training. So it is nothing new for us to execute AAR at night. It was only natural conditions, such as unusual environment, lightning, and the lack of visual references you were used to, that were the only issues that challenged us a little bit." And to summarize the importance of the RAMSTEIN FLAG exercise, Major Serhat said: "In a nutshell, I can say that it is very useful and beneficial for us to participate in these kinds of advanced and sophisticated exercises in a multinational environment. By training to integrate aircraft and systems from across the Alliance, RAMSTEIN FLAG 25 reinforces the credibility and responsiveness of NATO Air Power. RAMSTEIN FLAG 25 not only strengthens tactical air cooperation but also deepens strategic trust, ensuring that NATO forces remain always ready to defend the NATO Airspace persistently." A final quote by Major Serhat: "Not specifically for RAMSTEIN FLAG 25, but I can say that the Turkish Air Force motto is always: Train As You Fight."

All images this page U.S. Air Force/Tech. Sgt. Jessica Avallone

Main: **A Turkish Air Force F-16C *Fighting Falcon* prepares to land at RAF Fairford**

Inset: **A "Follow me" pickup truck guides the Turkish F-16C *Fighting Falcon* pilots after arriving for RAMSTEIN FLAG to the ramp**

Turkish Air Force F-16C *Fighting Falcons* landing at RAF Fairford and taxiing on the flight line

All images this page U.S. Air Force/Tech. Sgt. Jessica Avallone

Turkish Air Force F-16C *Fighting Falcon*
U.S. Air Force/Tech. Sgt. Jessica Avallone

Main: A Turkish Air Force crew chief and an U.S. Air Force Base Operating Support – Integrator (BOS-I) work together to fuel the Turkish F-16C *Fighting Falcons*

Inset: Three F-16 Fighing Falcons sitting on the ramp

All images this page U.S. Air Force/Tech. Sgt. Jessica Avallone

An F-15E *Strike Eagle* assigned to the 492nd Fighter Squadron prepares to test a Mobile Aircraft Arresting System (MAAS)

The F-15E Strike Eagle assigned to the 492nd Fighter Squadron tests a Mobile Aircraft Arresting System (MAAS) on RAF Fairford, England

FIRE BLADE 2025

ARTICLE BY JORIS VAN BOVEN AND ALEX VAN NOIJE

Two Agusta-Bell AB212s and one Sikorsky S-70A *Black Hawk* of the Austrian Bundesheer taking off at Pápa AB

In May 2025, Pápa AB in Hungary was once again the epicenter of Europe's most integrated rotary-wing tactical exercise FIRE BLADE 2025. The exercise was hosted under the umbrella of the Multinational Helicopter Training Center (MHTC). FIRE BLADE was more than just a display of collective flight skills of multiple member states. This training marked the continued transformation of Europe's helicopter training doctrine, a journey that began with the European Defense Agency (EDA) and has now moved forward under the leadership of the MHTC. The exercise reflects Europe's ambitions to prepare its helicopter crews for the conflicts of today and tomorrow.

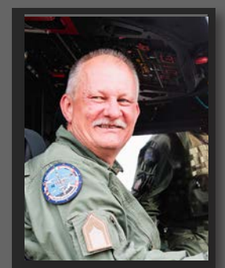
FIRE BLADE is designed to provide all partner nations with a realistic training environment for their aircrews where they can work on a multinational basis to the standards, techniques, tactics, and procedures that are described by the Multinational Helicopter Training Center (MHTC) Standard Operating Procedure (SOP). One of the main training objectives is to use the Air Force Planning Method of the 4Ts and use the COMAO (Composite Air Operations) structure for planning purposes. Each year, one of the MHTC member nations acts as Host Nation and provides the other countries with a good and solid training environment. This year, Hungary oversees hosting the exercise, and one of the additional training objectives includes live firing during the training missions. That's why the exercise is called FIRE BLADE. But the main aim still counts: enhancing international or multinational

The flight line shows two Hungarian Air Force Airbus H225M *Caracal* long-range tactical transport helicopters and three Swiss Air Force AS532UL *Cougar* multi-purpose helicopters

interoperability between aircrews in order to share common knowledge and tactics, techniques, and procedures, to become better military aviators after the exercise. The exercise is designed with a crawl-walk-run attitude, which means that at the beginning the focus is more on getting to know each other, and the missions will become more and more complex over time. The Host Nation, together with the multinational mentor team (consisting of helicopter tactics instructors from different nations), works closely together to script a scenario which elaborates the actual situation around the globe in order to provide the participants with a realistic training scenario. One of the main training aims, alongside the use of the standard planning process, is to identify and apply proper tactics, techniques, and procedures to operate in the electronic warfare environment. Thorough understanding of the strengths and weaknesses of different systems, as well as the ability to identify opportunities to handle the situation and therefore apply proper tactics, is actually very important.

Building Legacy from Combat Zones

An exercise like FIRE BLADE has a long history of European cooperation. Every year, a BLADE exercise is organized by one of the member states, and every year the exercise has a different theme based on the current European situation. This European initiative started many years ago with the discovery that there are gaps in the European defense which needed to be filled or solved. Lt. Col. Zoltán Szili brings a wealth of experience to the current Multinational Helicopter Training Center (MHTC). He is the deputy commander of the MHTC, which is located in Portugal at Sintra AB. In the past, he was a Mi-24 Hind attack helicopter pilot in the Hungarian Air Force. Szili has been flying since 1992 and has seen firsthand the transitions in rotary-wing combat and the instruction of its crews. From 2016 to 2019, he served at the European Defense Agency and he helped to manage and set up three major programs: the Helicopter Exercise Program (HEP), the Helicopter Tactics Course (HTC), and the Helicopter Tactics Instructor Course (HTIC).


Lt. Col. Zoltán Szili

Zoltán: "When I talk about training, we always understand it in a crew concept. We do not train pilots, we train full crews, including pilots, crew chiefs, loadmasters, door gunners, and whoever is part of the helicopter crew. They perform their job all together."

These courses follow a progressive structure. The HTC is a three-week simulator-based basic tactics course. The HTIC is the highest level, where selected individuals are trained as tactics instructors, capable of mentoring entire crews during exercises like FIRE BLADE. The HTIC graduates play critical roles at events like FIRE BLADE, according to Zoltán Szili: "They mentor the crews from the moment they receive the mission task, through planning and execution, and finally during debriefing. They highlight strengths and areas for improvement. This is not just about flying, it's about operational learning."

Why the EDA Created the Helicopter Programs The origins of this entire system are steeped in the realities of combat deployments in Afghanistan and Iraq. "Back in 2007 and 2008, during an EU summit, there was a side meeting between the presidents of the United Kingdom and France," Szili recounts. At that moment, all the deployments were focusing on the Afghanistan and Iraq missions. Specifically, these two missions were just changed, from a rotary-wing helicopter perspective, from a fighting-against-the-enemy mission into the mentoring mission to train the local forces to keep the peace. Szili added: "The gap they recognized was that they had no manpower for that. None of these two countries, France and the UK, who were in the lead of these missions at that moment, had this knowledge in their hands. Also, they did not have any expertise on the typical Russian-built helicopters on which the mentoring should have been performed, like the Mi-17 Hip and the Mi-24 Hind." To bridge this gap, the Multinational Helicopter Initiative (MHI) Trust Fund was created. "The aim was to pool resources and uplift Central and Eastern European countries operating these aircraft and helicopters, bringing them to the same tactical level envisioned by NATO standards," Szili adds. Although the European Defense Agency (EDA) was never intended as a training provider – it is a strategic and political entity – it recognized these gaps and initiated the upcoming programs to fill them. In the year that followed, they recognized the programs they launched to fill in the gaps. These programs eventually led to the BLADE series of exercises for helicopter crews. When the whole program became mature, the EDA withdrew from the program, as they only set up programs to fill the European defense gaps. Szili explained how Portugal was involved in taking over the lead role of the program: "The EDA addressed the question: OK, gentlemen, my member states, we need to release you. We need to let you go because

The crew chief of the Swiss Air Force's AS532UL *Cougar* monitors the engine start and keeps an eye on the area around the helicopter

we need to make EDA resources free to look for another capability gap in European defense. And that was the moment when Portugal raised its hand to facilitate the emerging MHTC. That was the way we all went to Portugal to Sintra AB to create the current MHTC."


Col. Jorge Inácio

MHTC's Institutional Independence

The current commander of the MHTC is Colonel Jorge Inácio of the Portuguese Air Force. The Colonel was also present during the exercise in Hungary to see how his crew is doing. Jorge joined the Air Force in 1992. After completing the course, he was assigned to the Tactical Air Transport Squadron, where he flew the Alouette III. Later, he transitioned to the Search and Rescue Squadron (751 Sqn), flying the Puma and subsequently the EH-101 Merlin. Jorge: "I spent three years in the Air Command's Plans Branch before returning to the Alouette Squadron (552 Sqn), first as an instructor pilot and later, in 2013, as Squadron Commander until 2017. Following that, I spent three years in Brussels, in the European Union Military Staff, Concepts and Capabilities Directorate. Upon returning from Brussels, I began working for the MHTC. Over the course of my career, I have flown the Alouette III, AS330 *Puma*, and EH-101 *Merlin*, accumulating approximately 3,000 flight hours, primarily in Search and Rescue and instructional roles." According to Jorge, some changes were necessary when the MHTC became independent of the EDA: "However, as MHTC Commander, and given that MHTC was already consolidated on the EDA side, my goal was to minimize alterations and focus on consolidation within MHTC. All courses were approved, and I aimed to implement only minimal adjustments to ensure consolidation while maintaining continuity with the same provider throughout these two years. This period serves as a transition phase, integrating the programs received from EDA while solidifying them within MHTC." The MHTC was deliberately established as politically independent, in contrast to EDA. Jorge says: "The EDA is bound by EU rules, but the MHTC is free from both EU and NATO political constraints. That was a primary objective, to make the MHTC a neutral, technical, and capability-driven center." Still, collaboration continues. "From a political or organizational standpoint, we no longer have direct ties with EDA," Inácio says. "But since the EDA was responsible for creating and consolidating the project, they remain a valuable support." At the MHTC, all decisions are made by the Steering Board. If a country expresses interest in joining, the final decision rests with the Steering Board. While the Technical Arrangement (TA) states that MHTC

A Serbian Air Force Airbus H145M (left) and a Hungarian Air Force Airbus H145M (right) are hovering close to each other after take-off

focuses on European crews, exceptions can be made. The Colonel added: "We had speakers from Ukraine and Israel at our symposia. I was hesitant to invite the Ukrainian or Israeli pilots. However, from our perspective, the most crucial aspect was the current conflict, as they were the ones actively employing tactics. Our primary focus in the discussion was on tactical employment, understanding how they were operating in these circumstances." The MHTC now oversees the continuation and expansion of the legacy EDA programs. Under the HEP module, the BLADE exercises, like FIRE BLADE, serve as the main field event. These exercises are scheduled up to sixteen years in advance. Additional training includes the COMAO Planning Course, an advanced Electronic Warfare course, and the development of a new simulator-based basic EW course. Every November, the Helicopter Tactics Symposium gathers experts from member states to share lessons learned. Guest speakers from conflict zones are invited to offer operational insights. Szili continues to underline the member states: "Currently, the MHTC counts 14 member states who are originally signatories to the Technical Arrangement when the MHTC was established. Right now, we have two additional countries in the signatory process, namely Slovakia and Switzerland. Both countries are now also present at the current exercise in Hungary. Achievements-wise, Serbia, an original signatory member, participated in a BLADE exercise for the very first time during FIRE BLADE 2025. Moreover, we currently have four countries – France, Bulgaria, Denmark, and Poland – who have expressed interest in joining the MHTC. Observers from these nations, along with representatives from other MHTC members, attended FIRE BLADE 2025. Their presence reinforces the growing interest and acknowledgment of the MHTC's valuable training offerings. This level of attention shows there's real interest in our activities."

A Culture of Trust

Both Szili and Inácio stress that while politics may be unavoidable in defense matters, the MHTC remains a technical organization. "Our focus is on tactics, on what works operationally," Szili states. "When we invite speakers from Ukraine or Israel, it's because they're applying the very tactics we train every day. Their insights are invaluable." "We're not interested in political messaging," Inácio adds. "We don't allow political presentations at our events. Everything must be validated technically. That's our standard." At the heart of MHTC's philosophy is a simple triad: Team, Train, Trust, says Szili. "These three words

A Serbian Air Force Airbus MH145M(Serbian designation H-50B) takes-off with a Serbian Air Force Mi-17V-5 (Serbian designation HT-49) *Hip* and a Hungarian Air Force Mi-24 *Hind* seen parked in the background

are emblazoned on the MHTC banner and reflect the core values of the organization," stated Szili. "We shape a team with mentors supporting participants. We train together in a progressive structure in our programs (HTC, HTIC, HEP). And through that training, we build trust among nations and crews." FIRE BLADE 2025 is a living example of this. Multinational crews fly complex missions together. They fail and succeed together. They debrief together. And in doing so, they forge a deeper interoperability that cannot be manufactured overnight. By 2026 or early 2027, the MHTC will receive a new simulator, marking another step forward in its evolution. "That will be the moment when we can say we've fully consolidated the transition from EDA," Inácio says. "From there, we can begin our next phase." FIRE BLADE 2025 is not just a military exercise. It is the culmination of over a decade of strategic thinking, multinational cooperation, and tactical refinement. It stands as a symbol of Europe's readiness to act together, not just through policy, but in action, through the rotor wash of helicopters flying low and fast across challenging terrain. In a world of shifting alliances and emerging threats, the MHTC's commitment to pure, operational excellence may be its greatest asset of all." Szili finalizes: "If I have to define FIRE BLADE in only a few words, it will be three words: **Team, Train, Trust**."

Host Nation Hungary – Preparing for a Major Exercise

The exercise FIRE BLADE 2025 is on the operational side currently led by Colonel Zoltán Rolko, callsign 'Roka'. Hungary is the host nation under the command of the Colonel during FIRE BLADE 2025, which takes place at Pápa AB in the west of the country. The Colonel is, next to this role, also the deputy commander of the MH Kiss József 86 Helikopterdandár (86th Helicopter Base), located in Szolnok. This base is home to all the Hungarian helicopters. Rolko is responsible for the attack helicopter fleet, the JTAC issues, and the integration of the Airbus H225M *Caracal* into the Hungarian system at squadron level.

Serbian Air Force Mi-17V-5 *Hip*. Serbia currently has five Mi-17V-5 in its inventory

Rolko already has a long history in the Hungarian Air Force. Since 1986, he was for many years a pilot on the Mi-24 Hind attack helicopter. The Colonel has more than 3,000 flight hours on this Soviet-built helicopter. Also, the Colonel is responsible for the smooth introduction of the H225M *Caracal* in the Hungarian Air Force. He acts as a pilot and test pilot himself on this type and is currently the most experienced pilot on this new type in the Hungarian Air Force. Rolko said it was the second time that the exercise took place in Hungary: "The first time we hosted the exercise here was in 2017. The first FIRE BLADE exercise was also here in Pápa AB. I was the deputy exercise director at that time. It is the second time that I am the director of this exercise." Organizing an exercise like this is built up in two parts, according to Rolko. These parts are an operational part and a logistical part. The logistical part is more organized here in Pápa; they have very good experience in hosting exercises. That's why the Hungarian Air Force decided to move this exercise to Pápa AB. According to Rolko, the Hungarians had more exercises here in the past, not only with helicopters, but also with fighters and with heavy transport aircraft. Rolko continues: "Operationally, we are responsible for the planning part of this exercise. We create the scenarios for the participants based on the learning objectives

The Airbus H225M *Caracal* of the Hungarian Air Force sightly banks away for this great air-to-air photo shot

which were stated in an earlier stage. This was already aligned with all participating nations before we even started here in Pápa. We just show the created scenarios to the mentors of the MHTC, and they approve it. When this approval is given, we can go over to executing these scenarios with all the involved parties." On the question why the Hungarians are organizing this exercise already for the second time in three years, Rolko is clear: "Hungary is a country on the border of the European Union and NATO territory. With the situation over the eastern border of our country in Ukraine, we see as the Hungarian Air Force that we have to be ready. We feel the need to be ready at all times, and the best way to prepare our helicopter crews is by participating in this MHTC program to make our crews better in all areas." The scenarios are built up in several pieces. The main scenario daily is the COMAO scenario where all participants are daily briefed in what is expected from them. The second objective is training. Every nation can use the live fire range for their own training purposes during the exercise. Not all participating countries have live firing abilities in their own country, and therefore they can use the Kőröshegy Training Area in Hungary, which is very suitable for this. Rolko pinpoints how important this training is for the participants: "Some nations want to train their

This Hungarian Air Force H225M *Caracal* approaches to land at Pápa AB

young pilots here. Specialized training, such as live firing, is crucial for the survival of the crews in real scenarios. It is the only blade exercise where they can shoot at the shooting range with live ammunition. That is the specialty of this exercise. The name FIRE BLADE is chosen for that reason." As a Host Nation, Hungary has a few more roles next to participating in the exercise, says Rolko: "We have an operational flying staff here responsible for creating the air tasking orders, the fragmentary orders, and all the Intel information which comes along. We have the airboss here present at Pápa AB who is responsible for this. He works at our airbase as head of the flight operations department. This person is responsible for the approval of the commands. The final word, 'go' or 'no go', is his responsibility." The mentors also have the responsibility to stop the execution, and that counts also for the flight safety department. Rolko acts as an instructor too during the exercise: "I instruct only in the training part as an instructor. We are continuing flight training here, like basic flight training and type rating for the younger personnel. We have to move on here also, so I'm doing that."

Airbus H225M *Caracal*, A Leap into the Future

One remarkable helicopter participating in FIRE BLADE 2025 was the Hungarian Air Force H225M *Caracal*. In a significant milestone for Hungary's air mobility and special operations capabilities, the Hungarian Air Force is nearing Initial Operational Capability (IOC) with its newly acquired fleet of H225M *Caracal* helicopters. This modern platform represents a generational shift from the legacy Russian-built helicopters long operated by the Hungarian military. Colonel Zoltán Rolko offered insight into the *Caracal* program, sharing firsthand experiences with the helicopter and the rationale behind Hungary's decision to adopt this versatile helicopter system. As a NATO front-line state situated on the eastern flank of Europe, Hungary plays a vital role in the alliance's collective defense posture. The acquisition of the Airbus H225M *Caracal* reflects the country's commitment to strengthening its rapid response capabilities in a changing security landscape, said Colonel Rolko: "We can provide a full range of helicopter capability for the country. It's simple, that's sometimes the best kind of answer." Hungary's journey toward fielding the H225M began

in 2018, as part of the national Zrínyi 2026 defense modernization strategy. A year later, a contract was signed with Airbus for 16 helicopters. Until now, 14 helicopters have been delivered, with the final two expected to arrive by mid-July 2025, completing the fleet and enabling the official declaration of Initial Operational Capability (IOC), according to the Colonel: "We are about reaching the Initial Operational Capability. The training level of the aircrews is good now. We are able to operate the helicopter in almost the whole range of its tasks, day and night, and in all weather conditions." Colonel Rolko, who has flown Russian-built Mi-series helicopters for decades, noted that adapting to the *Caracal* was straightforward, particularly for pilots accustomed to digital systems: "The conversion was very smooth from my point of view. Some of the old guys found it a bit difficult to convert the digital information from the analog. But I didn't have any hard issues with it. From my point of view, this helicopter is the best choice in Europe for this task. The choice to procure the Airbus H225M *Caracal* was based on both operational needs and budgetary considerations. With its competitive cost and wide-ranging capabilities, the *Caracal* stood out as the most practical solution, says Rolko. "In terms of cost effectiveness, in terms of effectiveness itself the H225M delivers high-end capability on the battlefield, because we have one more solution as an option. The NH90 is terribly expensive. So that's why we have chosen this helicopter for the Hungarian Air Force." The Hungarian fleet includes both tactical transport and HForce-armed variants, allowing Hungary to perform a full spectrum of missions, from troop transport and special operations support to precision strike and armed escort.

Mission-Ready and a Proven Concept

The Airbus H225M *Caracal* is a long-range tactical transport helicopter designed for high survivability and performance in the most demanding conditions. Part of Airbus's military helicopter portfolio, the H225M offers exceptional mission flexibility, capable of performing everything from special forces insertion to casualty evacuation with ease. Hungary has acquired two mission-tailored variants of the H225M, namely a tactical transport version (12 helicopters) and a weaponized HForce configuration version, equipped with 20mm cannons and 70mm rockets. This dual setup allows the Hungarian Air Force to perform both utility and combat missions using the same helicopter platform, maximizing efficiency and adaptability. The H225M's capability is significantly expanded through HForce, Airbus's modular, plug-and-play weapon system for military helicopters such as the H125M, H145M, and H225M. This system

Right: A very close formation flight gives this excellent opportunity for another great photo shot of a H255M *Caracal*
Left: The crew chief of tis Hungarian Air Force H225 *Caracal* visually scans the landing zone for any obstacle and/or threats rom hostile troos

transforms the *Caracal* into a versatile light-attack aircraft. Key features of the HForce system include: a core weapon management computer, the Thales Scorpion helmet-mounted sight display (HMSD), a high-performance Wescam EO/IR sensor, and flexible weapon pods supporting 20mm cannons, 12.7mm heavy machine guns, 68/70mm rockets, laser-guided rockets, and future integration of air-to-ground or air-to-air missiles. The HForce system has demonstrated high-precision capability during multiple trials. Firing tests were conducted on the H225M in 2016, and again during rocket and cannon trials in 2024, confirming impressive accuracy, achieving within 30 meters at 1,200 meters distance with unguided rockets. The system enables fire control quality previously exclusive to dedicated attack helicopters like the Tiger, now made accessible to transport platforms such as the H225M *Caracal*, according to Airbus. The *Caracal* was also used in several operational scenarios, mainly by French forces, who had used the helicopter for several years.

Standardization Tested at FIRE BLADE

Colonel Rolko explains that all the capabilities, except the 70mm rocket pods, of the *Caracal* in Hungarian service were used during FIRE BLADE, which is an incredible achievement for the introduction team of this helicopter. "Thanks to modular hardpoints and quick-change fire control options, Hungarian crews can reconfigure the helicopter for combat, rescue, or firefighting missions within 30 minutes, using only minimal tools and personnel. This flexibility greatly enhances the platform's responsiveness across operational scenarios," highlights Rolko. HForce is also designed to reduce cockpit workload

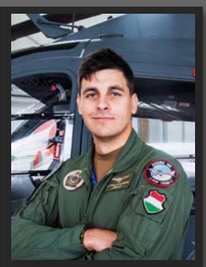
Main: **Two Hungarian H255M *Caracal* helicopters are returnig from an afternoon mission to Pápa AB**
Insets: **The *Caracal* can be configured with a Nexter M621 20mm gun pod that has an effective range of up to 2 km**

Head-on shot of a Hungarian Air Force H225M *Caracal* with a Nexter M621 gun pod attached to the starboard side of the helicopter

by allowing smooth task separation. While the pilot focuses on flight, the gunner manages targeting and weapons release using the electro-optical system and the helmet-mounted display. Hungarian aircrews have already conducted live-fire exercises with the HForce-equipped H225M, employing the H4 weapon system, a setup shared with the H145M, says the Colonel: "It's a suspended cannon, the same as on the H145M. The H4 system is exactly the same on the two types. Very accurate, very durable, very effective. This is the standardization we were looking for in the Hungarian Air Force." For pilots like Colonel Rolko, who transitioned from analog Russian cockpits to the digital H225M, the aircraft's modern systems represent a dramatic leap in capability: "The autopilot is, I think, one of the best in the world. The avionics are very good. The sensors are very good. The biggest difference is night capability, NVG compatibility, the electro-optical sensor, and self-defense systems. It's an off-the-shelf capability which we bought, and we are completely satisfied." While the H225M *Caracal* is a technically sophisticated aircraft, Colonel Rolko emphasized the strong factory support Hungary has received from Airbus: "We have great support from Airbus – factory support, technical representatives, and pilot instructors at our base. From a maintenance point of view, it's a bit demanding,

The Hungarian Air Force has a total of 16 H225M *Caracal* multi-role helicopters. Ten of these are for tactical medium-lift operations, and six are specifically equipped for Special Operations with HForce weapon systems

but we can manage it." With the H225M and HForce system now integrated into its operational inventory, Hungary has significantly enhanced its helicopter capability, bridging tactical airlift, special forces support, and light attack roles in one highly adaptable platform


Lt. Roland Pivovarnyik

Airbus H145M, a Small but Versatile Helicopter

Next to the Airbus H225M *Caracal*, the Hungarian Air Force is also integrating the Airbus H145M light reconnaissance and attack helicopter during the FIRE BLADE exercise. Lieutenant Roland Pivovarnyik, callsign 'Pivo', shared an inside look into his role as a pilot in the Hungarian Air Force, where he flies the Airbus H145M, which is a highly capable light utility military helicopter. With over 600 flight hours, Lt. Pivovarnyik offered a firsthand perspective on the helicopter's features, versatility, and performance in real-world operations. The Airbus H145M is a militarized variant of the civil H145 helicopter, tailored for a wide array of missions such as troop transport, armed reconnaissance, close air support, and medical evacuation. It's designed to be modular and highly adaptable. As Airbus notes, "The H145M can be equipped with Airbus' HForce weapons system like the H225M *Caracal* can do as well. It is a unique, incremental modular weapon system that allows the Hungarian Air Force to equip and operate the same platform for a broad range of mission types." Lt. Pivovarnyik currently flies the transport version: "Under normal circumstances, we usually fly the transport version. The main difference is the HForce weapons system. Otherwise, it's essentially the same helicopter." Having flown other rotary-wing platforms before, Lt. Pivovarnyik praised the H145M's advanced avionics and pilot-assist features: "I would say this is the best helicopter I've flown, due to the systems that help us to fly together, control the helicopter, and communicate

The Hungarian Air Force Airbus H145M is about to take off. The helicopter is fitted with an Nexter M621 20mm gun pod

information. It's a really well-performing helicopter, and I enjoy working with it." One particularly valued feature is the cockpit's design: "What I would like to emphasize is the size of the canopy. It provides us a really, really good view of the terrain. And we absolutely like it, especially during reconnaissance missions where we have a perfect overview over the scenario."

Light-Weighted, Huge Fire-Power

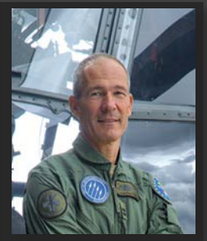
During FIRE BLADE the crews also used the weapon systems of the helicopter which are mounted on brackets on both sides of the helicopter. Lt. Pivovarnyik provided detailed knowledge of its weapons. The H145M, through the HForce system, can integrate a variety of armaments including machine guns, cannon pods, unguided Hydra rockets, and guided munitions like laser-guided missiles. "On the Hungarian helicopters we fly typically with a 20-millimeter cannon pod, with 250 rounds," he explained. "It's quite a punctual system, and the effective range is approximately four kilometers, which is quite a lot for a gun." To aim, pilots use a helmet-mounted display containing a connection with the HForce computer on board the helicopter. Lt. Pivovarnyik said that the aiming of the weapon is achieved by maneuvering the aircraft itself toward the target as it is a fixed gun pod. In addition to its cannon, the Hungarian H145M helicopters are mostly outfitted with unguided Hydra 70mm rockets, which are standard in NATO inventories. "We can launch 12 rockets from one pod," said Pivovarnyik. "These rockets are Hydra unguided rockets, actually, but it's very reliable as well as the gun pod." The Lieutenant emphasized the system's flexibility: "You can adjust how many rockets you want to use with one shot. If you have to do two rounds or three rounds, or you want to launch all of your rockets in one round, you can adjust it in the system." The H145M is powered by twin Safran Arriel 2E engines, offering excellent performance for hot and high environments and rapid maneuvering, says Pivovarnyik: "The engines are quite good, quite reliable and quite strong. It gives you the ability to accelerate and climb very fast with the helicopter, which is also ideal for aiming your weapons in flight."

Special Forces and Tactical Missions

Designed for flexibility, the Airbus H145M is ideal for special operations missions: "We typically carry up to five passengers, plus two pilots. That gives us about two hours of flight endurance," said Pivovarnyik. He described various insertion methods: "According to the technical capabilities, with the special forces, we can use fast rope facilities, but mainly we come in for a tactical landing and they leave the helicopter. We also can provide them with parachute jumps as well." Thanks to its compact size and agility, the H145M can land in tight, unprepared zones, explains the

The Hungarian Air Force Airbus H145M carries a rocket launcher for 12 unguided air-to-gound rockets

Lieutenant. "The small size of the helicopter allows us to land in somewhat confined spaces. The other thing is the weight, the maximum takeoff weight is 3,700 kilograms. It allows us to land, for example, on a rooftop of a building for Special Forces interventions." The H145M is equipped with full night vision goggle (NVG) compatibility and modern digital avionics, allowing it to perform 24/7 operations. As Lt. Pivovarnyik's firsthand account demonstrates, the Airbus H145M is a modern, flexible, and capable helicopter platform suited for a wide variety of mission profiles. Whether used in a transport, armed reconnaissance, or special forces support role, the H145M delivers performance, precision, and reliability, making it a valuable asset in the Hungarian Air Force and across allied forces worldwide, says Pivovarnyik, "It is not for nothing that also our Serbian colleagues here at FIRE BLADE 2025 use the same helicopter for these tasks. We learn a lot from each other by training every day together with the same helicopter type. This really adds value for me as a pilot."


Lt. Col. Rechsteiner

Swiss Precision – Third Swiss Participation

Lieutenant Colonel Lukas Rechsteiner is a helicopter pilot of the Swiss Air Force for many years, and he is currently the Detachment Commander (DetCo) of the Swiss team in Hungary during FIRE BLADE 2025. With over 6,000 helicopter flight hours and an additional 2,000 hours on fixed-wing aircraft, his career has spanned decades in Swiss service. His journey began in the early 1990s, where he learned to fly several helicopter types. He started his training on the Alouette II and later the Alouette III before transitioning to the AS332 *Super Puma* and AS532 *Cougar*. At a later point in his career, Lukas became an instructor on these helicopters. Until a few years ago, he flew the EC635 helicopter, mainly for the benefit of training young pilots. The EC635 is the Swiss military version of the famous EC135 (Airbus H135) platform. Nowadays, Rechsteiner is stationed at the military airfield in Dübendorf, where he works for the purpose of international cooperation, focusing on the Swiss helicopter fleet. His current mission brought him to Hungary for the FIRE BLADE 2025 exercise. This edition of the exercise was Switzerland's third participation in a BLADE exercise, Rechsteiner explains: "This is the third time we have a helicopter detachment on a BLADE exercise. We were in Beja in Portugal for the last two years. And now the third time is the FIRE BLADE exercise in Hungary. The participation in this program is for us to develop our tactical procedures in the field of helicopters. This is in view of the improvement of the defense capability, in view of international cooperation and better cooperation between ground and air forces. We are strong in Switzerland in the field of mountain flying. We are very strong in the field of VIP transports. And where we need to act to improve further is in the tactical area to further develop our pilots." FIRE BLADE 2025 represented a critical opportunity for the Swiss Air Force to refine its tactical helicopter

The Hungarian Air Force has 20 Airbus H145M multi-role battlefield utility helicopters. The helicopters are equipped with the HForce weapon management system. The first two were delivered in November 2019

Swiss Air Force AS532UL *Cougar* – the crew chief is connected to the helicopter's intercom system by a cable to commuicate with the pilots from outside the helicopter

procedures, enhance defense capabilities, and deepen international cooperation. The preparation for FIRE BLADE was rigorous, according to Rechsteiner. The Swiss pilots underwent foundational tactical training on the Airbus EC635 helicopter, says Rechsteiner: "Our pilots have the basic training. The tactical basic training in Switzerland is on the EC635, which includes low-flying, formation flights, and transport of troops. Then after the basic training, there is a tactical introduction on the AS332 *Super Puma*/AS532 *Cougar*. We have the option of simulating tactical missions in the simulator, and we also have training with our self-defense system." The Swiss Air Force is practicing its night and tactical flight campaigns in Vidsel in Sweden to further develop the skills of the pilots. Participation in FIRE BLADE required more than just flight hours for the pilots. The participating Swiss pilots needed at least three years of experience on the *Super Puma* or *Cougar* and had to complete a series of tactical courses, according to Lukas: "Regarding training, we have also these tactical training courses in Switzerland with various basic training on the EC635 and later the AS332 *Super Puma*/AS532 *Cougar*. A *Super Puma* pilot with about three years of experience on the pattern is then able to visit these kinds of exercises like FIRE BLADE. We train the entire crews, including loadmasters, in preparation mainly at home, because our exercises are based on the MHTC standard procedures which are similar to our standards in Switzerland. A few Swiss pilots even attended the advanced courses in Sintra, Portugal, covering electronic warfare and COMAO mission planning."

More than Just an Exercise

FIRE BLADE was not just another exercise, it was the culmination of months of planning and preparations for the Swiss. Operational objectives were defined nearly a year in advance, tailored to the capabilities and needs of each participating nation during an initial planning conference. From this planning conference, the design of the exercise was designed with different mission types to cover all the objectives. Hungary's unique training environment is very suitable for live firing exercises, says Rechsteiner: "Hungary offers the possibility for live firing for armed helicopters, which is something that Switzerland does not have. This is comparable with Béja in Portugal, for example. It is very hot there, and you need to adapt to these elements, which we also do not have in our country. When we organize an exercise ourselves, we know what to expect. Here at FIRE BLADE, it is a challenge for our crews. They are commissioned a day before with their mission. They have to plan as well as possible with the available means and the given conditions. This is the challenge. If you ask, what kind of exercise are we flying? Then the exercise management always says, we will find out tomorrow. It is the art of adapting to the changing situation every time." Communication is key for every participant. English served as the official language, ensuring clarity among international teams. While German could be used informally with Austrian colleagues, professionalism dictated the use of English in joint operations and debriefings. Switzerland deployed three AS532 *Cougar* helicopters to Hungary, two helicopters for daily activities and one in reserve. Looking ahead, Rechsteiner acknowledged that Switzerland's helicopter fleet is still in excellent condition, but it would reach the end of its service life within a decade. While planning for replacements had begun, no official decisions had been made yet by the Swiss government. Reflecting on the exercise, Rechsteiner emphasized that success depended not only on the flight crews but also on the behind-the-scenes support. Logistics, administration, and maintenance teams played a crucial role in ensuring smooth operations. Thanks to their efforts, the crews could focus entirely on their missions. As Senior

The Swiss Air Force currently has ten active AS532UL *Cougars*

National Representative, Rechsteiner expressed pride in his team and the cooperation with the Host Nation Hungary. FIRE BLADE was more than a training event for the Swiss; it was a very good example of international solidarity, adaptability, and the relentless pursuit of excellence in military aviation.


Major Chris Kappl

Large Austrian Participation – With Multiple Types Involved

The Austrian detachment during FIRE BLADE was led by Major Chris Kappl, who is also a helicopter pilot in the Austrian Air Force. Kappl has been the Commanding Officer of the Armed Multi-role Helicopter Squadron based at Tulln Langenlebarn in Lower Austria since 2011. Kappl is an active pilot on the Bell OH-58B *Kiowa Warrior* helicopter. He started his career as a helicopter pilot in 2003, and since then he has flown roughly 4,000 flying hours on Agusta Bell 206 Jet Ranger and Bell OH-58B *Kiowa*. Soon he will start his next adventure, which is the conversion training to Austria's newest helicopter type, the AW169 from Leonardo Helicopter Division. Major Kappl: "With our good old OH-58 *Kiowa*, we do provide a good training platform for different partners within the Austrian Armed Forces as well as on international exercises. The helicopter entered service in 1976, which means that it is older than myself, but it is an easy-to-maintain and reliable helicopter." Major Kappl is currently very satisfied with the performance of his team: "During the MHTC exercise FIRE BLADE 25 in Hungary, my attending crews performed nicely and as expected from my point of view. We trained and prepared them already back home in Austria, and I am happy with their performance during the

The Swiss Air Force deployed three AS532UL *Cougar* to Pápa AB

A small group of members of the Special Forces is extracted by a Swiss Air Force AS532UL *Cougar*

exercise. During the planning process as well as during the live flying event, they act in different roles, and what we can see is the fact that our national preparation in Austria is on a really high standard, which leads to the fact that our crews have an easy ability to work in a multinational environment and provide solid solutions as well as good products." Austria is a country that brought the majority of the participating helicopters to the exercise with no less than three types and one fixed-wing asset. Showcasing this amount of assets has a clear objective, according to Major Kappl: "One of the main objectives within the Austrian Air Support Brigade is that we train all our crews within the different squadrons to the same standard. Even though our squadrons operate different helicopter types and fulfill different tasks, it is one of the main guidelines of our Air Support Brigade Commander that we are always capable of working together and using the same tactics, techniques, and procedures. During the participation in the exercise, we have the chance to prove that the Austrian way of training is also compatible in a multinational environment." To prove these trainings and their standards, the Austrians brought three different helicopter types: the UH-60 *Black Hawk*, the Agusta-Bell AB212s, and OH-58 *Kiowa Warrior*. Next to this, the Austrians also brought one Pilatus PC-6 aircraft, including personnel from their air reconnaissance squadron. Kappl points out the importance of all these assets working together: "We really like to use the capabilities of our PC-6 in combination with the air reconnaissance team, because they can provide accurate and valid data and information about the target area, landing sites, enemy avenues of approach, etc. An additional benefit is that we can overlook the interoperability within our own air support wing, because nearly all elements of the wing take part in the exercise."

Live Firing Integration during BLADE Exercises

Hungary, as the Host Nation, provided access to shooting ranges, enabling live firing during the exercise. It was the first time that live firing was done in the COMAO scenarios during a BLADE exercise since the beginning of the program. These opportunities were available either during national training flights in the morning or in the evening/night hours, or integrated into the COMAO missions in the afternoon. "For our OH-58s, we already have good firing ranges in Austria," explains Major Kappl. "So our squadron focused on participating in the COMAO missions rather than national live-fire sessions." In contrast, for units like the UH-60 squadron, the Hungarian ranges offered more firing opportunities than what's available at home. "That's why their focus was on the live firing component, especially training their door gunners." When considering live firing abroad, planning and logistics play a key role. "You always have to weigh the preparation effort, like logistics and paperwork, against the training value. If we can consistently integrate live firing into COMAO missions, as we've successfully done here, it will shift how we set training priorities for future BLADE exercises." This year, Hungary demonstrated that it is indeed

Take-off of an Agusta Bell AB212 (foreground) and a Sikorsky S-70A *Black Hawk* of the Austrian Air Force. The AB212 is a Bell UH-1N Twin that was license-bulit by Agusta in Italy and is in Service with the Bundesheer (Austrian Armed Forces) since 1980

Austria plans to withdraw the AB212 by 2030 and replace them with the Sikorsky UH-60M *Black Hawk*, starting in 2028

possible to incorporate live firing into complex mission profiles. However, such integration always depends on what the Host Nation can offer. Kappl recalls his first BLADE Exercise in 2013 during HOT BLADE in Portugal: "They gave us access to a sea-based range with floating targets, but only for national training flights." Environmental conditions can also be a limiting factor. "The time of year matters. If the exercise takes place during a dry season, there's a high risk of accidental bush or forest fires, which can restrict live firing activities." In summary, while live firing adds significant value to multinational training, it requires careful coordination, forward planning, and adaptable objectives based on the Host Nation's capabilities and seasonal conditions.

Team, Training, Trust – The Power of Shared Standards

Major Chris Kappl's involvement with the BLADE series of multinational helicopter exercises began in 2013. "From day one, I was committed to the idea," he says. That commitment quickly grew further as he began the Helicopter Tactics Instructor Course (HTIC), delivered by the European Defense Agency (EDA), in 2014. Kappl completed all three instructor courses, achieving the Gold Level Instructor status in the MHTC. From 2016 onwards, Kappl served as a staff instructor for the HTIC, and by 2018, he joined the Chief Instructor Team. "We were responsible for delivering instructor training, mentoring during BLADE exercises, and maintaining the Helicopter Exercise Program's Standard Operating Procedures (HEP SOP) and updating it whenever necessary." All of this was in addition to his full-time role as squadron commander and tactical training lead within the Austrian Air Force. "It was a 'part-time job' in name only." In 2021, changes in the multinational team left Major Kappl as the sole Chief Instructor. "I became responsible for the entire HTIC delivery, leading the Mentor Team, and acting as custodian of the HEP SOP." That responsibility continued until November 2023, when the Multinational Helicopter Training Center was formally established. "With that, my task as Chief Instructor ended, and I was happy to hand over the reins to my successor." Despite stepping back, Kappl remains a strong advocate for the program: "I'm still fully convinced of its necessity. In Europe, we must work towards a common standard for tactics, techniques, and procedures. We need to know each other, and we need to understand each other." Major Kappl will give a good example of the need for the program. It was 2018, during his UN deployment to Mali together with the German Army Aviation. During the three months of this deployment, he had the chance to create a good relationship with NH90 pilots. They offered him the chance to talk about the HEP SOP as well as provide some lectures during the days. Kappl explains what they did: "For some missions we tried the different planning process (COMAO 4T Planning) and it turned out that it worked pretty well. After my re-deployment, we didn't meet each other for nearly 4 years, but in 2022 we met each other again at an air show and we talked at length about our experiences during the last couple of years. After quite a time I asked my German friend what he thought about becoming a tactics instructor within the EDA. He convinced his commander and started the training to become a Helicopter Tactics Instructor last year. He is really addicted to training and developing tactics, techniques, and procedures (TTPs), and this will be the foundation for future cooperation. We will speak the same language, we use the same TTPs, and we understand and trust each other. Therefore, we still have a very good friendship and we both try to find ways and solutions to help both our systems to improve their capabilities. We try to send the same messages to our superiors and commanders in order to achieve small steps to improve the capabilities of our crews and to increase the network. Regarding trust, it is one of the most important things in aviation according to Kappl: "You must trust your maintenance guys when they provide you the assigned aircraft daily for each individual mission. You must trust your comrades and colleagues during the planning process, and you must trust your crew during each individual flight. Trust cannot be commanded, trust can only be earned. If you trust your employees and colleagues, you will recognize even the slightest signs of nervousness or discomfort. For this reason, you can quickly determine how a colleague is feeling, for example, by his voice or his behavior, both during planning and during the execution of a mission. Trusting each other, understanding each other's strengths and weaknesses will determine the success on the battlefield. If you lose trust, you will fail."

A Satisfying Result of Teamwork

The Major was also very satisfied with Hungary as a host nation during FIRE BLADE. "We have to say a big thank you to Hungary as the host nation because

Left: Austria brought two Pilatus PC-6 *Turbo Porters* to FIRE BLADE to provide aerial reconnaissance

it was the first time in Blade history that the trainees were able to integrate live firing during the COMAO missions. This possibility is a big milestone because it will give the crews an additional training value and therefore they are forced to apply range safety rules into their planning. It also shows really quickly any real-life limitations or concerns regarding directions of fire as well as opportunities for the infiltration of troops." FIRE BLADE brings great value for the Austrian crews to take part in this Blade exercise, because it will provide them with several lessons learned and opportunities for working in a multinational exchange where people share experiences, where people share emotions, and where people make friends. Kappl concludes: "Making friends and building up a good network within the community is always very important, because if you need to perform some deployments, probably another nation has already been there, and you will remember yourself that you know somebody. You pick up your phone and raise your questions and concerns. Usually, you will get answers to your questions and that's one of the main values of the exercise, the network that works for you."

The Austrian Air Force AB212 can carry up to 14 passengers and has an external load capacity of 5,000 lb (2,268 kg). The helicopter has provisions for mounting MG 42/59 caliber 7.62 mm NATO machine guns on both sides of the fuselage

The Austrian Air Force Bell OH-58 *Kiowa* can be armed with an M134 Minigun, a Gatling-style six-barrel rotary machine gun to engage both air-to-ground and air-to-air targets.

As an armed helicopter, the Bell OH-58 *Kiowa* serves in the role of a "pathfinder" during airborne operations. Additional mission profiles include liaison and reconnaissance flights, aerial imagery missions using its own onboard camera systems, and border surveillance

The Austrian Air Foce operates the Sikorsky S-70A *Black Hawk since 2002* and has 12 S-70A *Black Hawk*s in its inventory

The Austrian *Black Hawks* feature several unique adaptations that make them especially suited for Austria's mountainous terrain, harsh winters, and multi-role military operations. The Bundesheer emphasizes the civil-military integration, using helicopters for both defense and emergency response (e.g., avalanches, floods). Some of the key modifcations and upgrades are:

- Glass Cockpit: Austria was the first to receive *Black Hawks* with a modern Electronic Flight Instrument System (EFIS), replacing analog dials with configurable digital display
- Rotor Blade De-Icing: Both main and tail rotors are equipped with de-icing systems, allowing safe operation in snowy and icy conditions
- High-Altitude Performance: Twin General Electric T700-GE-701C engines (1,940 hp each) provide the power needed for Alpine missions, including rescue and transport in rugged terrain
- Extended range: auxiliary fuel tanks to extended the S-70's range up to ~1,600 km

Serbia: A Delayed but Impressive Debut – First Participation in FIRE BLADE

The MHTC Deputy Commander, Hungarian Lt Col Zoltán Szili, explained the Serbian Armed Forces' participation in the FIRE BLADE exercise: "Serbia has been a part of MHTC since its inception, being one of the original 14 signatories. Their integration began during the early years when MHTC was still in its formative stages under the guidance of EDA. Serbia, a PfP (Partnership for Peace) country like Austria and Switzerland, was involved in the initial MHTC working groups and meetings in Brussels (Belgium). The Serbian Air Force Command recognizes the importance of the role of the MHTC for European helicopter developments and training, and that helped to anchor Serbia's commitment to the MHTC." The reason why Serbia only participated for the first time is because the country had to adapt itself to the changing situation in Europe, Szili explains: "For Serbia, the path has not been without obstacles. Following the outbreak of conflict in Ukraine in 2022, Serbia (like many other European countries) pivoted to focus on national priorities, leading Serbia to cancel international participation in exercises temporarily. Now, with FIRE BLADE 2025, Serbia has made its long-awaited debut in a Blade exercise." The Serbian Air Force's modernization efforts were recently showcased during Exercise FIRE BLADE 2025, held in Hungary. Serbia participated with two helicopters: a Mi-17 Hip from the 890th Mixed Helicopter Squadron (Batajnica Air Base), used for troop transport, and an H-145M used in the observation and fire-support role. The Serbian Air Force continues to elevate its operational readiness and international presence with the introduction and deployment of the Airbus

The Serbian Air Force Airbus H145M helicopters are used in several roles: Special Forces Support, Combat Support/Light Attack (equipped with the HForce modular weapon system, MedEvac & SAR, Reconnaissance & Surveillance (equipped with electro-optical sensors, thermal imaging, and NVG capability), and Transport & Logistics

H-145M multirole helicopters. Now actively serving with the 890th Mixed Helicopter Squadron 'Pegazi' of the 204th Air Brigade, the H-145M is proving to be a cornerstone of Serbia's modern aerial strategy. These helicopters are enhancing the country's capacity for reconnaissance, fire support, search and rescue (SAR), and air transport missions.

Advanced Features and Tactical Impact

The Airbus H-145M marks a significant upgrade from previous platforms. The helicopter is designed to transport up to ten personnel and, in its combat configuration, it supports special forces operations, terrain reconnaissance, and aerial fire support. The H-145M's modern avionics, including advanced optronic and navigation/attack systems, make it capable of operating in all weather conditions, day or night. The upgraded D3 version features a five-blade rotor system, offering increased lift, reduced vibration and noise, and a higher payload capacity, all while reducing the aircraft's weight. These improvements contribute to enhanced flight safety and training effectiveness for pilots and crews. An especially notable development is the integration of the Serbian-developed L-80-07 rocket launcher. This seven-tube launcher supports 80mm S-8KOM unguided rockets and is fully compatible with NATO and Russian-standard hardpoints. It uses the MIL-STD-1760 digital interface, allowing for seamless connection to the HForce weapon management system aboard the H-145M. The launcher is externally mounted in a honeycomb configuration and designed for use across multiple helicopter platforms, including the Mi-17 Hip and SA-342 Gazelle. This solution is perfect for all the helicopter types currently in service with the Serbian Air Force. The H-145M of the Serbians was, during FIRE BLADE, armed with the Serbian-made S8 80mm rocket system, fully integrated into the aircraft's HForce system. Before each sortie, rockets were loaded at a Forward Arming Point (FAP), underscoring Serbia's growing logistical and tactical proficiency. This participation marked a critical milestone in Serbia's defense diplomacy and regional interoperability. As Serbia's aerospace capabilities continue to evolve, the H-145M stands at the forefront of a modern, modular, and multi-mission force structure. With

Integrated in the H145M's HForce modular weapon system is the Serbian-developed L-80-07 rocket launcher. This seven-tube launcher supports 80mm S-8KOM unguided rockets and is fully compatible with NATO and Russian-standard hardpoints


AIRBUS
H145M
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homegrown innovation like the L-80-07 rocket system and active engagement in multinational exercises such as FIRE BLADE 2025, the Serbian Air Force is clearly committed to shaping a future-ready aerial defense strategy.

Slovakia: From Observers to Members – Integration of *Black Hawk* Helicopters

Slovakia is a typical country which is rapidly advancing its defense modernization and NATO integration, with a focus on helicopter capability and multinational cooperation. The expansion of its American-made UH-60M *Black Hawk* fleet and active involvement in European exercises such as FIRE BLADE 2025 are strong indicators of this momentum. The Slovak Air Force initially acquired nine UH-60M *Black Hawk* helicopters through a United States Foreign Military Sales (FMS) agreement finalized in 2015. The helicopters were delivered between 2017 and 2020. The helicopters have become a cornerstone of Slovakia's tactical mobility and NATO interoperability strategy. The Slovakian Air Force is now at a point where it wants to expand its fleet of tactical helicopters. Defense Minister Robert Kaliňák recently announced the acquisition of twelve additional UH-60 helicopters, this time refurbished aircraft provided by ACE Aeronautics in Alabama. Valued at €150 million (excluding armaments), the deal offers a cost-effective alternative to the previously considered AH-1Z Viper attack helicopters. Among the new generation of Slovak military aviators is Captain 'Pablo'. As the pilot in command of a UH-60M *Black Hawk*, he represents both the technical and personal journey behind Slovakia's strategic upgrades. Pablo has accumulated approximately 500 flight hours since he began his aviation career in 2020. His initial training took place in Slovakia, where he learned to fly the Schweizer H269, and later he trained on the MD500 helicopter. In 2022, he completed a comprehensive aircraft qualification course in Alabama, United States. He did this at the training center formerly known as Fort Rucker, now officially renamed Fort Novosel. The course spanned six months and included academic instruction, simulator sessions, and live flight training. According to Captain Pablo, the program was exceptionally well-structured and thoroughly covered both standard flying maneuvers and emergency procedures. "That was a six-month course in Alabama – academic sessions, simulator time, and live flights. It was perfect. I have to say that it was perfect," Pablo said. Meanwhile, he has already gained 300 flight hours on the *Black Hawk* in Slovakian service.

The Slovak Air Force currently has nine Sikorsky UH-60M *Black Hawk* helicopters that replaced the Mi-17 *Hip* beginning in 2017 and the last of the nine helicopters delivered in 2020. Recently, Slovakia announced to buy another twelve, second hand U.S. Army UH-60s

A Slovak Air Force UH-60M MEDEVACs a wounded soldier

The UH-60M's door gunners secure the landing zone against hostile ground forces using their caliber 7.62 mm machine guns

First Multinational Experience

Held in the area at and around Pápa Air Base in Hungary, Exercise FIRE BLADE 2025 marked Pablo's first participation in an international helicopter exercise. The scale of the training left a strong impression on this young pilot, who is growing in his role every single day. He says: "In Slovakia, I flew with a maximum of six choppers in one mission. Here, we had up to 13 helicopters flying together. It's a really good exercise, a really good experience for me. The whole exercise is about planning. Planning is the most important, and after that comes the flying. I enjoyed it very much." One notable milestone for Captain Pablo during FIRE BLADE 2025 was performing fast-roping for the first time. He did this in cooperation with the Hungarian Special Operations Forces. While he had previously begun rope and rappel training in Slovakia, this exercise was his first time executing a fast rope insertion. Pablo described the experience as especially meaningful and memorable: "For me, it was special. In Slovakia, we had just started rope and rappel training, but here, I actually did fast-roping for the first time. That's something I'll remember forever." Despite the exercise's remote location and compact two-week duration, Pablo called it a meaningful chapter in his career: "It's only two weeks and only in Pápa, near Budapest, but for me, it was something very special."

The Route to MHTC Membership

Despite not yet being full members, Slovak crews actively participate in the exercises. Slovakia is an absolutely active participant in MHTC activities and has been involved for several years already. Their journey started in 2019 during the DarkBlade exercise in the Czech Republic, where they attended as observers. Already at that moment, they recognized the benefits of belonging to this multinational helicopter training community and began engaging actively with EDA. It took several years of administrative processing and intergovernmental coordination, but Slovakia is now among the countries in the signatory process. The only remaining step is the final round of approvals and signatures by the Ministers of Defense. Once those are completed, Slovakia will officially become a full member of MHTC. The Slovakians contribute meaningfully to the multinational training effort, demonstrating interoperability and commitment. Their presence at FIRE BLADE 2025 reflects the momentum building behind their forthcoming membership. In the meantime, Slovak crews like Captain Pablo's crew have already become a fixture in MHTC exercises, contributing meaningfully and consistently to multinational training and interoperability. As Slovakia upgrades its rotary-wing capabilities and forges stronger NATO ties, its growing *Black Hawk* fleet and participation in multinational exercises like FIRE BLADE 2025 mark tangible progress. Behind the equipment are people like Captain Pablo who are well-trained, enthusiastic, and ready to operate in complex multinational environments. "I'm so glad that I'm here, 100%," Pablo said. "It was a really good step in my flying career and learning from this helicopter community with so much experience is really helpful for our crew."

Demonstration

In the last week of the exercise, a Distinguished Visitors Day was organized to show the final demonstration of a large helicopter package at a gunnery range in Kőröshegy near Lake Balaton. Unfortunately, bad weather caused a cancellation of the demonstration for the visitors. During the rehearsal the day before, the whole demonstration was shown. It started with gunnery by the Gripen jets, followed by Hungarian and Serbian H-145M helicopter gunnery. Then an observation team of Austrian *Kiowa*s entered the scene to prepare the landing of an Austrian AB212, a Hungarian H225 *Caracal*, and a Swiss AS532UL (Airbus H215) *Cougar*, all packed with Hungarian soldiers. When the soldiers on the ground received some 'casualties', the Slovakian UH-60 *Black Hawk* entered the scene as a MEDEVAC helicopter to airlift the 'casualties' out of the area. A Hungarian H145 and an Austrian S-70A *Black Hawk* flew over the area to observe the situation on the ground, followed by the large formation of two Austrian *Kiowa*s, a Swiss *Cougar*, Hungarian *Caracal*, and Austrian AB212 to pick up all the soldiers from the battlefield.

Participants in Exercise FIRE BLADE 2025

Country	Helicopters/aircraft	Remark
Hungary	Airbus Helicopters H145M Airbus Helicopters H225M *Caracal* JAS-39 *Gripen*	The JAS-39 Gripens flew from their homebase Kecskemét
Switzerland	Eurocopter AS532UL *Cougar*	three helicopters (two flying and one spare)
Austria	Bell OH-50 *Kiowa* Sikorsky S-70A *Black Hawk* Agusta Bell AB212 Pilatus PC-6	The PC-6 was used for observation tasks
Serbia	Airbus Helicopters H145M Mi-17V *Hip*	
Slovakia	Sikorsky UH-60M *Black Hawk*	

Members of the Special Forces wait inside the UH-60M for their go-order. The *Black Hawk* is equipped with a rope system that allows the soldiers to rappel (so called "fast roping") from the helicopter when landing is not possible – such as in rough or inaccessible terrain.

Su-22 *FITTER* IN MALBORK

TEXT BY RALF JAHNKE | **PHOTOS** BY THE AUTHOR UNLESS NOTED

In August 2024, six Su-22M4 *Fitter-K* and two Su-22UM3K *Fitter-G* aircraft were temporarily relocated from Mirosławiec AB to the 22nd Tactical Air Base in Malbork due to renovation work at their home station. Positioned on NATO's eastern flank, Malbork served as the forward operating location for the multi-week deployment

Among the aircraft actively flying daily missions was Su-22UM3K, serial 707, distinguished by its striking tiger paint scheme. The twin-seat trainer variant is seen here turning onto final approach for landing at Malbork, continuing its operational role alongside the single-seat *Fitters*

In August 2024, eight Su-22M4 and Su-22UM3K combat aircraft from the 12th Air Base in Mirosławiec were temporarily relocated to the 22nd Tactical Air Base in Malbork due to extensive renovations at their home base. This provided a unique opportunity to document the operations of the "Suczka" ("bitches" – as affectionately called in Poland) from outside the airfield. Malbork offers optimal conditions for observing the Fitter K and G variants. At that time, the decommissioning of the last remaining *Fitters* was scheduled for the end of 2024, presenting a final chance to photograph these exceptional aircraft in active service.

Normally, the Fitters are assigned to the 21st Tactical Air Base in Świdwin, however, due to ongoing modernization to prepare for the arrival of the first F-35A in 2027, the airfield is under major construction. The Polish Air Force has ordered a total of 32 F-35A *Lightning II* fighter aircraft from the US, which will replace the Su-22 fleet. Until decommissioning, the Su-22s of the 21st Base have found a new home in Mirosławiec, having relocated there in October 2023.

Given that the northeastern region of Poland borders the Kaliningrad Oblast and Lithuania (one of the Baltic States), NATO recently decided to strengthen its eastern flank by air. Malbork was chosen due to its excellent infrastructure and proximity: 70 km to Kaliningrad (Russia), 280 km to Lithuania, and 300 km to the Belarusian border. The 22nd Tactical Air Base in Malbork routinely hosts aircraft from other NATO countries and has the MiG-29 *Fulcrum* in its own inventory. These factors were instrumental in relocating the Fitters to Malbork to visibly strengthen the eastern presence. During the transfer, the base's MiG-29s were moved to Minsk Mazowiecki, but following a MiG-29 crash in March, they remained grounded.

The primary tasks of the 21st Tactical Air Base include ground attack, close air support (CAS), reconnaissance, support for naval and ground special forces, as well as training new pilots for the Su-22 fleet. In 2011, the then-commander of the 21st Base initiated the establishment of the Sukhoi Display Team, which was intended to showcase both the pilots' skills and the Su-22 aircraft during airshows in Poland and abroad. Since its founding, the team has participated in various airshows both domestically and internationally, with the last demonstration taking place in 2017, always a highlight for aviation enthusiasts.

Initial deliveries of the Su-22 to Poland began in 1984. The Su-22M4, purchased from the Soviet Union, was the export version of the Russian Su-17M4. Aircraft were delivered to units stationed in Powidz and Pila, significantly enhancing the combat

During the morning cycle, No. 707 taxis to the take-off point at Malbork AB for its next training mission. This Su-22UM3K was the very last *Fitter* to receive a major overhaul at the Bydgoszcz Plant (WLZ-2) in August 2024

capability of the Polish Air Force. Poland was the first Warsaw Pact state to operate this impressive aircraft.

Until 1988, the Polish Air Force (Siły Powietrzne Rzeczypospolitej Polskiej) had acquired a total of 90 Su-22M4 Fitter-K and 20 Su-22UM3K Fitter-G" distributed across four airfields: Piła (6th Fighter-Bomber Aviation Regiment, 6 PLM-B), Powidz (7th Bomber-Reconnaissance Aviation Regiment, 7 PLB-R), Mirosławiec (8 PLM-B), and Świdwin (40 PLM-B).

The Su-22s arrived in Poland aboard Il-76 transport aircraft and were assembled and test-flown by Soviet personnel. The Soviets then supervised the introductory phase for over a year. After that, responsibility for the new model was transferred entirely to the Polish Air Force.

When Poland joined NATO in 1999, modifications were required to enable interoperability with alliance air forces. Thirty-two aircraft were upgraded with radio transponders, Identification Friend or Foe (IFF) systems, and anti-collision lights, in accordance with NATO specifications, to make them NATO-compatible.

After joining NATO, the number of available Su-22s was gradually reduced. This resulted in the deactivation of the Piła, Powidz, and Mirosławiec squadrons – a consequence of the so-called "peace dividend". Today, this must be painfully and, above all, cost-intensively reevaluated.

Ultimately, a total of 12 Su-22M4 and 6 Su-22UM3K remained at the 21 Baza in Świdwin. From 2015 onward, these aircraft received life-extension measures to ensure another ten years of service. Upgrades included avionics modernization, new digital cockpit instruments, updated radios, and flight recorders. The modernization for each aircraft took up to nine months and was performed at Wojskowe Zakłady Lotnicze Nr. 2 (WZL-2) in Bydgoszcz. The most noticeable change was a new grey-toned camouflage. The Bydgoszcz plant oversaw major overhauls throughout the Su-22's service, performing the final inspection on Su-22UM3K no. 707 ("Tiger") in August 2024. This marked the end of 35 years of technical support for the Su-22 at this factory in Bydgoszcz.

It should be noted that the Su-22's core combat capabilities were never modernized during all its

Above left: No. 707 is lined up on the starting grid on runway 25
Above right: In the late afternoon the Tiger rolls for its last flight of the day
Above: After a touch and go, the machine pulls up spectacularly steeply

A flight over the 22nd Tactical Air Base in Malbork. The sweep wings are in the forward position for flight at lower speeds. The tiger skin stands out clearly from the old three-color scheme

years of service, and the Fitter is no longer state-of-the-art. Although outdated, the Fitter remains highly capable for current Polish military requirements, especially maritime operations, and is renowned for its extensive and specialized weapons suite.

Both pilots and technicians appreciate the Su-22 for its responsive handling; despite its age, the aircraft demands continuous attention from its pilot, as it lacks the automation found in modern platforms, where the pilot is more or less replaced by a computer. Flying the Su-22 is challenging, particularly at low altitude and high speed, where pilots are constantly struggling with a lack of time. For example, pilots must execute the targeting procedures within a narrow window of three to five seconds, especially during dive attacks. The primary weakness of the Su-22 is the lengthy preparation of its navigation system, typically 15 minutes, but this procedure can be shortened to five minutes if necessary.

Of the original 18 Su-22M4/UM3K aircraft, an unspecified number have already been retired. On a typical flying day, four Fitters are prepared for operations. Noteworthy are the special paint schemes developed at the 21st Base: Su-22UM3K no. 707 in tiger stripes, no. 305 in black (retired in 2023), and no. 509 in a historic/modern camouflage for this year.

With the last flight of a Su-22 *Fitter* on 11 September and 41 years after its introduction, the Polish Air Force is decommissioning one of the last icons of the Cold War era.

Su-22UM3K No. 707 turns onto runway 25 late in the evening. The mission likely took place over the Baltic Sea, as the pilots are wearing orange cold-weather suits

Main: An afterburner takeoff of No. 3201 for another training mission. The Lyulka AL-21F-3 engine delivers maximum thrust
Insets: Su-22M4 No. 3201 taxis to takeoff on runway 25 and is equipped with two external fuel tanks

Su-22M4 *Fitter-K* No. 3201 performs a flyover of Malbork Airfield, followed by a landing at the airfield. In recent years, the last Fitters have been used primarily as Red Air Aggressors for training Air Force squadrons and ground-based air defense units (GBAD)

The pilot of Su-22M4 No. 3817 waits for taxi clearance from ATC. The fighter aircraft received this wild boar livery a year earlier!

Aircraft No. 3817, nicknamed "Wild Boar," is configured for tactical reconnaissance missions. Mounted beneath the fuselage is the KKR-1 reconnaissance pod, which is divided into two primary sections. The forward compartment houses three distinct optical sensors:

- A-39 daylight camera, forward-facing, capable of capturing high-resolution imagery from altitudes ranging between 600 and 15,000 feet
- PA-1 panoramic camera, downward-facing, designed for wide-area daylight coverage
- UA-47 night camera, also downward-facing, which illuminates the target area using photo-flash flares for nighttime imaging.

The rear section of the pod contains an ELINT (Electronic Intelligence) module, used to detect and geolocate hostile radio-frequency emitters, enhancing situational awareness and threat mapping capabilities.

Main: After a reconnaissance mission, No. 3817 comes in for landing. Two distinctive features are immediately noticeable: the "Wild Boar" livery and the large KKR-1 reconnaissance pod

Left: The aircraft on its final descent, gently gliding over Runway 25 in preparation for landing

Right: The aircraft makes firm contact with the runway, leaving behind a visible trail of rubber, the signature of a well-executed landing under high load

Su-22M4 No. 8101 rolls onto the runway in Malbork in a clean configuration. This aircraft is also the second combat aircraft to be decorated with the special "Wild Boar" livery on the front section of the fuselage

The Su-22 Fitter is considered a reliable and robust platform with durable, yet uncomplicated, Soviet-style avionics

Fitter No. 8101 is one of a total of 12 modernized Su-22M4 fighter aircraft of the Polish Air Force and is seen here late in the evening. Its original home is the 21st Tactical Air Base in Swidwin. This base is currently being converted for the arrival of the first F-35A *Lightning II* in 2027.

The Polish Air Force acquired a total of 110 Su-22 fighter jets from the Soviet Union starting in 1988. At the same time, Poland was the first nation within the Warsaw Pact to operate the Su-22M4. They were stationed at the air bases in Pila, Powidz, Swidwin, and Miroslawiec.

Here's the Wild Boar rolling for the last takeoff of the day!

Su-22M4 No. 8101 en route to air combat training. Each of the inner pylon stations is equipped with an R-60 (AA-8) "Aphid" air-to-air missile, equipped with an infrared seeker *Grzegorz Gibas*

The deployment-command of the 21st Tactical Air Base brought a total of two two-seat *Fitter-G*s to Malbork AB. A beautiful formation flight of Nos. 308 and 707 over Malbork AB.

Main: A nice view of two *Fitters* during their landing. Just above the runway, the pilot applies the four airspeed brakes to compensate for the thermal ground effect

Insets: Training aircraft No. 308 made several approaches to the runway. The external fuel tanks are decorated with 'shark mouths'

Main: The Su-22UM3K accelerates down the runway at full thrust, lifting off into the skies over Malbork AB. The extended periscope, mounted atop the rear canopy, provides the flight instructor with a forward-facing view – essential for monitoring flight operations during training sorties

Insets: The training aircraft taxies onto the runway for its next training flight

A very low and flat approach to runway 25 for landing. On this day, the aircraft completed two distinct missions, covering various airspace sectors across Poland. The flight time was approximately to 1.5 hours each, demonstrating the jet's endurance and versatility during tactical operations

In March 2023, this Su-22UM3K, sporting a special black livery, made one of its last approaches to its home base in Swidwin. hortly thereafter, the aircraft was officially retired from service. Over the years, specially painted *Fitter*s have become a proud tradition within the Świdwin unit, marking milestones and honoring the legacy of Poland's Cold War-era fighter aircraft

In the final weeks before the closure of Poland's 21st Tactical Air Base for F-35A Lightning II infrastructure upgrades, several Su-22 *Fitters* continued flight operations. Among them, aircraft No. 3304 was captured on approach in a clean configuration – free of external stores – highlighting the sleek profile of this Cold War-era strike jet.

Captured during its final operational months, Su-22M4 No. 3920 of Poland's 21st Tactical Air Base was photographed on approach in May 2023. Designed for high-speed, low-altitude flight, the Su-22 features variable-geometry wings that significantly reduce drag during fast, 'terrain-hugging' missions. For precision ground attack, the aircraft is equipped with the Klen-54 laser rangefinder and target designator system housed in the nose – enabling effective engagement of surface targets with guided munitions.

Fitter-K No. 8205 approaching Swidwin Airfield on a freezing cold day in March 2023. The external fuel tanks have a shark mouth painted on them. The fighter aircraft has up to ten external mooring points, allowing a maximum payload of 4,000 kg. Standard armament includes unguided munitions, rocket and cannon pods, and multi-purpose bombs. The aircraft is optimized for ground attack but can also carry infrared-guided short-range Molniya/Vympel R-60 (NATO designation: AA-8 Aphid) air -to-air missiles for self-defense

INIOCHOS 2025

TEXT BY DANNY REIJNEN | **PHOTOS** AS NOTED

A formation of Indian Air Force Su-30 MKI-3 *Flankers* returned from their daily INIOCHOS sortie to Andravida AB. The Su-30MKI-3 is India's main air defense aircraft. India has received 260 aircraft to integrate in their operational squadrons. *Danny Reijnen*

FORGING THE FUTURE OF NATO'S MULTINATIONAL AIR POWER

Introduction

In the recent decade the Hellenic Air Force has taken a major leap in modernizing its Air Force capabilities. The service launched an upgrade program for their existing Lockheed Marin F-16 fleet to block 70 standard in which a total of 105 aircraft will be modified. A total of xx Dassault Rafale aircraft were purchased from France and on July 25, 2024 the Greece government finalized its intention to procure a batch of Twenty Lockheed Martin F-35 *Lightning II* aircraft by signing a Letter of Offer and Acceptance (LOA) through a U.S. government Foreign Military Sale. The LOA also includes an option for 20 additional aircraft.

From March 31 to April 11, 2025, the skies over Greece transformed into a dynamic theater of air combat operations as the Hellenic Air Force (HAF) hosted its premier multinational exercise, INIOCHOS 2025. The exercise was hosted by Andravida Air Base, and the 2025 event marked the most extensive participation in the exercise's history. It underscored the pivotal role of Greece in fostering international defense collaboration.

Purpose and Necessity of INIOCHOS

Originating in the late 1980s as a modest tactical drill, INIOCHOS has evolved into a comprehensive training platform designed to enhance interoperability, readiness, and tactical proficiency among allied air forces. The exercise aims to provide realistic training by simulating complex battle environments, exposing personnel to intensive operations that test both physical and psychological endurance. This approach ensures that participants are prepared for the multifaceted challenges of modern aerial warfare.

Vision and Mission of the Hellenic Air Force

The Hellenic Air Force is committed to safeguarding the Greek airspace, supporting national and allied military operations, and contributing to international

An Italian Air Force Tornado IDS MLU from GEA 6° Stormo was captured on its way towards the runway *Danny Reijnen*

peacekeeping efforts. The INIOCHOS motto, "Always Dominate the Heights," reflects a dedication to excellence, adaptability, and strategic foresight. Through exercises like INIOCHOS, the Hellenic Air Force demonstrates its commitment to maintaining a robust and responsive air force capable of addressing contemporary security challenges.

Exercise Objectives

INIOCHOS 2025 defined several key objectives:

- Realistic Training: Creating a battle environment that mirrors modern combat scenarios, including live threats and real-time mission injects.
- Enhanced Interoperability: Facilitating seamless coordination among diverse air forces to execute Combined Air Operations (COMAO).
- Comprehensive Mission Profiles: Conducting a wide range of missions, such as offensive and defensive air operations, strategic strikes, close air support, reconnaissance, combat search and rescue, and protection of high-value assets.
- Accurate Assessment: Utilizing advanced tracking data and debriefing software to reconstruct missions and evaluate performance, ensuring continuous improvement

Top: Tornado IDS – the Tornado flight line of the Italian Air Force in the meantime has been restructured, with all the Tornados consolidated in the 6th Stormo based at Ghedi, with the 154th Gruppo *Diavoli Rossi* on the IDS and the 155th Gruppo ETS (Electronic Warfare Tactical Suppression) *Pantere Nere* flying the ECR version *Danny Reijnen*

Above: Tornado ECR – having played an important and active part throughout their long career – after 42 years of service are nearing the time of retirement. The Italian Air Force still operates 33 IDS aircraft (of which five trainers) and 13 ECR aircraft. Along with the AMX, they are slated to be soon replaced by the F-35 *Lightning II* stealth multirole fighter *Danny Reijnen*

INDIAN AIR FORCE – SUKHOI SU-30MKI-3 *FLANKER*

The Indian Air Force operates approximately 260 Su-30MKI *Flanker*s. The participating *Flanker*s were assigned to 8 Squadron nicknamed *Eight Pursuits* and are based at Bareilly AFS *Danny Reijnen*

Personal Experiences
Pilots and commanders from various nations shared their insights into the exercise's impact. A Hellenic Air Force pilot noted, "INIOCHOS challenges us to adapt rapidly to evolving scenarios, enhancing our decision-making and teamwork under pressure."

An Indian Air Force officer highlighted the value of international collaboration: "Participating in INIOCHOS allows us to learn from our allies, refine our tactics, and strengthen our operational readiness in a multinational context."

These testimonials underscore the exercise's role in building mutual trust, sharing best practices, and fostering a cohesive defense community.

Conclusion
INIOCHOS 2025's emphasis on low-level flying underscored the Hellenic Air Force's commitment to realistic and comprehensive training. By challenging pilots to operate in demanding environments and refining their tactical skills, the exercise ensured that participating air forces are better prepared for the complexities of modern aerial combat.

INIOCHOS 2025 stands as a testament to the Hellenic Air Force's commitment to excellence, innovation, and international cooperation. By providing a realistic and challenging training environment, the exercise not only enhances the capabilities of participating nations but also contributes to global security and stability. As geopolitical dynamics continue to evolve, initiatives like INIOCHOS will remain vital in preparing allied forces to meet emerging threats with unity and resilience.

Right: **The development of the SU-30MKI *Flanker* started after India signed a deal with Russia in 2000 to manufacture 140 Su-30 fighter aircraft. The first Russian-manufactured Su-30MKI variant was accepted into the Indian Air Force (IAF) in 2002, while the first Su-30MKI assembled in India entered service with the IAF in November 2004** *Danny Reijnen*

Above: **In 2007, another order of 40 Su-30MKI *Flankers* was placed. In 2009, the planned fleet strength was to be 230 aircraft. In 2008, Samtel HAL Display Systems (SHDS), a joint venture between Samtel Display Systems and HAL, won a contract to develop and manufacture multi-function avionics displays for the *Flanker*** *Danny Reijnen*

HELLENIC AIR FORCE – F-16C/D *FIGHTING FALCON*

Four F-16 *Fighting Falcons* assigned to 347 Mira, operating the F-16 Block 50 are based at Nea Anchialos AB. The four-ship formation is captured above Andravida AB as they are returing from a daily sortie *Danny Reijnen*

Top: The 343 Mira, nicknamed *Asteri* was the first unit to receive the modernized F-16s back in 2021

Above: In early 2020, the Hellenic Air Force (HAF) announced the start of the modernization program of its extensive F-16 fleet. Greece awarded Lockheed Martin a $280 million contract to upgrade the air force's fleet of F-16C-52+ and F-16D-52+

Right: The HAF F-16s will be upgraded to the Block 72 Viper configuration. The modernization includes an APG-83 Active Electronically Scanned Array (AESA) radar significantly enhancing the aircraft's ability to identify and engage adversary aircraft

All photos this page Patrick Roegies, courtesy of Aviation Photo Crew

The Hellenic Air Force has nine operational F-16 squadrons. The modernization will be limited to upgrading the Block 50 and Block 52 fleet. The Block 30 aircraft will gradually be withdrawn from use *Patrick Roegies, courtesy of Aviation Photo Crew*

Multiple squadrons participate in the annual editions of INIOCHOS. 340 Mira based at Chania has been a regular participant to the exercises *Patrick Roegies, courtesy of Aviation Photo Crew*

POLISH AIR FORCE – F-16C *FIGHTING FALCON*

Main: **The Polish Air Force received a total of 48 F-16C/D Block 52 aircraft and became the first former Warsaw Pact member to operate the F-16 *Fighting Falcon*** *Danny Reijnen*

Inset: **This Polish Air Force F-16C-52CF is equipped with the SNIPER TARGETING POD and is assigned to 3. Eskadra Lotnictwa Taktycznego (3. ELT) based at Poznań – Krzesiny AB, 31. Baza Lotnicza Taktycznego (31.BLT)** *Danny Reijnen*

The Polish Air Force operates three F-16 squadrons, respectively 3., 6., and 10. Eskadra Lotnictwa Taktycznego (ELT). The first two squadrons, 3. ELT and 6. ELT are based at Poznañ – Krzesiny and 10. ELT is based at Łask AB 32. Baza Lotnictwa Taktycznego (32.BLT) *Danny Reijnen*

Top: **The 482nd FighterWing / 93rd Fighter Squadron *Makos* was deployed with 12 aircraft from the United States. The Squadron operates the Block 30 F-16C / D *Fighting Falcon*** *Danny Reijnen*

Left: **Some of the aircraft were painted in the "Have Glass" color scheme. "Have Glass" is the code name for a series of RCS (radar-cross section) reduction measures for the F-16 fighter. Its primary aspect is the addition of an indium-tin-oxide layer to the gold tinted cockpit canopy. This is reflective to radar frequencies, while it may seem odd, adding a radar reflective coating actually reduces the plane's visibility to radar. An ordinary canopy would let radar signals straight through where they would strike the many edges and corners inside and bounce back strongly to the source, the reflective layer dissipates these signals instead. Overall, "Have Glass" reduces an F-16's RCS by some 15 percent** *Danny Reijnen*

Right: **The pilot helmet is fitted with several sensors and electronic devices to support the pilot during combat operations** *Danny Reijnen*

The United States Air Force is gradually replacing its F-16 aircraft and their main training bases have transitioned to the F-35A. The remaining F-16's are all assigned to Air National Guard and Air Force Reserve units *Danny Riejnen*

HELLENIC AIR FORCE – MIRAGE 2000-5

The Hellenic Mirage 2000s are predominantly used as interceptors against adversary ships as they are compatible with the EXOCET missile. They used to operate with 331 Mira *Thiseas* and 332 Mira *Geraki* respectively based at Tanagra AB. With the arrival of the Rafale fighter, 332 Mira has transferred to the Rafale *Patrick Roegies courtesy of Aviation Photo Crew*

Top: **A HAF Mirage 2000-5BG is retracting its gear while taking off. It belongs to 331 Mira based at Tanagra AB. The Mirage 2000-EGs have already been withdrawn from use and replaced by the new Rafale aircraft** *Danny Reijnen*

Left: **332 Mira transitioned from the Mirage 2000BG/EG to the Rafale by 2022 and its remaining Mirage 2000BG/EGs were stored at Tanagra and are up for sale** *Danny Reijnen*

Right: **The remaining Mirages assigned to 331 Mira is subordinated to the 114 Wing based at Tanagra AB** *Danny Reijnen*

Greece has operated the Mirage 2000 since 1988. During the early 2000s, the Hellenic Air Force upgraded part of their fleet to 2000-5 Mk. 2 standard whilst simultaneously ordering new aircraft. Recently, part of the fleet was returned to France as part of an agreement to purchase the Rafale *Patrick Roegies, courtesy of Aviation Photo Crew*

To reduce the large variety of aircraft in its air force, the Hellenic Air Force has started to replace its Mirage 2000-5 Mk II while keeping three types of combat aircraft in service: Rafale, F-16 *Fighting Falcon*, and the F-35 *Lightning II*, which are not expected to arrive before 2028 *Patrick Roegies, courtesy of Aviation Photo Crew*

UNITED ARAB EMIRATES AIR FORCE – MIRAGE 2000-9EAD/DAD

The UAE's Mirage 2000-9s are equipped for the strike mission with the Shehab laser targeting pod (a variant of the Damocles) and the Nahar navigation pod, complementing the air-to-ground modes of the RDY-2 radar. They are also equipped with a classified countermeasures system designated IMEWS, which is comparable to the ICMS 3 *Danny Reijnen*

The UAE's Mirage 2000-9s are equipped for the strike mission with the Shehab laser targeting pod (a variant of the Damocles) and the Nahar navigation pod, complementing the air-to-ground modes of the RDY-2 radar. They are also equipped with a classified countermeasures system designated IMEWS, which is comparable to the ICMS 3 *Danny Reijnen*

QATAR EMIRI AIR FORCE – F-15QA *STRIKE EAGLE*

In September 2016, the sale of 72 F-15QAs to Qatar was submitted to the US Congress for approval. The contract for 36 aircraft plus an option for the delivery of 36 additional aircraft was signed in November 2016 *Danny Reijnen*

Main: Flying Wing 5 has been baptized with the nickname *Ababil* which translated means *Flock of Birds*

Insets: During INIOCHOS 2025 multiple sorties were completed per day including several scenario's that were completed during dusk and night operations. An impressive specific color scheme is applied to the Qatari AF F-15QA's. Quatar is the second Middle East F-15 Operator together with Saudi Arabia

SPANISH AIR FORCE – F/A-18+ *HORNET*

This Spanish Air Force operates one squadron of ex-United States Navy F/A-18A+. They are different from the standard EF-18M assigned to Ala 12 and Ala 15. All F/A-18A+ are assigned to 462 Esc based at Gando AB at Gran Canaria *Danny Reijnen*

HELLENIC AIR FORCE – F-4E (AUP) *PHANTOM II*

The last operational F-4 *Phantom II* squadron is 228 MDV based at Andravida AB which is the hosting base for the INIOCHOS exercise. The F-4 *Phantom II* is flew as 'Red Air' during INIOCHOS 2025 *Patrick Roegies, courtesy of Aviation Photo Crew*

It becomes increasingly difficult keeping the F-4 *Phantom II* in operational condition. The number of aircraft is gradually reduced and it is expected that the F-4 *Phantom II* will gradually be withdrawn from use in the near future *Danny Reijnen*

Top: Although the F-4 *Phantom II* is a second-generation aircraft, a total of 36 Hellenic Air Force *Phantoms II* have been upgraded with advanced electronics (program "Peace Icarus 2000"), extending their operational life *Patrick Roegies, courtesy of Aviiation Photo Crew*

Left: The role of the F-4 *Phantom II*, once renowned for its agility and maneuverability, has gradually faded into the background with the introduction of the latest fourth- and fifth-generation fighter jets into the Greek Air Force's inventory *Danny Reijnen*

Right: It is unclear how long the F-4 *Phantom II* will remain in operational service, but over the past two years, the aircraft have been gradually withdrawn from service *Danny Reijnen*

The F-4 *Phantom II* was introduced in the Hellenic Air Force in 1974 under the Foreign Military Sales (FMS) program "Peace Icarus" and still is in operational use after five decades *Patrick Roegies, courtesy of Aviiation Photo Crew*

SLOVENIAN AIR FORCE – PC-9M

The Slovenian Air Force operates one PC-9M squadron. All aircraft are assigned to Letalska eskadrilja 152.LEESK or 152 Aviation Squadron based at Cerklje ob Krki *Danny Reijnen*

VOURAIKOS VALLEY – LOW LEVEL

THE "GREEK MACH LOOP": VOURAIKOS VALLEY

A focal point for low-level training during INIOCHOS 2025 was the Vouraikos Valley, often referred to as the "Greek Mach Loop." Located in the northern Peloponnese, this 20-kilometer-long canyon offers a challenging environment with its narrow passages and varying elevations, making it ideal for practicing low-altitude maneuvers. The valley's resemblance to the UK's renowned Mach Loop has made it a popular destination for both military training and aviation enthusiasts.

The low-level missions presented several challenges, including unpredictable weather conditions and the inherent risks of flying at minimal altitudes. Despite initial rumors of cancellations, the low-level flights proceeded, much to the delight of aviation enthusiasts and photographers who had gathered in the Vouraikos Valley. Noteworthy moments included the sight of Hellenic Air Force F-4E Phantoms navigating the canyon, a rare and nostalgic experience as these aircraft approach retirement.

Throughout the exercise, approximately 1,300 sorties were conducted across the Athens Flight Information Region (FIR), encompassing a variety of mission profiles, including low-level flights. Each sortie was meticulously planned and executed, with pilots navigating challenging terrains and responding to simulated threats.

Post-mission evaluations were integral to the exercise's success. Utilizing onboard and offboard tracking data, sensors, and specialized debriefing software, missions were reconstructed for detailed analysis. Experienced instructors from the Fighter Weapons School oversaw these debriefings, providing feedback to enhance tactical proficiency and mission effectiveness.

336 Mira is operating the F-16C/D block 52 aircraft. The squadron is nicknamed *Olympos* (*Olympus*) after the nearby mountain near their home base Araxos *Bernd Kalis*

Main: **The Spanish Air Force participated with the aging F/A-18A *Hornet* aircraft from Ala 46 based at Gando Air Force Base. Unlike the remaining Hornets in the Spanish Air and Space Force these F/A-18A aircraft have not been upgraded to the EF-18M standard and are still assigned Air Defense tasks** *Bernd Kalis*

Top: **The primary mission of 155°Gruppo ETS *Pantere Nere (Black Panthers)* is SEAD – Suppression of Enemy Air Defenses – and DEAD – Destruction of Enemy Air Defenses. The Italian Air Force has used 123 Tornado airframes in all possible variants of the aircraft IDS (strike), ECR (electronic warfare) and ADV (air defense)** *Bernd Kalis*

Bottom: **During INIOCHOS, low-altitude flights are integrated. The aircraft must maneuver at high speed in a very narrow gorge in order to complete their mission** *Bernd Kalis*

The Mirage 2000D is a two-seat, all-weather attack aircraft derived from the nuclear-capable Mirage 2000N. The MLU program included enhancements to the aircraft's weapons systems, avionics, and cockpit. It can now deploy a range of precision-guided bombs, including the GBU-48, GBU-49, and GBU-50, as well as the AASM *Hammer* precision-guided munition. The aircraft also carries the MICA infrared air-to-air missile. *Bernd Kalis*

Main: The upgraded Mirage 2000DRMV is designed to remain combat-capable through the 2030s, extending the aircraft's service life and operational capabilities. The French Air Force plans to operate a fleet of 50 modernized Mirage 2000DRMV aircraft *Bernd Kalis*

Top: The Hellenic Air Force (HAF) used to utilize the Mirage 2000, a French-made, multirole fighter jet, in both air defense and anti-ship roles. Specifically, the HAF operated the Mirage 2000EGM/BGM and Mirage 2000-5 variants. These aircraft once were assigned to 331 and 332 squadrons, based at Tanagra AB, equipped with various missiles including the Exocet for anti-ship missions *Bernd Kalis*

Bottom: The Mirage 2000-5s have been upgraded with modern weapons like MICA EM/IR missiles and the SCALP missile for long-range air-to-ground targeting. Greece is considering retiring its Mirage 2000-5 fleet, potentially offering them to India, to fund new Rafale purchases and reduce maintenance costs. *Bernd Kalis*

The Vazduhoplovstvo i protivzračna odbrana Crne Gore or Air Force and Air Defence of Montenegro operates the Bell 412EPI from its Podgorica Gulobovci Air Base. INICHIOS 2025 was the first time that Montenegro participated in the exercise *Bernd Kalis*

Top: A P180AM *Avanti* with serial MM62201 captured on take-off at Andravia after the distinguished visitors day *Danny Reijnen*
Left: The C-130 *Hercules* is a dying breed within the Hellenic Air Force. This C-130H with serial 741 assigned to 356 MTM brought VIPs to Andravida during a press day *Danny Reijnen*
Right: A French TBM-700A belonging to ET00.060 is taxiing towards the runway after the distinguished visitors day *Danny Reijnen*

Participants

Air Force	Squadron	Type	Home Base
Hellenic Air Force	330 Mira	F-16C/D Block 30	Nea Anchialos
	335 Mira	F-16C/D Block 52	Araxos
	336 Mira	F-16C/D Block 52	Araxos
	343 Mira	F-16C/D Block 52	Souda
	347 Mira	F-16C/D Block 50	Nea Anchialos
	331 Mira	Mirage 2000-5	Tanagra
	332 Mira	Rafale DG/EG	Tanagra
	338 MDV	F-4E (AUP)	Andravida
Italian Air Force	6° Stromo/154 Grupp	Tornado IDS,	Ghedi
	6° Stromo/155 Gruppo	Tornado ECR	Ghedi
Spanish Air and Space Force	Esc 462	F/A-18A	Gando
Slovenian Air Force	152 LEESK	PC-9M	Cerklje ob Krki
United States Air Force	93rd Fighter Squadron	F-16C	Homestead
Polish Air Force	31. Baza Lotnicza Taktycznego	F-16C Block 52CF	Poznan-Krzesiny
Montenegrin Air Force	Helikopterska Eskadrila	Bel 412EPI	Golubovci
French Air Force	EC01.003	Mirage 2000D	Nancy
	EC02.003	Mirage 2000D	Nancy
Indian Air Force	8 Squadron	Su-30MKI-3	Trishul
Israeli Air Force	122 Squadron	Gulfstream G-550ETTAM	Nevatim
United Arab Emirates Air Force	76 Multirole Squadron	Mirage 2000-9EAD	Al Dafra
QatarEmiri Air Force	Flying Wing 5	F-15QA	Al Udaid

Participants
INIOCHOS 2025 witnessed participation from 12 nations, making it the largest assembly since the exercise's inception as an Invitation Exercise (INVITEX) in 2015. Countries included France (Mirage 2000), India (Su-30), Israel (Gulfstream G-550), Italy (Tornado), Montenegro (Bell 412), Poland (F-16), Qatar (F-15), Slovenia (PC-9), Spain (F/A-18 Hornet), United Arab Emirates (Mirage 2000-9), the United States (F-16, KC-46, KC-135), and Greece, which deployed its full spectrum of fighter jets, helicopters, transport, and training aircraft. Additionally, Bahrain, Cyprus, and Slovakia participated.

Throughout the exercise, a total of approximately 1,300 sorties were conducted across the Athens Flight Information Region (FIR), encompassing day and night operations that tested the limits of participating forces.

F-4E *Phantom II*s and F-16 *Fighting Falcon*s from the Hellenic Air Force in formation above Andravida AB. This formation represents over five decades of Greek Air Defense Air Power *Danny Reijnen*

FALCON SPRING 2025

ARTICLE BY JORIS VAN BOVEN AND ALEX VAN NOIJE

U.S. Army UH-60 *Black Hawks* are about to take-off from a landing zone close to the Ossesluis lock head

PREPARING THE 13TH INFANTRY BATTALION

An impressive military spectacle took place in the Drenthe landscape in the Netherlands in May 2025. The exercise FALCON SPRING 2025 has started; a large-scale, realistic training in which Dutch and American soldiers prepare for deployment under hostile conditions. The 11 Airmobile Brigade, together with the Defense Helicopter Command (DHC) and the American 12th Combat Aviation Brigade, has been conducting operations in the northern Netherlands for almost two weeks. The exercise came at a crucial time. The deteriorating geopolitical situation underlines the importance of a well-trained armed force. The first main task of the Dutch Defense is to defend its own territory and that of its allies. Realistic training is essential for carrying out this task effectively. "FALCON SPRING is a realistic exercise that we have been preparing for twelve months," said Major Marc Bakker, deputy battalion commander of the 13th Infantry Battalion from Assen. "We train for a scenario in which an opponent has already brought small units across the border to cause hostile actions in a part of our country."

11th Air Maneuver Brigade

The 11th Airmobile Brigade is a rapidly deployable light infantry combat unit that carries out operations from the air to the ground. The brigade can be deployed worldwide within 7 to 20 days, for the defense of its own and allied territory, to protect the international legal order, for disaster control and humanitarian aid. In crisis situations, the brigade is also the first point of contact for nine Dutch safety regions. Since June 2014, the brigade, with approximately 2,000 soldiers, and has been part of the German-Dutch Division Schnelle Kräfte (DSK). This collaboration strengthens interoperability, saves costs and facilitates joint deployment. The staff of this division is located in Stadtallendorf (Germany), while the Dutch troops remain stationed in Schaarsbergen and Assen. When the 11 Airmobile Brigade cooperates with the DHC and 336 Squadron of the Royal Netherlands Air Force, they form the 11th Air Maneuver Brigade (11 AMB). This unit can be deployed worldwide within 20 days, smaller units even within seven days. Within this cooperation, various forms of airmobile deployment are practiced, including air assault, air attack, air drop, air landing and air mobile. The most complex and intensive form, air assault (AASLT),

This U.S. Army CH-47F *Chinook* just landed, deploying special forces

is the brigade's specialty and forms the core of exercise FALCON SPRING. Approximately 1,500 Dutch army and air force soldiers participate in the exercise. The air component is impressive and consists of a mix of Dutch and American helicopters.

12th Combat Aviation Brigade

12th Combat Aviation Brigade is an American air combat capability in Europe. The 12th Combat Aviation Brigade (12 CAB) is part of the United States Army Europe and Africa, and is the only permanently stationed air combat unit of the United States Army on the European continent. The brigade is based at the Lucius D. Clay Barracks in Wiesbaden, Germany, and consists of multiple specialized battalions and companies, including the 1st General Support Aviation Battalion and the 214th Aviation Regiment, which participated in FALCON SPRING 2025. Their participation underscores the close cooperation within NATO. This unit operates a wide range of helicopters, including the CH-47F Chinook heavy lifting helicopter, the UH-60V Black Hawk multi-role utility helicopter, and the HH-60M medical evacuation helicopter. The primary mission of the 12CAB is to provide tactical air mobility, direct air support, and air-based logistics capabilities to allied ground forces. This includes troop lift operations, air assaults, MEDEVAC, Forward Arming and Refueling Point (FARP) support, and the deployment of airmobile command posts. Thanks to their mobility and reach, the units are able to move troops over long distances in a short time, in all weather conditions and in enemy territory. The brigade frequently exercises with NATO partners in the context of the Enhanced Forward Presence (eFP), Defender Europe and other large-scale operations and training that contribute to deterrence and collective defense on the continent.

Defense Helicopter Command

Major Marco, is an experienced helicopter pilot with over 20 years of experience, including deployments to Afghanistan and has more than 3,500 flight hours, 2,500 of which were in the CH-47F Chinook, serves with the Royal Netherlands Air Force's 298 Squadron. During Exercise FALCON SPRING, held in May 2025, his detachment consisted of 65 personnel, including six operational crews made up of pilots, loadmasters, and aerial gunners. In his role as S3 Air/Chief Air Ops, Major Marco was responsible for coordinating all flight operations for the squadron. He emphasized the significance of FALCON SPRING as the launch point for a more dynamic operational concept, driven by evolving security challenges in Eastern Europe. This exercise provided his team with a critical opportunity to assess their development in areas such as command and control, tactics, techniques, and procedures (TTPs), and their capacity for self-sustainment. Working in an international context, Major Marco highlighted how operating alongside fellow NATO members, especially with shared platforms like the *Chinook* and *Apache* helicopters, reinforces interoperability. He and his team contributed both tactical flight expertise and valuable maintenance knowledge to their partners. Preparation for the exercise involved rapid deployment, achieving full operational capability, and gradually increasing mission complexity – from basic daytime operations to complex nighttime and multinational flight formations. Despite initial challenges adapting to the integration of Transport, Attack, and Combat Service Support squadrons, Major Marco stressed that overcoming those struggles was essential for growth, proudly affirming their squadron motto during the exercise: "You Call, We Haul!"

Major "Loekie," with over 20 years of flying experience and more than

The CH-47F *Chinook*'s sling-load capacity is 26,000 lbs (11,793 kg) at the center hook, 17,000 lbs (7,711 kg) at the forward/aft hook, and 25,000 lbs (11,340 kg) tandem

The CH-47F *Chinook* can lift intra-theater payloads up to 16,000 lbs (7,257 kg) in high/hot environments

2,500 hours in the AH-64E Apache, is the acting squadron commander of 301 Squadron, based at Gilze-Rijen Air Base in North Brabant . In the FALCON SPRING 2025 exercise, his squadron took charge of attack missions under the task force commander's direction, with Major "Loekie" leading his team through each phase. As the second installment in a three-part series aimed at transitioning from COIN (Counter Insurgency) focused operations back to large-scale combat readiness, this exercise was crucial in reacquainting the unit with massed engagement tactics. Although 301 Squadron did not conduct combined training with international units this time, the presence of the United States Army's 12th Combat Aviation Brigade flying alongside them at Gilze-Rijen AB underscores the importance of multinational interoperability, particularly since the Netherlands will not operate solo in future large-scale operations. Throughout FALCON SPRING, the squadron contributed its expertise in attack aviation operations, sharing tactical insights and combat-proven procedures. Going forward, Major "Loekie" revealed plans for expanded cooperation with the 12 CAB Attack Aviation Battalion, building on joint events already initiated this year. Proudly embracing their role and ethos, he aptly summarized the squadron's mindset with, "We fight, we lead, we learn."

The CH-47F *Chinook* has a max. gross weight of 50,000 lbs (26,800 kg) and an internal payload capacity of 24,000 lbs (10,886 kg). Its top speed is 170 kts (315 km/h) and its range is 400 nm (740 km)

The CH-47F *Chinook* can transport up to 55 combat equipped troops

Joint Integration

During FALCON SPRING 2025, elements of the 12 CAB operated seamlessly alongside Dutch units. The deployment of American *Black Hawk*s, *Chinook*s, and Medevac helicopters significantly increased the level of realism of the exercise and provided the airmobile infantry with crucial air mobility under simulated combat conditions. The collaboration with the Dutch Defense Helicopter Command (DHC) and 11 Airmobile Brigade demonstrates the high level of interoperability that NATO strives for. In addition, the exercise offered the opportunity to further align procedures in the areas of communication, command and control, air traffic coordination, and FARP logistics. For the 12 CAB, participation in FALCON SPRING also means a demonstration of their readiness and responsiveness to respond quickly to crises in the NATO treaty area. Leeuwarden AB serves as the "beating heart" of the operation. The ground component is formed by the 13th Infantry Battalion Airmobile (13Infbat), part of the Regiment Stoottroepen Prins Bernhard. This unit from Assen carries out the main tasks of the exercise, supported by reservists from the 20th Infantry Battalion, who take on the role of the enemy in the scenario.

The U.S. Army is investing in the CH-47F Block II program, which incorporates redesigned rotor blades, composite airframe components, and upgraded avionics. These modifications are intended to increase lift capacity by more than 1,500 lbs (680 kg) and improve operational survivability in high-threat conditions

Exercise Objectives

The exercise FALCON SPRING 2025 is not only a technical or tactical training, but also an important strategic test for the Dutch armed forces. The objectives are therefore multiple. In light of the increased tensions on the eastern flank of Europe and hybrid threats, the emphasis is on being able to carry out robust, fast combat operations on own or allied territory. This requires seamless cooperation between air and ground components, rapid deployment, and adaptability under pressure for the defense of NATO territory. By working closely with the American 12th Combat Aviation Brigade, the aim is to test and improve tactical interoperability with NATO partners. Differences in procedures, communication, and deployment methods are coordinated and standardized in practice, which is essential for joint NATO operations. In addition to direct combat skills, the emphasis is on operational sustainability; being able to operate from temporary bases, setting up FARPs (Forward Arming and Refuelling Points), logistics in enemy territory, and medical evacuation under pressure. All of this forms the backbone of long-term deployment. By building up the scenario dynamically, with unexpected changes in assignments such as from Oudemolen to Ossesluis, not only the physical reaction capacity is tested, but also the mental switching of commanders at different levels. The ability to plan, delegate and improvise under pressure is crucial. The exercise therefore also tests the command structure and

The U.S. Army UH-60V *Black Hawk* has an MTOW of 22,000 lbs (9,980 kg), the internal payload is 5,700–6,600 lbs (2,585–2,994), and external sling load lift capacity is 9,000 lbs (4,082 kg). The helicopter has a transport capacity of 11 fully equipped soldiers.

decision-making under pressure.

FALCON SPRING was set up to prepare the airmobile units for deployment in a dynamic and hostile area. The emphasis is on main task of the armed forces, which is combat. But other aspects are also intensively practiced; logistics, medical evacuation, communication, cooperation with air support, and operating from temporary bases. Soldiers train, among other things, in setting up Forward Operating Base camps (FOBs), carrying out airborne operations, securing strategic targets such as bridges and locks, and operating under enemy threat. A lot of attention is also paid to cooperation, tactical action, and operating in difficult circumstances. "We not only train in carrying out combat operations, but also in operating in large groups and maintaining sustainability," says Bakker. The exercise is also a crucial step in the certification of the battalion for possible deployment within the NATO Response Force. FALCON

U.S. Army UH-60V *Black Hawk*s insert special operations forces near enemy positions

The UH-60V *Black Hawk* is basically a UH-60L with UH-60M-level avionics (digital glass cockpit, open architecture). The engines, payload, and MTOW remain the same as the L model, there is no performance boost in lift or speed. The UH-60V is a cost-saving retrofit: about $9M cheaper per aircraft than buying a new UH-60M, while extending fleet life by about 10 years (the UH-60M brings better engines and incremental improvements in performance, reliability, and handling). The U.S. Army released its first UH-60V for service on 29 September 2020

SPRING is part of a multi-year process towards readiness for deployment within the NATO Response Force (NRF). The NRF requires rapid availability and high readiness of participating units. The exercise, therefore, serves as a substantive assessment and certification for that deployment. The exercise, FALCON AUTUMN, in Poland, will follow in the autumn, where the unit will be further tested under realistic conditions.

Deployment from Oudemolen to Ossesluis

One of the most dynamic parts of FALCON SPRING 2025 is the successive deployment of airmobile units at two strategic locations: the Oudemolen mobilization complex and the Ossesluis lock head. This succession of missions forms the core of what the exercise aims to train: flexibility, speed and adaptability. On 16 May, five *Black Hawk*s and four *Chinook*s landed in two waves – at 12:00 and 14:00 – with a total of 300 to 400 soldiers at Oudemolen. The helicopters remained on the ground for only a few minutes. The units recaptured the complex, eliminated enemy elements, and occupied the area during the night. The next day, the troops were picked up again by helicopter. It was only during the extraction that they were told that a new order had been received: to fly directly to the Ossesluis to carry out a new raid there. "Being quickly ready for a new deployment after a deployment – from Oudemolen straight to Ossesluis – is what it's all about," Major Bakker explains. "You have to adapt and be ready for battle again quickly."

At the Ossesluis, the units had to operate under pressure again. The goal: to capture the strategic lock complex, occupy it, and eliminate all enemy activity. The night was also spent here, where the complex had to remain firmly in the hands of the airmobile troops. After this double deployment, the units moved to Havelte, where they spent the weekend on the training ground. For the first time, a camp was set up and defended on this scale in enemy territory. There was no flying, but the exercise for the ground troops continued unabated. "You have to be able to set up and defend a base of operations in enemy territory," says Bakker. An important aspect was the guarding of parked helicopters, which required extra protection

UH-60V *Black Hawks* are standing by to extract special operations forces following successful mission completion

U.S. Army CH-47F *Chinook*s are deploying additional special operations forces as reinforcements

as vulnerable assets. In the second week of the exercise, the focus shifted to the Marnewaard. Here, exercises were mainly conducted in the dark. Night flights and scenarios are a new and challenging part of FALCON SPRING. Helicopter crews train intensively on operations with night vision goggles, while ground troops prepare for combat and movements in complete darkness.

Forward Arming and Refueling Point

A vital part of air operations is the deployment of FARPs – Forward Arming and Refueling Points. These mobile refueling and rearming locations ensure that helicopters such as Chinooks and Apaches can quickly refuel and reload, without returning to a fixed base. This increases operational flexibility and makes it possible to operate in enemy territory for long periods of time. Low-level flying is necessary to remain out of range of enemy radar and missile systems. Helicopters use natural cover such as tree lines and terrain elevations to operate unseen. "This method of self-protection requires specific training, which must be kept up to date," says Bakker. The deployment of mobile refueling and ammunition points allowed helicopters to continue operating close to the front. This enables a broader deployment range and higher frequency of missions – a tactical advantage that could be decisive in future conflicts.

Future

Major Patrick van Aalderen (public relations officer), 11th Airmobile Brigade, explains some future steps of the Brigade. The FALCON SPRING exercise is a crucial step in the certification of the 13th Infantry Battalion (the regiment Prince Bernhard's shock troops) for possible deployment within the NATO Response Force. In the autumn, the Falcon Autumn exercise will follow in Poland, where the unit will be further tested under realistic conditions for their final certification.

Why Poland was chosen: "Because Poland naturally lends itself well in terms of environment and infrastructure for a possible deployment somewhere along the eastern flank if necessary." As the drone threats are getting very serious, drone countermeasures will be implemented, and that is also the reason that a new command has been established with the 11th Airmobile Brigade, completely focused on drones. Also, the Man-Portable Air Defense Systems (MANPAD) will return to the 11th Airmobile Brigade for better air defense operations. In this exercise, drones are used for observation purposes.

Conclusions

FALCON SPRING 2025 shows how the Dutch armed forces are preparing for a changing and complex threat picture. The cooperation between the air force and the army, and with international partners such as the Americans, is central. The exercise is realistic, intensive, and strategic in design. "We are a northern battalion. We see this as our environment and want to be visible in it," says Bakker. "In addition, it saves a lot of travel time and therefore also money. And here in Drenthe, there is more space to carry out these types of activities." After two intensive weeks, Defense draws a number of important lessons and conclusions from FALCON SPRING 2025. The execution of back-to-back missions, from deployment at Oudemolen to raid on the Ossesluis, confirms that the Airmobile Brigade can remain fully deployable in a very short time. This underlines the operational value of light, rapidly mobile units within the current threat picture. The airmobile units have speed and flexibility as core qualities during these types of operations. The intensive training in darkness, supported by night vision goggles and adapted procedures, has proven that units can also function in challenging circumstances. This increases the chances of survival and operational surprise during future deployments. Night operations were therefore really used as a game changer during FALCON SPRING.

Interoperability of units is not yet self-evident, but is growing. The cooperation with American units went smoothly for the most part, but also revealed points of attention. Differences in communication protocols, logistical planning, and command require continuous attention. Nevertheless, there is confidence that these exercises lay the foundation for effective NATO deployment. The choice to train in Drenthe was not only logistically smart but also contributed to social visibility. Local involvement, media interest, and cooperation with civil authorities, such as in securing infrastructure, ensure support and realism. It thus ensures visibility in the region and within Defense itself to emphasize the importance of Defense in these times. The exercise ran from 12 to 23 May 2025 and ended at Leeuwarden AB base. After that, the 13th Battalion is ready for certification. FALCON SPRING 2025 confirms that the Dutch airmobile units are not only deployable but are also able to improvise and work together under pressure. In a world in which military threats are no longer abstract, this exercise is a necessary investment in safety, preparedness, and international cooperation. Did they complete their mission today? Bakker smiles: "The thirteenth battalion, of course." The next step? FALCON AUTUMN, where the lessons learned will be tested in an even more severe scenario in Poland.

A Royal Netherlands Air Force CH-47F *Chinook* is picking up special operations forces after their mission is completed

The Royal Netherlands Air Force currently has 20 active CH-47F *Chinook*s in its inventory

DYNAMIC MANTA 2025

ARTICLE BY MATTEO BUONO

Flight line at Naval Air Station Sigonella with one Royal Canadian Air Force CP-140 *Aurora*, two Royal Air Force P-8 MRA.1 *Poseidons*, and two U.S. Navy P-8A *Poseidon* (left to right)

From 28 February to 14 March 2025, the Mediterranean Sea once again served as the stage for DYNAMIC MANTA 2025 (DYMA), one of NATO's most complex and advanced anti-submarine warfare exercises. Annually planned by the NATO Allied Maritime Command (MARCOM), based in Northwood, United Kingdom, DYMA aims to train and refine allied capabilities and competencies while enhancing interoperability in anti-submarine warfare (ASW) and anti-surface warfare (ASUW). Alongside surface units, submarines, aircraft, and helicopters were also engaged, with thousands of sailors and flight personnel participating from nine allied nations.

The exercise built on the success of previous editions by incorporating new tactics, technologies, and operational insights. The primary objective remained the training of submarine crews to respond to any surface or subsurface threat. "Large and complex exercises like Dynamic Manta help NATO maintain its edge in anti-submarine warfare," stated U.S. Navy Rear Admiral Bret Grabbe, Commander of NATO Submarines, emphasizing that "By conducting coordinated operations against both conventional and advanced underwater threats, NATO continues to demonstrate its commitment to safeguarding the strategic waterways connecting its member states." For the third time since the first edition, submarine assets also worked with the Allied Maritime Special Operations Forces (SOF), strengthening interoperability with this resource and highlighting how cooperative capabilities serve as a force multiplier for the alliance.

As the host nation, Italy provided logistical support for operations by making the ports of Catania and Augusta available for naval assets from Greece, Spain, Turkey, and the United States, as well as the Italian Navy. The latter hosted two NH-90 NFH helicopters from the Royal Netherlands Navy's 860 Squadron at the MARISTAELI base in Catania. Meanwhile, the Italian Air Force accommodated maritime patrol aircraft (MPA) from Canada, Germany, Turkey, the United Kingdom, and the United States, which were deployed to Sigonella Air Base, home of the 41st Anti-Submarine Warfare Wing. Specifically, two P-8A

A Royal Canadian Air Force CP-140 *Aurora* taxis to the end of runway 10L for take-off

U.S. Navy P-8A *Poseidon* assigned to VP-26 *Tridents* at NAS Jacksonville, Florida, sitting on the ramp and waiting for the crew to arrive

Poseidon MRA.1s from the Royal Air Force based at Lossiemouth, Scotland; two CP-140 *Auroras* from the Royal Canadian Air Force stationed at Greenwood; an ATR-72-600 MPA from the Turkish Navy's 301 Deniz Hava Filosu; one of the last two P-3C Orions from the German Marineflieger, soon to be retired and replaced by modern P-8 *Poseidon* this year, were involved. The United States Navy also participated in the exercise, conducting around ten missions with P-8A aircraft from the VP-26 *Tridents* patrol squadron, deployed from Jacksonville, Florida, and stationed in Sicily (TDY) for approximately six months, with a total of eight aircraft usually operating near 'hot' theaters such as the Black Sea and the southeastern Mediterranean.

Six submarines from the navies of France, Greece, Italy, Turkey, and the United States took part in the training event under the NATO Submarine Command (COMSUBNATO), which exercised operational control as required by the exercise scenario. To ensure that each participant had the opportunity to conduct various submarine warfare operations, the Command planned and coordinated with other naval and aerial entities, alternating ASW missions and evasion drills for each ally. The Standing NATO Maritime Group 2 (SNMG2), an integrated multinational naval force belonging to NATO's Response Force, was also involved. SNMG2 was commanded by Turkish Navy Rear Admiral H. Ilker Avci. It comprised the Turkish frigate TCG Kemalreis (F247), the Greek frigate HS Kountouriotis (F462), the Spanish replenishment ship ESPS Patiño, the frigate ESPS Álvaro de Bazán, the French ship FS Commandant Birot (F796), and the Italian Navy offshore patrol vessel ITS Paolo Thaon di Revel (P430). DYNAMIC MANTA is one of dozens of annual maritime exercises led by MARCOM. These, along with numerous national exercises, help enhance NATO's defense readiness. The sister exercise, DYNAMIC MONGOOSE, will take place between April and May 2025 in the cold waters of the North Atlantic, continuing NATO's ongoing training and cooperation in submarine warfare.

Above left & middle: **Bergamini-class frigate Carlo Margottini (F 592) of the Italian Navy**

Above right: **A crew member is handling an AN/SSQ-53C DIFAR (DIrectional Frequency Analysis and Recording) passive-only sonobuoy**

Right: **Crew at work inside an U.S. Navy P-A8 at their workstations**

Main: The crew of a P-8A *Poseidon* poses for the camera in front of their aircarft
Insets: *Poseidon's* dual-pilot, state-of-the-art glass cockpit including a head-up display

The German Navy participated with a P-3C *Orion* in DYNAMIC MANTA. The aging P-3C *Orion* is being replaced by the Boeing P-8A *Poseidon*, with the German Navy having procured eight aircraft through the U.S. Foreign Military Sales (FMS) program. The first P-8A *Poseidon*, bearing German markings, is scheduled for delivery later this year

Turkish Navy ATR 72-600 MPA (Maritime Patrol Aircraft) twin-engine turboprop aircraft configured for maritime surveillance, anti-submarine warfare (ASW), and anti-surface warfare (ASuW) missions. It is equipped with advanced radar, electro-optical sensors, sonobuoy systems, and a mission management system for real-time data sharing. The aircraft can carry lightweight torpedoes and other mission-specific payloads, providing long-endurance patrol and reconnaissance capabilities over sea

REPUBLIC OF KOREA AIR FORCE
PHANTOM PHAREWELL

PHOTOREPORT BY WOLFGNAG JARISCH

Active *Phantom* crew members of the 153 Fighter Squadron, 10 Fighter Wing, are posing on the last *Phantom* after its last flight

On 7 June 2024, the Republic of Korea Air Force (ROKAF) bid farewell to the Phantom after 55 years of service with a solemn ceremony at Suwon Air Base, South Korea. The ceremony opened with a memorial to the F-4 Phantom crew who lost their lives in the line of duty.

Afterward, two aircraft – serials 78-739 and 80-743 – from Fighter Wing 10 took off for the last flight of an F-4E of the ROKAF. The F-4E Phantom II with serial number 78-739 was painted in the original "jungle" camouflage pattern (SEA Camo – Southeast Asia Camo). This color scheme was used from the Phantom's introduction in the 1970s until the 1980s, mirroring the U.S. Air Force's color scheme during the Vietnam War. This scheme supported the typical low-level strike and air-superiority missions of that time by blending with the lush terrain and forests.

The other Phantom, serial number 80-743, was painted in the ROKAF's current dark gray camouflage that was similar to the U.S. Air Force's "Euro 1" color scheme.

After the flight, the aircraft taxied back to a special parking position in front of the visitors and joined an RF-4C with serial 70-457. The RF-4C reconnaissance version had already been phased out in 2014. This aircraft was painted in the Two-Tone Light Gray Camouflage. This color scheme was adopted as it was better suited to Korea's diverse weather and modern air-combat environments – offering improved concealment at high altitudes and in overcast conditions. It also reflected a broader trend in air forces, prioritizing air-to-air effectiveness over ground concealment.

The Republic of Korea Air Force (ROKAF) operated around 187 to 192 F-4 Phantom II aircraft throughout its history in three main versions:

- F-4D: approximately 92 units received and operated starting in 1969; retired by 2010.
- F-4E: about 94 to 103 units received, including the last Phantom built by McDonnell Douglas (serial 78-0744); retired in 2024.
- RF-4C reconnaissance version: around 27 units operated; retired by 2014.

This F-4E *Phantom II* was repainted in this historic camo for the farewell event. This classic Southeast Asia (SEA) comouflage, a pattern of green, brown, and tan, was the ROKAF Phantom's first livery, used from their introduction until the 1980s


ROKAF
78 739
739


ROKAF
78 739
739


ROKAF
78 739

This F-4E *Phantom II* was painted in the ROKAF current dark grey camouflage that was similar to the U.S. Air Force's "Euro 1" color scheme


ROKAF
80 743
1960


ROKAF
80 743
국민의 품에서, 국민의 마음으로
1969 - 2024
743


G10 →


1969 - 2024
743


ROKAF
78 739
739

Photos of the 'farewell ceremony' and the two crews of the two *Phantom*'s last flight

The F-4C *Phantom II* reconnaissance version (main) was phased out in 2014. This aircraft was painted in the two tone light grey camouflage, which offered an improved concealment at high altitudes and in overcast conditions

RAF ODIHAM OPERATIONS

TEXT BY KRIS CHRISTIAENS | **PHOTOS** BY KRIS CHRISTIAENS AND GERT TRACHEZ

Chinook HC6A (CH-47F) of No. 27 Squadron. The Chinook HC6A is an upgraded HC4 (basicly identical to the U.S. Army CH-47D with some RAF specific modernizations). The last of a total of 38 HC6A was delierd to the RAF in October 2021

On Monday, 14 April and Tuesday, 15 April 2025, COAP Wings (Center of Aviation Photography) organized a two-day photo shoot at RAF Odiham, where photographers had the unique opportunity to photograph up close the military helicopters stationed here during their daily military operations. RAF Odiham is a Royal Air Force station situated a little to the south of the village of Odiham in Hampshire, England. It is home to the Royal Air Force's heavy-lift helicopter, the Boeing Chinook, including the HC5, HC6, and HC6A variants, and to The King's Helicopter Flight (TKHF). RAF Odiham's mission statement is to "Deliver and sustain Chinook and Special Forces aviation operations worldwide, to support UK defense missions and tasks." During World War II, RAF Odiham hosted fighter and reconnaissance aircraft. Postwar, the station transitioned to a focus on rotary-wing aircraft, becoming the hub for the RAF's Chinook operations in the early 1980s. To fulfill its mission, the station is home to No. 7 Squadron, No. 18 Squadron, and No. 27 Squadron, all operating the Boeing Chinook and forming part of the RAF's Support Helicopter Force. The Chinook Display Team is also based at RAF Odiham, and the station is also home to the headquarters of the Joint Special Forces Aviation Wing (JSFAW). This two-day photo shoot was also part of the 100th anniversary of RAF Odiham. This site was chosen in 1925 as an ideal place for a helicopter base, and today this RAF station employs about 1,700 military and civilian personnel.

During this two-day photo shoot, photographers were welcomed by Flt Lt Andy Donovan and people from the No. 27 Squadron who ensured that this event ran smoothly and was very professionally organized. No. 27 Squadron of the Royal Air Force was formed on 5 November 1915 and currently operates the Boeing Chinook. In the past, this squadron and its Chinook helicopters conducted numerous important missions abroad, such as Operation Telic in Iraq and Operation Jacana and Operation Herrick in Afghanistan. Before this squadron performed its duties with the heavy-lift Chinook helicopters, the pilots of No. 27 Squadron also flew on Douglas Dakota, English Electric Canberra, Avro Vulcan, and Panavia Tornado aircraft, among others. On the first day of this photo event, photographers got the opportunity to photograph the mighty Boeing Chinook helicopters at sunset and in the evening as they conducted ground runs and several exercises. In addition, an AgustaWestland Apache attack helicopter of the British Army Air Corps also visited RAF Odiham and we were given plenty of time to photograph both the Chinook and the Apache from all possible positions.

Chinook HC5 – This version is an upgraded HC3, a Special Forces variant of which eight were built. The upgrade comprised a digital cockpit and replaced the analogue flight control system with Digital Automatic Flight Control System (DAFCS). With the DAFCS the pilots can hover the Chinook in place and land with limited visibility

During the second day, photographers were able to attend a fire drill in the morning, where the fire department demonstrated how to extinguish a Chinook. At a special training area, RAF Odiham has a full-size metal frame of a Chinook helicopter that can be set on fire so that military firefighting teams can learn how to tackle such fires. This was followed by a visit to the military working dog section of RAF Odiham. After this, the group photographers were taken to a separate area of the air base where a Chinook helicopter performed touch-and-go exercises on a slope, followed by a sling load exercise with a container and a cannon. This was all carried out by a Boeing Chinook HC5 with registration ZH900. In the afternoon, we were taken by bus to the Bramley Training Area, where the Chinook helicopter ZH900 conducted numerous exercises. Bramley Training Area, spanning approximately 900 acres, is a British Army training camp, located south of the village of Bramley, Hampshire, and is used regularly by recruits. In this huge training area, a Boeing Chinook HC6 helicopter from RAF Odiham conducted numerous landings and also picked up recruits who were at the end of their basic training. During these exercises at the Bramley Training Area, we got a close-up look at how the impressive Chinook helicopter was set down at small landing sites, in which communication between the pilots and the flight engineer or loadmaster is essential.

This two-day photo shoot was fantastically organized from start to finish, resulting in unique photos and unforgettable moments. We would like to sincerely thank RAF Odiham, Flt Lt Andy Donovan, the pilots and crews of No. 27 Squadron, and Center of Aviation Photography for this wonderful event!

Training for the worst-case scenario: firefighters from RAF Odiham demonstrate how to extinguish a burning Chinook helicopter

The Chinook HC5 is capable to transport oversized loads with the help of slings that can be attached to three external cargo hooks. The sling-load capacity is 26,000 lbs (11,793 kg) at the center hook, 17,000 lbs (7,711 kg) at the forward/aft hook, and 25,000 lbs (11,340 kg) tandem (for CH-47F)

The HC5 variant of the Chinook is visually distinguished from the HC6 and HC6A models by its oversized, bulbous fuel tank

Chinook HC6A 'ZH710' assigned to No. 18(B) Squadron

The Chinook HC5 can carry up to 55 troops internally, however due to specific configurations and mission requirements the number can vary.

An AgustaWestland Apache attack helicopter of the British Army Air Corps, visiting RAF Odiham, and a Chinook HC6A presented themselves in the evening light for a photo shoot in different positions

Army Air Corps Agusta Westland AH1 Apache

Chinook HC6A parked on the ramp at RAF Odiham

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