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- Bulgarian Air Force at 110
- Fire Blade 2022
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Content

Cover: Exercise STORM TIDE 2022 - A Belgium Air Force NH90 TTH approaches the landing zone to extract a Special Forces team. ***Photo Kris Christiaens***

This page: Exercise ANATOLIAN EAGLE 2022 - For the first time, a Bayraktar Akıncı High Attitude Long Endurance combat drone is participating in this exercise. ***Photo Peter Thivessen***

THE AVIATION MAGAZINE

by www.TheAviationMagazine.com e-mail: editor@TheAviationMagazine.com

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.

Do you feel addressed and want to be part of our team? We would love to publish your work too, so feel free to shoot us an e-mail to editor@TheAviationMagazine.com. Please note that we do not accept any unsolicited articles or images for publication.

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Dear Readers,

Welcome to this year's last issue of THE AVIATION MAGAZINE. This year, we have reported on exciting and interesting events with a focus on military aviation in a total of 74 articles with a total of 1,540 pages. And we are very confident that we will increase that in the coming year.

For the first issue of 2023, we are planning reports from base visits in the U.S., multinational exercises in Europe, air policing in Eastern Europe and international air shows, among others.

Until then, we wish you all the best, be safe, and stay healthy.

Hope to see you again in 2023

Ralf Peter WALTER
Publisher & Editor

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BULGARIAN AIR FORCE AT 110

REPORT BY ISTVÁN KELECSÉNYI

On 25 June 2022, a ceremony and an open day were held to mark the 110th anniversary of the establishment of the Bulgarian Air Force at Graf Ignatyevo AB near Plovdiv. The ceremony was attended by the President of the Republic of Bulgaria, Rumen Georgiyev Radev, and the Minister of Defense, Emil Eftimov. President Radev, 59 years old, was a soldier before his presidency, serving in the Bulgarian Air Force from 1987 to 2017, an excellent MiG-29 pilot, and in his last position, Commander of the Air Force.

The static display showcased current equipment as well as equipment that is withdrawn from service. As an external guest, the U.S. Air Force Europe was represented with two F-16 Block 40CM fighter-bombers, assigned to its Aviano-based 555th FS *Triple Nickel*.

In Bulgaria, the delivery of eight Lockheed-Martin F-16V, the latest and most modern variant of the F-16, has been delayed by about two years. Supply chain disruptions caused by the COVID-19 pandemic brought the Greenville production line to a virtual standstill. Apart from Bulgaria, Slovakia will also receive its aircraft later.

The flying program kicked off with a Mi-17 transport helicopter flying the flag of Bulgaria. It was followed by two PC-9s, one L-39ZA training aircraft, and two MiG-29UB fighter trainer aircraft. The two MiG-29UBs intercepted a C-27J transport aircraft, which had taken off in the meantime, according to the NATO Integrated Air Defense System (NATINADS) air defense procedures. Next were a Mi-17 Hip and an AS.532 Cougar medium transport helicopter, first performing a search and rescue demonstration and then, showing its dynamic capabilites.

During the lunch break, the audience was entertained by a demo of the Zlin 242L training aircraft and the Bulgarian Navy's AS.565 Puma helicopter.

In the afternoon, the same program was flown as in the morning, with an additional demonstration by a Mi-17 and an AS.532 Cougar together with the Bulgarian Special Forces. Also in the afternoon only, a Mi-17 demonstrated the use of a Bambi Bucket for aerial firefighting. This was followed by an impressive dogfight combat simulation of the two MiG-29UB trainers. Next were two Su-25 Frogfoot attack aircraft from the Bulgarian Bezmer AB. To conclude the dynamic part of the event, Brigadier General Nikolay Ruzev, commander of the Graf Ignatyevo base, demonstrated the MiG-29B fighter aircraft.

We like to thank the Bulgarian Air Force for the invitation to this event.

Su-25UBK *Frogfoot* training variant on the taxiway after landing, where its pilot will drop the drag chute to be picked up by the ground crew.

A Mi-17 carrying the national flag of Bulgaria opened the flying display.


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The Su-25K single-seat, twin-engine aircraft (serial 249) is designed for CAS (close air support). The trainer variant (serial 002) is designated Su-25UBK.

MiG-29UB fighter trainer aircraft. Due to the not effective combustion of fuel in combustion chamber, the old Klimov RD-33 engines produce a lot of black smoke at low throttle settings and when throttling up.

These two MiG-29UB twin-seat training aircraft were simulating a 1-versus-1 dogfight.

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- **1, 2, 3** MiG-29UB
- **7, 8** MiG-29A
- Artwork on some of the MiG-29's starboard vertical stabilizer :

4 MiG-29UB, serial 14 - Bulgarian pilots Radul Milkov (and Prodan Tarakchiev) were the first in the world to carry out an aerial bombing raid over the Karagachi railway station near Fort Edirne on 16 October 1912. The two bombs were placed in a basket on each side of the aircraft. Radul Milkov died in 1962.

5 MiG-29A, serial 37 - Stoyan Stoyanov shot down fifteen aircraft during the Second World War. Officially, three of these were B-24s, and he damaged three of them. He also shot down two P-38 escort fighters and damaged one. He was an ace pilot in the Bulgarian Air Force. He died in 1997.

6 MiG-29UB, serial 33 - Lt Cdr Nedelcho Bonchev achieved two aerial victories in World War II. His second victory was achieved by a crash into a B-17 Flying Fortress on 17 April 1944. Bonchev parachuted to safety. In 1944 Bulgaria joined the Allies and entered the war against Germany. Bonchev flew eight sorties. On 8 October, he provided cover for six Bulgarian Dornier Do-17 bombers during an attack on German positions. Shot down by German air defenses, he jumped out of his plane but was killed on the ground by former allies.

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The Bulgarian Air Force has 12 Eurocopter AS532L *Cougar*s and three Mi-17 in service.

Above: A Eurocopter AS532L *Cougar* and a Mi-17 *Hip* use the Bambi Bucket to fight fires from the air.
Left: Eurocopter AS532L *Cougar*.

Fast roping of a Special Forces team from a Eurocopter AS532L *Cougar* while a Bell 206B hovers nearby.

Bulgarian Navy AS365N3 *Dauphin*.

Main Image: The Bulgarian Air Force currently has six Swiss-made Pilatus PC-9 basic/advanced turboprop trainer aircraft and six Aero L-39ZA *Albatros* advanced jet trainers.

Insets: Aero L-39ZA *Albatros* taxying back to the flight line after having finished its flying display.

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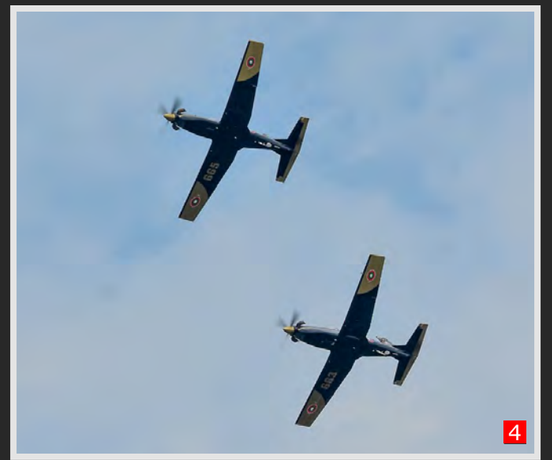
The Bulgarian Air Force uses the Pilatus PC-9 turboprop aircraft **(1, 3, 4, 5)** for basic and advanced pilot training.

Image 2 shows the Bugarian Air Force's only PC-12M *Eagle*, built by the Swiss aircraft manufacturer Pilatus.



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Two of three Alenia C-27J *Spartan* transporters Bulgaria has in its inventory.

▲ U.S. Air Force F-16 assigned to 555th FS *Triple Nickel* at Aviano AB, Italy.
▼ One of four recently to the Bulgarian Air Force delivered Zlin 242L trainer aircraft.

One of two active Let L-410UVP-E3 utility aircraft. ▲
The Bulgarian Air Fore operates a single Antonov An-2. ▼

THE EAGLES OF MAR MENOR PART 2

ARTICLE BY MARCO MUNTZ
AND WIEBE KARSTEN

The Swiss option

In the competition to search for a suitable C-101 replacement, the bid made by Pilatus to supply the PC-21 training system offered Spain the best value for money. The Pilatus turboprop trainer competed with the Embraer EMB-314 Super Tucano, Beechcraft T-6A Texan II, KAI KT-1 Woongbi, and the PZL-130T Turbo Orlik in a rigorous evaluation process. In the end, aircraft manufacturers Pilatus Aircraft, Beechcraft, and PZL Mielec responded to the call for tender issued by the Spanish procurement agency DGAM (Dirección General de Armamento y Material) which closed on 23 September 2019. The selection of the PC-21 as the preferred bidder was made public by the Spanish Ministry of Defence in late November 2019. Two months later, on 30 January 2020, a contract was signed by Pilatus and DGAM, worth nearly € 205 million. This is still 10 percent less than the allocated budget of € 225 million Euro approved by the Spanish government in April 2019. The contract included the acquisition of an integrated training system comprising 24 PC-21s, simulators developed and built by Pilatus, spare parts, a logistics support package, and training of an initial cadre of eight instructor pilots. The Technical Specifications Document dictated the delivery of the first six PC-21's before December 31, 2020, together with two simulators (one Cockpit Procedure Trainer – CPT, and one Full Flight Simulator – FFS) and the first package of spare parts to cover 17,200 flight hours in two years. In June 2021, the second CPT and FFS simulators were due to be delivered, together with the ground training device. The second batch of eight PC-21s should have been handed over before the end of August 2021, followed by two aircraft in November of the same year and one pair each month from January until April 2022. However, the COVID-19 pandemic delayed this ambitious scheme which forced the Escuela Básica of the Academia to operate the C-101 for an additional year. The first PC-21 for the Ejército del Aire, serial E.27-01, made its maiden flight on 18 December 2020 from the Pilatus factory airfield at Stans-Buochs. In April 2021, the two test pilots from the Centro Logístico de Armamento y Experimentación (CLAEX – Weapons and Test Centre) assigned to the PC-21 program went to Switzerland for specific training related to the aircraft acceptance procedures. One month later, in May 2021, the initial group of four instructors started their type rating course in Stans, followed by the second group in September. Training sorties were already flown on future Spanish PC-21s and instructed by Pilatus factory pilots. Finally, the first two Spanish PC-21s were delivered to San Javier on September 14. Three days later, both aircraft were transferred to the Spanish military aircraft register after the successful completion of the acceptance tests by CLAEX personnel on behalf of the Ejército del Aire. On September 28, a PC-21 (E.27-02) was crewed for the first time by two Spanish pilots making a local training flight as 'Arpón 01' (Harpoon). In 2021, another eleven PC-21s were delivered to Spain, five in October and six in November. The next three

Since September 2022, all students at the Academia General del Aire (AGA) get their basic training on the new Pilatus PC-21.

Captain Fernandez, one of the initial instructors on the PC-21 assigned to 792 Escuadrón, is performing the walk-around carefully checking the ailerons, ahead of a verification flight in October 2021.

aircraft were ferried to San Javier in late February 2022, followed by two each month from March until June 2022, completing the order of 24 aircraft.

The acceptance process of the PC-21 comprises two flights. The first one, a functional flight check, is made in Switzerland. After the successful completion of the acceptance test procedures carried out by a team of DGAM, both the Certificate of Conformity (CoC) and factory acceptance certificate are released. The aircraft is then ferried to San Javier for on-ground testing and the second test flight. During this final acceptance flight, all systems and equipment are checked to verify that the aircraft complies with all characteristics specified by the manufacturer which include avionics, radio aids, electrical and hydraulic systems. Subsequently, the aircraft will be transferred to the Ejército del Aire by DGAM. Both flights are executed by a mixed crew, one Pilatus company pilot and one pilot from CLAEX. As the aircraft remains the property of manufacturer Pilatus until the formal handover to the Ejército del Aire, the aircraft keeps its Swiss civil registration. For this reason, the pilot in command on the ferry flights to Spain is a Pilatus factory pilot although the rear seat is offered to Spanish instructors for the transit. Due to the range of the PC-21, which is limited to 1000 NM, a fuel stop is made at Perpignan-Rivesaltes in France.

Due to the geographical position of San Javier, local environmental elements might affect the PC-21 in a negative way. To protect the aircraft against the strong mediterranean sun, shelters are required. Five sun sheds were already assembled in 2021 while sixteen definitive shelters will be constructed in summer 2022, incorporating dehumidifying systems. Meanwhile, external air is supplied to the engines when PC-21s are parked outside during the weekend against high humidity. In collaboration with Pilatus, procedures were developed to minimize the influence of sand and sea salt. For instance, after every flight, the engine and aircraft surface need to be cleaned. Of the 24 aircraft, between 70 to 80 percent should be operational at any given time, however, Pilatus claims this number is likely to be higher. Twelve technicians were trained in Switzerland by Pilatus, six of them received detailed training on the aircraft structure, mechanical and hydraulic systems while the other group focussed on the electrical system, instruments, and electronics. They are training other technicians at San Javier in their field of expertise. Two engineers from Pilatus are being present at

Captain Fernandez and Major Astudillo, both experienced EF-18 fighter pilots, did their PC-21 type rating course in Switzerland. They were part of the initial cadre of eight pilots in 792 Escuadrón, the transition squadron responsible for conversion training of all other instructors assigned to the PC-21 ahead of the academic year 2022/2023.

Strapped in the rear seat of a PC-21, deputy commander of 792 Escuadrón, Major Astudillo, holds a checklist used during one of the verification flights in October 2021.

San Javier for two years to support the program. Although the majority of their support is related to maintenance, Pilatus also provides additional training to the instructors.

The future is here

"The PC-21 is known as the E.27 and 792 Escuadrón is a transition squadron with the objective to convert most of the C-101 (E.25) instructor pilots to the PC-21", as deputy squadron commander Astudillo points out. "The first thing we have to face is a change of mentality. Future training on the PC-21 involves an entire system, better known as the Integrated Training System or ITS. The center are the actual aircraft complemented by the Ground-based Training System (GBTS) including three types of simulators. First, the Cockpit Procedure Trainer (CPT) which is a basic simulator to train ground procedures, emergency procedures, and basic flying either to prepare a flight or improve knowledge. Secondly, there will be the Full Flight Simulator (FFS) which gives us the ability to perform VFR flights with high-quality terrain graphics but also flying IFR in poor weather conditions. We will have to explore the possibilities with regard to formation flights." Both CPTs had arrived at San Javier by October 2021 while the first FFS should be running prior to the first PC-21 student course in September 2022. Construction works for the new simulator center started in autumn 2021, in total two FFS devices will be present at the Academia. The third type of simulator is the Egress Training Device or ETD of which one has been purchased. Major Astudillo: "The ETD is a 1/1 scale model, the same design but without any working displays. Not all the buttons and switches will be functional, however, this will be a very helpful tool for students to familiarize themselves with the cockpit, to train crew coordination and other procedures prior to starting flying. The environmental control system is fully working and gives an idea of the cockpit airflow and regulation of the inside temperature. The ejection position can be trained, the grasp, how to evacuate the aircraft, coordination, and associated procedures. The ETD will also be available to maintenance personnel and rescue services to have the opportunity to practice with a dummy aircraft instead of a real aircraft as some risks are involved here. The canopy and also the seats can be removed to enable rescue services to train their procedures and to get familiar with both ejection seats like their position and how to use them. To support the ground course, Computer Based Training (CBT) will be used which is interactive software to study aircraft systems and to learn how the PC-21 operates, assisted by pictures, videos, and 3D slides. The CBT training will be given during the initial part of the course, in particular, however, both instructors and students are free to go to the classroom to review, the CBT will always be available." In total, 40 CBT terminals will be put into use, 38 for students and 2 dedicated to instructors. All CBT-related computer systems were delivered to the Academia in November 2021. The availability of the PC-21 Mission Planning and De-briefing System or MPS(S) will be a big step forward in the quality of daily training compared to the C-101. Major Astudillo explains: "The PC-21 has a portable Pilot Memory Module or PMM, this a large USB device which allows us to load pre-flight information to the aircraft like radio frequencies, waypoints, routes, targets, maps and specific areas marked by coordinates plotted on a map. The debriefing system will give us the option to review the tape, not only video but also audio, while the graphics will give us a 3D view of the

A Pilatus PC-21 is taxiing in front of the CASA C-101 flight line at San Javier, the jet trainer it replaces. For 40 years, the C-101 was used by the Academia General del Aire (AGA) as basic trainer aircraft. The C-101 made the final training sorties from San Javier at the end of July 2022. Only the airframes with enough flight hours left will be allocated to 794 Escuadrón to be used by the Patrulla Aquila display team and support missions for the Spanish armed forces.

aircraft with our flown flight tracks. When we fly in formation, we can have up to four aircraft displayed at the same time, share communications, and so on. This will certainly provide us with high quality (de) briefing and post-flight training analysis." The PC-21 is equipped with the Health and Usage Monitoring System (HUMS) which records engineering data for maintenance purposes. Also new to the technicians will be the Interactive Electronic Technical Publications (IETP) which are electronic technical manuals. This includes 3D graphics to display parts and assemblies and records all changes which were made during maintenance.

Step by step

The implementation of the new PC-21 into the training system is divided into three phases. Major Astudillo points out: "The first phase is the transition onto the new aircraft which is the main target for 792 squadron for the current academic year. The second phase will be the first full basic training course on the E.27, while the next courses will be the consolidation phase, where we expect to employ all capabilities of the ITS. In the first academic year, the current syllabus of the C-101 will be followed and possibly just minor changes implemented such as speeds and altitudes. The main reason for this decision is twofold, first, to set a standard that is relatively easy for instructors to teach and secondly, to guarantee the continuation of the courses due to the available time. The type of missions will be pretty standard: transition, formation, instrumental, and night flights. For sure, we are thinking in advance of the problems we might face and the pros and cons of the PC-21. After completion of the first PC-21 course, we can obtain lessons learned and apply those to the next course. The introduction to the advanced phase will also get better as the PC-21 has certain systems in common with the F-5 such as a virtual radar and Flight Management System (FMS). We already communicate with Talavera about the set up and which aspects to include to make this additional training highly valuable for the students in the preparation of their advanced flying course. As we are not starting from zero, most of our instructors have a background where they used to fly with aircraft equipped with a lot of technology such as HUD, FMS, and embedded GPS systems, we certainly can give valuable input to this new type of learning methodology." The 792 Escuadrón has currently eight instructor pilots assigned, all with fast jet experience on either the EF-18 or EF-2000. Four pilots transferred directly from their combat units to Stans for the PC-21 course while the others are former C-101 instructors from San Javier. According to Major Astudillo, the transition phase is quite complicated: "We not only have to face new systems and how we are going to employ these during the course, but we also have to accommodate all facilities. Now, we have a bunch of computers instead of manuals which need to be set up, connected and run properly, trying to obtain all

The Pilatus PC-21 is designated E.27 in Spanish military service (E – Entrenamiento or training). The type was selected in favour of other competitors such as the T-6 and Orlik. The Academia General del Aire did not only receive a new aircraft but a complete integrated training system which includes simulators and other training devices.

the capabilities of systems. The course that we are preparing right now is going to be initially orientated on the E.25, our main goal is to be ready and to have all the knowledge available to face the conversion of most of the C-101 pilots in a pretty short period. We just have two months available as all instructors need to be ready at the start of the new academic year. In total, 20 instructor pilots are still flying the C-101 and half of them will make the conversion onto the PC-21, together with four T-35 instructors. The seven display pilots of Patrulla Águila will not be trained on the Pilatus but will be fully dedicated to the display team instead. For the 2022-23 academic year, we expect to have between 20 to 24 instructors available on the PC-21."

"The possibilities that Pilatus gives us are enormous. The availability of advanced flight simulators will require less flights in the contact phase. We will develop a new training system for the future, including changes in flight instruction. That is what we are studying in the squadron right now. It is not possible to link real flights with the Full Flight Simulator, however, you can link the CPT with FFS terminals. This way, 2 vs 2 could be flown or flying with four different aircraft at the same time. The total amount of flying hours on the PC-21 will be roughly the same as the C-101", says Major Astudillo. "For the introduction to advanced training, the tactical part, we don't know yet as this depends on our remaining time available. We first have to run a full flying course with the new aircraft and see how many flights and simulator sessions we can organize per day, that is our primary focus." The eight instructor pilots of 792 Escuadrón will also be responsible for the evaluation after the first PC-21 course to see if everything was working like they planned as they have one year in advance flying the type. "As instructors, we have to get used to the new aircraft and adapt to the new technology, run the training course, and only then, we are in a position to vision our background and knowledge as feedback. Once we know what we can do with this aircraft, we can start applying this to the initial course to make the transition for the students from a conventional to a glass cockpit smooth. Completely new to us will be a planning and management system called Flight Pro to help us during our daily tasks, for example, to assign instructors or to monitor the number of aircraft. It is a fully integrated software system that not only includes a flight planning tool for operations and maintenance but also to record and monitor data related to the training course itself such as flight hours, qualifications, training progress, and grades. This Flight Pro system will also be available to students to check the daily flight schedule for example. Different countries from all over the world already use this very capable tool such as Australia, France, and Belgium. With the experience of all current users, improvements are constantly being made to optimize this system. We will receive courses from the software company (Ocean) to become current on the system and to transfer our knowledge to all the other instructors."

The instructors of the instructors

One of the initial four instructor pilots who went to Stans for the PC-21 type rating course is Captain Fernandez, who previously flew the EF-18M in 121 Escuadrón, Torrejón. "We spent about three months in Switzerland, from May 2021 until the first week of August. The course started with two weeks of theory before the actual flight phase consisting of 19 hours. First, we flew VFR which included aircraft handling and aerobatics. We then switched to IFR to learn how to handle the aircraft in IFR conditions using the autopilot and FMS flight computer. Only one lesson was dedicated to formation flying. As the PC-21 is capable of both, air-to-air and air-to-ground missions, we were also instructed in these areas of tactical training. During all four phases, we were simultaneously flying on the actual aircraft and Full Flight Simulator. Compared to the C-101, the flight characteristics of the PC-21 are quite similar in terms of handling. However, the Pilatus has way more capabilities. It is a completely different platform."

PC-21 E.27-01/792-01 is one of 24 turboprop trainers operated by 793 Escuadrón. Eventually, all PC-21's will be adorned with 793 prefix to refer to their operating squadron as 792 Escuadrón is only a transition squadron. This particular aircraft was one of the initial two PC-21's delivered to the Academia General del Aire on 14 September 2021. It made its maiden flight on 18 December 2020 from the Pilatus factory airfield Stans-Buochs.

PC-21 E.27-02/792-02 is seen taxiing on San Javier's main apron at the conclusion of a verification flight. With the arrival of the PC-21, also a new paint scheme was introduced sporting the colours of the Spanish flag. In the background a C-101 can be seen in the traditional colour scheme for training aircraft which require a high visibility.

After having finished their course in Switzerland, all eight instructors had to complete an additional twelve flights in Spain as part of their training syllabus. The familiarization period that followed included items not covered in the Swiss training such as formation and night flights. Also, elements of the student syllabus needed to be verified. Captain Fernandez: "The objective for this phase is the introduction of the PC-21 into our Spanish training system and to get familiar with the new aircraft." Major Astudillo adds: "These flights will give us more experience on the Pilatus but also provide us with more data and knowledge on operational circumstances of daily training flights in the future. For example, we check the performance compared to the C-101 by using the syllabus of the latter flying to the training areas and patterns at the base. As an additional information source, we are in close contact with the French Air Force PC-21 squadron (EAC 00.315) for any advice while we also have access to their training syllabus." Next phase will be the PC-21 conversion for the instructors currently flying the C-101, explains Captain Fernandez: "Their training course will be slightly different compared to the one given to us by the Swiss as it needs to be adapted to our requirements. The VFR and IFR part will be more or less the same, new are the formation and night flights. Only instructor pilots who were previously flying fast jets will also receive training in air-to-air and air-to-ground in addition to the regular syllabus. They are the ones who are going to provide the advanced flight introduction course to the students selected to fly combat aircraft." About 16 instructor pilots will make the transition to the PC-21 this year. Ideally, we would like to have a few more instructors to complement us to make sure we can provide all training required throughout the summer. After the end of the first basic training course on the PC-21, we will then have to build the future syllabus for the students to incorporate all new systems we have at our disposal like CBT, CPT, FFS, MPDS (Mission Planning and (De)briefing System) and Flight Pro. Initially, the total amount of PC-21 simulator hours will be the same as the C-101, flown on both, the CPT and FFS. Only after evaluation of the first year's course, a more detailed training schedule can be made on both types of simulator. The implementation of a new training system is quite a demanding project as a lot of objectives need to be accomplished. It is actually a whole process that will take a few years. The current syllabus will be changed significantly as the C-101 is predominantly about flying while PC-21 training is also about managing systems and missions. In fact, it is actually more demanding how to manage all the information than how to fly the aircraft itself. The course will surely be a challenge for students having only 50 hours experience on the Pillán. However, the Pilatus is more adapted to the technology and systems of modern aircraft they will be operating in the future such as the EF2000 or A400."

Future options

Although the PC-21 has been acquired to replace the C-101 in the training role, more options are available in the future due to the versatility of the Pilatus as a training platform. Captain Fernandez says: "With the arrival of the PC-21 three platforms need to be maintained, the Pillán, Pilatus, and the CASAs of the aerobatic team. To have one platform available for both elementary and basic training would certainly have many benefits including a reduction in maintenance costs and a more efficient use of training resources. For example, certain elements of the syllabus don't need to be repeated such as the transition (VFR) part. In this way, you could either reduce the total amount of flight hours or save them to provide more air-to-air and air-to-ground training. On the other hand, the PC-21 could also be used for advanced training due to its combat capability. Theoretically, if the same syllabus of the SF-5M can be flown on the PC-21, students could transit directly from the Pilatus to combat aircraft such as the Eurofighter. However, compared to an advanced jet trainer, the average speed on the PC-21 is about 100 knots less. You could compensate this by adapting the syllabus providing more flight hours in the advanced phase and additional hours on combat aircraft during conversion training for example. In the French Air Force, students transfer from the PC-21 directly to the Rafale. The Spanish Air Force keeps a close eye on PC-21 operators where students jump from a turboprop directly to fast jets such as France and Switzerland. It is an option we have for the future."

With the substitution of the C-101 by the PC-21 at the Academia General del Aire, the quality of flight training is being taken to a higher level at a lower cost. The new trainer features modern avionics equal to the new generation aircraft operated by the Ejército del Aire, a high fuel efficiency while an optimal use of simulators requires less actual flight hours. Besides, the cost of maintenance will drop remarkably as checks are carried out at longer intervals and spare parts are widely available. Once the Integrated Training System can be exploited to the full potential using the new syllabus, anticipated for the 2023-24 course, student pilots will get prepared in the best way possible for their future assignments.

PC-21 E.27-02 is about to park in one of the five temporary sun sheds constructed at San Javier in the summer of 2021. Sixteen definitive shelters will be equipped with dehumidifying systems protecting the PC-21's both against a high humidity and the strong Mediterranean sun.

FALCON LEAP 2022 MARKET GARDEN

Report by Joris van Boven and Alex van Noije

Exercise FALCON LEAP

From 5 to 16 September 2022, the international exercise FALCON LEAP took place. During this exercise, paratroopers and aircraft departed from Eindhoven AB in the Netherlands. FALCON LEAP ended on September 17 with the commemoration of 'Operation Market Garden'.

FALCON LEAP is organized by 11 Airmobile Brigade (11e Luchtmobiele Brigade) of the Royal Netherlands Army. During the first week of the exercise, cargo was dropped on parachutes above Marnewaard and locations in Belgium. The second week of the exercises was dedicated to dropping paratroopers at various locations in the Netherlands and Belgium.

Military aircraft participating:

- 1 Royal Netherlands Air Force Lockheed C-130 Hercules
- 1 British Air Force Lockheed C-130 Hercules
- 1 Italian Air Force Lockheed C-130 Hercules
- 2 USAF Air Force Texas Air national Guard C-130 Hercules (one C-130 remained on the ground)
- 1 Romanian Air Force Alenia C-27J Spartan
- 1 Polish Air Force Airbus Casa-295
- 1 Czech Air Force Mil Mi-17 Hip helicopter

Also, some civil aircraft participated in the exercise:

- 2 Shorts SC.7 Skyvans from Austria **(1)**
- 1 PZL M.28 Skytruck from Germany **(2, 3)**
- 1 Douglas C-47 Dakota from the United Kingdom (with the former military registration KP220)

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▲ Royal Netherlands Air Force C-130H *Hercules* assigned to 336 Squadron.
▼ Royal Air Force Hercules C4 assigned to 24/47 Squadrons.

Royal Netherlands Air Force C-130H *Hercules* assigned to 336 Squadron. ▲
U.S. Texas Air National Guard C-130J *Hercules* assigned to 181Airlift Squadron. ▼

Polish Air Force C295M assigned to 8.BLTr (13.el).

Romanian Air Force (RoAF) C-27J *Spartan* assigned to Esc.902 Av.Tr.si Foto. Between 2010 and 2015, the RoAF received seven *Spartan*s as a replacement for their Antonov An-26s.

Italian Air Force C-130J-30 *Hercules* assigned to 50° Gruppo TM at Pisa AB. The unit operates ten of these transport aircraft.

Czech Air Force Mi-17 *Hip* of 243.vrl

Operation Market Garden Commemoration

Saturday, 17 September, the aircraft took part in the commemoration of 'Operation Market Garden'. Paratroopers were dropped over the Ginkel Heath near Ede, commemorating one of the largest parajumps of World War II near Arnhem (NL), in September 1944. During operation Market Garden, the allied forces attempted to dash from Belgium to the city of Arnhem, occupying various vital bridges over rivers and canals. Unfortunately, the 100 kilometers dash through the southern part of the Netherlands was not successful.

The British paratroopers that were dropped at the Ginkel Heath (Ginkelse Heide) with the task to capture the bridge of Arnhem had to abandon the operation.

The events of this time were depicted in the 1977 war film "A Bridge Too Far."

This C-47 was built in 1945 and handed over as Dakota IV with serial KP220 to the Royal Air Force. In the years 1948 and 1949 it participated in the Berlin Airlift.

Main image Flyover of all aircraft participating in the exercise.
Insets In commemoration of Operation Market Garden, paratroopers are dropped from a C-130 *Hercules* over Ginkel Heath
Photos *RNLAF, Kpl1 Barend Westerveld, Luchtmobiele Brigade*.

Paratroopers are jumping out of the *Dakota IV* and land in Ginkel Heath
Photos *RNLAF, Kpl1 Barend Westerveld, Luchtmobiele Brigade*.

FIRE BLADE 2022

REPORT BY JORIS VAN BOVEN AND ALEX VAN NOIJE

FIRE BLADE 2022 is the 16th helicopter exercise organized under the European Defense Agency (EDA) Helicopter Exercise Program and the 2nd FIRE BLADE edition conducted by the Hungarian Air Force ('Magyar Légierö'). This exercise was held between 7 and 24 June 2022.

The participating forces deployed at Papa airbase in Hungary. The missions were conducted south of the airbase in two large exercise areas, including a gunnery range and the 'RUIN-CITY' urban warfare center, close to Lake Balaton. Papa airbase has a large infrastructure and has hosted many international exercises in the past.

The main focus of FIRE BLADE 2022 was to allow crews to practice operations in various environments during day and night sorties, replicating the challenging conditions that participant forces are expected to encounter when deploying to different theaters of operation.

The FIRE BLADE 2022 exercise consisted of one daily joint COMAO (Composite Air Operations, large missions with various types of numerous aircraft/helicopters) mission in the afternoon or in the evening. Before or after these joint flights, the participating countries could fly their own local missions in the various target areas in Hungary.

A total of 25 flying assets (20 helicopters plus five fixed wing) and some 550 military personnel from five participating countries – Austria, Belgium, Slovenia, Slovakia, and organizer Hungary – participated in this exercise.

A Slovakian Air Force UH-60M *Black Hawk* is extracting a Special Forces team at the urban warfare center "RUIN CITY".

Objectives

FIRE BLADE 2022's objectives were manifold, notably:

- Enhance tactical interoperability between helicopter units from the participating countries by using the COMAO concept in a combined, joint, realistic, and challenging environment and learn and practice common helicopter Tactics, Techniques, and Procedures (TTPs)
- Train and practice TTPs with and against fighter jets and electronic warfare threats
- Improve interoperability in training and operational tasks with ground forces involvement during day and night in a live and full spectrum environment.

Missions

FIRE BLADE 2022 started with familiarization flights and during the weeks, the missions have become more and more difficult and complex. The Rules of Engagements (ROE) were tightened, thread levels were increased, Electronic Warfare intensified, and more 'surprises' were added to the exercise.

A Belgian Air Force NH90 and a Hungarian Air Force H145M are approaching the Landing zone to pick up a Special Forces Team.

Main Image: Belgian Air Force NH90 and Hungarian Air Force H145M.

Insets: An A109 in MEDEVAC configuration arrives at the LZ to pick up a wounded soldier.

During the exercise, a wide range of missions was conducted, such as:

- Air Assault;
- Special Operations Aviation (e.g. fast rope techniques; insertion/extraction)
- Combat Service Support
- Close Air Support including Urban CAS and Emergency CAS
- Convoy/helicopter escorts
- Reconnaissance and Surveillance
- Combat Search and Rescue
- Personnel Recovery
- Medical Evacuation (MEDEVAC) and Casualty Evacuation (CASEVAC)
- Air-to-ground live firing.

Background

The Helicopter Exercise Program (HEP) is part of EDA's wider helicopter portfolio aimed at providing the Member States with a joint European framework to develop, consolidate and share best practices to meet the challenges of flying helicopters in a modern operational environment. Other components of this portfolio are the Helicopter Tactics Course (HTC) program, the Helicopter Tactics Instructor Course (HTIC) program, and the future Multinational Helicopter Training Centre (MHTC).

Media visit

A media visit was organized for two days. On the first day, a Hungarian Mi-24 Hind flight was organized during the morning, to participate in one of the national trainings. The local flight was a training flight for Hungarian Special Forces (SOF) sniper exercise onboard the MI-24. The helicopter boarded the snipers and flew to the training area close to Lake Balaton, where they trained to shoot from an unstable helicopter in the air, compensating for the downdraft of the rotor blades.

During the afternoon, a Hungarian Mi-17 Hip flight was organized with a Hungarian SOF unit which was deployed to the ground in a training area close to Lake Balaton. There, the unit observed enemy positions. Since enemy forces wounded a SOF colleague, a Belgian A109 had to fly a MEDEVAC mission to extract this soldier out of the area. After the operation, the SOF unit was recovered by a Belgian NH90 and a Hungarian Mi-17. In the background, two Hungarian H145s performed gunnery exercises at the nearby firing range.

On the second day, another media flight onboard a Hungarian Mi-24 was organized to photograph the rehearsal of the COMAO demonstration for the Distinguished Visitor Day in the "Ruin City" at the Újdörögd training area. That area was specially prepared to exercise urban warfare with helicopters.

During the afternoon, the actual COAMO demonstration for the Distinguished Visitor Day was performed. After the demonstration, many helicopters landed in the streets of "Ruin City" for photos and interviews.

Hungarian Air Force Mi-24P assigned to MH 86.HE on the way to the training area near Lake Balaton with snipers on board, who are training to shoot at targets on the ground from the helicopter.

The Slovenian Air Force AS532 *Cougar*, Slovakian Air Force UH-60M *Black Hawk*, and Belgian Air Force NH90 TTH (left to right) just landed in "RUIN CITY".

Colonel Rolko (callsign 'ROKA') joined the Hungarian Air Force in 1986 and started flying helicopters in 1988. He accumulated some 3,500 flying hours on various helicopter types. Among those were the Mi-8, Mi-17, Mi-24, and H145. He received his initial helicopter training in the former USSR.

"FIRE BLADE is the best choice for multinational tactical helicopter training in Europe because it focuses on tactical specifics to operate in a multinational environment", Hungarian Air Force and exercise director Colonel Zoltan Rolko stated. He continued: "One of the advantages to hosting an exercise like this in Hungary is the opportunity for the Hungarian military to supply both 'friendly' and 'hostile' (ground) forces, without deploying them abroad in costly deployments. FIRE BLADE 2022 is the only major helicopter exercise in Europe, where helicopters can exercise in large COMAO formations, and it is the only exercise where during COMAOs, it is possible to also exercise live gunnery. The Hungarian gunnery ranges are some 20 by 30 kilometers in size and they allow live machine gun, cannon, and small rocket firing. Hellfire rockets are not allowed to be fired in the ranges."

A Slovakian Air Force UH-60M *Black Hawk* is deploying a Special Forces team at "RUIN CITY" urban warfare center.

▲▼ Special Forces bring a freed hostage aboard a *Black Hawk* and fly her to safety.

Mission completed: Special Forces are boarding the Slovenian *Cougar*. ▲▼

Hungarian Air Force Mi-24P *Hind.*

Belgian Air Force A109 in MEDEVAC configuration.

Main image and left inset: Hungarian Air Force Mi-17 *Hip*.

Right inset: Belgian Air Force NH90 TTH deploys Special Forces soldiers close to 'RUIN CITY'.

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1, 2	Austrian Bundesheer Agusta Bell AB212.
3,6	Hungarian Air Force H145M.
4	Austrian Bundesheer Pilatus PC-7.
5	Austrian Bundesheer Bell OH-58 *Kiowa.*

ANATOLIAN EAGLE 2022

REPORT BY WOLFGANG JARISCH AND PETER THIVESSEN

From 22 June to 01 July, the INTERNATIONAL ANATOLIAN EAGLE (Anadoli Kartali) exercise took place at the Turkish 3'üncü Ana Jet Üs / 3rd Main Jet Base Konya in Central Anatolia. In addition to the Turkish Armed Forces, other NATO forces and countries of the Middle East and Asia participated in this large-scale exercise: the Azərbaycan Hərbi Hava Qüvvələri (AzAF, Azerbaijan Air Force) with two Su-25s, the Royal Jordanian Air Force (RJAF) with two F-16s, the Pakistan Fiza'ya (PAF, Pakistan Air Force) with six F-16s, and the Royal Air Force (RAF) with four Eurofighter Typhoons. The Boeing E-3A AWACS is an integral part of the exercise, which is permanently based at Konya. 48 observers from 19 countries attended the exercise. The Turkish Air Force was present with 19 F-16s (Blue Force) and another 10 F-16s (Red Force), one E-7T Wedgetail, one KC-135R, and two drones of TAI Anka (reconnaissance drone) type and Bayraktar Akıncı.

The city of Konya is located about 200 km south of the Turkish capital Ankara at an altitude of about 1,200 meters above sea level and is almost in the geographical center of Anatolia. The "Main Jet Base" is home to the Anatolian Eagle Training Center (AETC), one of the most modern training facilities for air operations. The Turkish Air Force (TuAF) gained its first experience in 1997 during the US Air Force's Red Flag exercise at Nellis AFB (Las Vegas). With these lessons learned, the Turkish Armed Forces launched one of its largest and most ambitious projects in early 2000: building a tactical training center. In June 2001, the first exercise AE-01 (AE= Anatolian Eagle, Anadoli Kartali) was conducted. The participation of the USA and Israel in Turkey underlined the importance of the new training center.

The centerpiece is the salt lake

With a training area of 120,000 square kilometers (300 x 400 km), the Salt Lake of Tuz (Tuz Gölü) is the "heart" of the Anatolian Eagle Training Center (AETC). All scenarios can be simulated one-to-one with the corresponding threat situation on the ground and in the air. The exercise provides an excellent opportunity for the participating Turkish and foreign air forces to conduct joint combat training in real-life scenarios, including Combined Air Operations (COMAOs) on tactical and strategic targets defended by aggressor aircraft and Surface-to-Air Missile (SAM) threats of all types. During Anatolian Eagle, a variety of missions are planned and executed ranging from CAP (Combat Air Patrol), Fighter Sweep, and SEAD/DEAD (Suppression/Destruction of Enemy Air Defenses) to AI (Air Interdiction), CAS (Close Air Support) and CSAR (Combat SAR). All missions can be performed without restrictions and without interfering with civilian air traffic. Flights take place at an altitude of up to 50,000 ft. State-of-the-art monitoring and analysis systems such as the Air Combat Maneuvering Instrumentation (ACMI) System and the Post-Mission Analysis System evaluate the missions in real-time. Anatolian Eagle flies complex air operations that demand everything from the pilots. For an air combat of 30 minutes, the pilots face 13 hours of preparation,

Flight line with Turkish and Jordanian F-16s.

mission planning, and mission analysis. These figures are probably the most impressive expression of the quality and requirement profile of the high-value exercise. Clearly set goals are the cornerstone of success. With the basic principle "To train fighter pilots for victory", the AETC pursues the primary goal of every military pilot: to plan, execute and survive the mission successfully. The main objective of Anatolian Eagle is to improve the capabilities of national and international elements, test new tactics and techniques, and develop combined operational procedures. By increasing the mutual support of the participating countries, mission effectiveness is to be enhanced. The training scenarios take place over two weeks. Two missions (Eagle 1 and Eagle 2) are flown daily, with the TuAF providing the majority of the flying units. Three main elements are involved: Red Force, Blue Force, and White HQ. The latter is in charge of preparing the training scenarios and transmitting the Air Tasking Orders to the respective teams.

"Since the start of Anatolian Eagle in 2001, a total of 46 Anatolian Eagle exercises have been successfully conducted. Twenty-one were at the national level and 25 at the international level, including NATO bodies with the participation of 15 countries. These exercises not only meet the educational needs of Turkey as well as allies and friendly nations but also play an important role in Turkey's contributions to international cooperation by utilizing the sources of its unique geographical location. Considering the statistics of the past years and the ongoing training, I believe that the exercise has served its purpose. The only prerequisite for constantly changing technology is modern weapons and warfare and a well-trained workforce. The most important force multiplier of the Turkish Armed Forces is the trained and qualified personnel. The shortcomings identified during the exercises, which are planned as a result of dedicated and diligent work, are as important as the experience gained. Another objective of the exercise is that lessons learned from these findings be used in the scenarios of future training periods. It is our realistic approach to the execution and the results of the planning that will lead us to achieve our goals and success," said Turkish Air Force Chief General Hasan Küçükakyüz, in his speech on the press day.

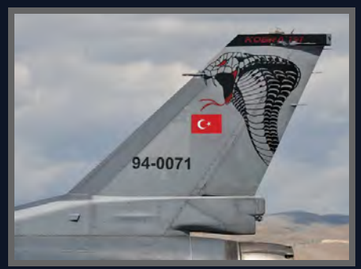
General Küçükakyüz
Commander Turkish AF

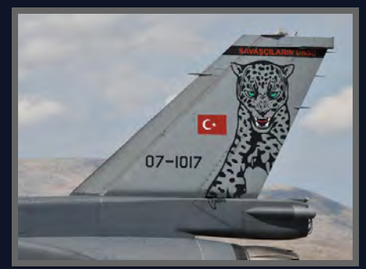
Left Boeing E-3A AWACS *Sentry* assigned to NATO Airborne Early Warning & Control Force.
Right Turkish Air Force E-7T (B737AEW&C) *Wedgetail* assigned to 131 Filo *Ejder (Draken)*.

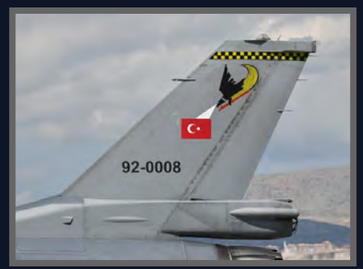
Royal Jordanian Air Force – Eight new F-16s

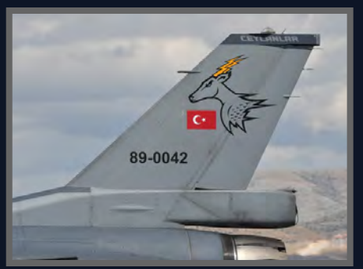
While the Jordanian leader has publicly floated the idea of a NATO-like alliance in the Middle East, his air force has completed a major upgrade by signing a Letter of Offer and Acceptance (LOA) for eight Lockheed Martin F-16 Block 70 aircraft. The LOA was signed on 17 June 2022, with a Lockheed spokesperson telling Breaking Defense "We expect the production contract for this LOA to be completed next year, with deliveries expected to begin in 2027". The US State Department approved the sale of 16 F-16 fighter jets in February 2022, the number reduced to half in the acceptance letter signed by Major General Yousef Al-Hnaity, head of the Jordanian Armed Forces, and Brigadier General Mohammad Hiyasat, commander of the Royal Jordanian Air Force (RJAF). "This is a function of the Foreign Military Sales process. We continue to work with Jordan and the US government to finalize the LOA for the additional eight jets," the Lockheed spokesperson told Breaking Defense about the cut. Indeed, publicly announced dollar and quantity figures for FMS cases often change when a final contract is negotiated. However, Ryan Bohl, the Middle East and North Africa analyst for the Stratfor/RANE Network, noted that budgetary constraints were likely a factor in cutting Jordan's request. "The likely cost is a major reason Jordan is only buying eight aircraft. The Block 70 costs around $63 million each, and eight of these aircraft already account for a quarter of the $2 billion defense budget for 2019," he told Breaking Defense.

Royal Jordanian Air Force F-16A **(top)** and F-16B **(above)** from 1st Squadron from Shaheed Muwaffaq Al-Salti Air Base (Al Azraq).









Top TuAF F-16D Block 40CF of 132 Filo.
Bottom TuAF F-16D Block 50CF of 191 Filo.

Top TuAF F-16D Block 50CF of 181 Filo.
Bottom TuAF F-16C Block 40CF of 162 Filo.

Top TuAF F-16D Block 50+CF of 161 Filo.
Bottom TuAF F-16D Block 40CF of 113 Filo.

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1 TuAF F-16D Block 50+CF of 161 Filo.
2 TuAF F-16D and F-16C Block 40CF of 132 Filo.
3 TuAF F-16D Block 50+CF of 161 Filo.

4, 5 TuAF F-16D Block 50CF of 132 Filo.

Main image Flight Line with TuAF F-16s of 161, 162 and 113 Filo.
Insets TuAF F-16D Block 50CF of 191 Filo.

▲ TuAF F-16C Block 40CF of 151 Filo.
▼ TuAF F-16C Block 40CF of 132 Filo.

TuAF F-16C Block 50CF of 191 Filo. ▲
TuAF F-16C Block 40CF of 113 Filo. ▼

Pakistan Air Force - Striving for professional excellence

The 11th Squadron, named Arrows, is a fighter squadron of the Pakistan Air Force (PAF) assigned to the PAF Southern Air Command's Multi-Purpose Squadron No. 39. It operates the Block 15 MLU model of the F-16 Fighting Falcon AM/BM in a multi-role mission and is also an Operational Conversion Unit (OCU). The squadron crest features an upward-pointing arrow surrounded by 11 stars, symbolizing the pursuit of professional excellence. The squadron was established on 1 January 1949 at Pakistan Air Force Mauripur Station as a light bomber unit. It was to be equipped with the Bristol Brigand, but the first aircraft crashed before it arrived in Pakistan. Procurement of this type was subsequently halted and the unit was disbanded in February 1949. In June 1951, the unit was reconstituted as an interceptor squadron and became the PAF's first jet fighter squadron with the introduction of the Supermarine *Attacker*. Under the first command of Squadron Leader A. Rahim Khan, the unit remained the PAF's only jet fighter squadron until 18 January 1956, when it was re-equipped with the F-86F *Sabre* and its role has been changed to a fighter-bomber squadron. The squadron is based at Shabaz AB.

Pakistan Air Force F-16AM assigned to 11 Squadron.

Pakistan Air Force F-16BM assigned to 11 Squadron.

The Azerbaijan Air Force participated at Anatolian Eagle for the second time with two Su-25s from Kürdəmir AB.


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Royal Air Force – Hard work and commitment

Four Eurofighter Typhoon FGR4s from No. 3 (Fighter) Squadron, based at RAF Coningsby and personnel operating in Romania as part of Operation BILOXI, were involved in Exercise Anatolian Eagle. RAF Typhoons flew alongside F-16 aircraft from the Turkish, Pakistani and Jordanian Air Forces and Su-25 aircraft from the Azerbaijani Air Force, and Turkish Akinci unmanned drones. A team from the NATO Deployed Air Command and Control Centre with a Boeing E-3A Sentry coordinated the exercise. The support elements of the 140 Expeditionary Air Wing made this deployment of the Typhoon from the 3rd (Fighter) Squadron possible. The personnel responsible for engineering, protection, and supply on the ground in Turkey contributed to the success of the

exercise. "The successful participation of RAF Typhoons in Exercise Anatolian Eagle is a testament to the hard work and dedication of the team and I am incredibly proud of what they have achieved together. The fact that we were able to take part in this exercise while still deployed in Romania is an impressive achievement and underlines the agility of the Typhoon force," said Lt Col Holland, Commanding Officer of 140 Expeditionary Air Squadron. "We are very happy to see the Royal Air Force in this exercise. The exercise gives us the opportunity to share experiences and technologies," said Lt Col Turgay Tümer, AETC Commander of the Turkish Air Force, during the press day. The Typhoons and personnel have returned to Romania after the exercise in Konya to continue NATO presence and increased attention tasks carried out since the beginning of April 2022.

Royal Air Force Typhoon FGR4 assigned to 3(F) Squadron.

Turkish Air Force – Drones with state-of-the-art technology

For the first time, a Bayraktar Akıncı High Attitude Long Endurance combat drone from the Turkish manufacturer Baykar Technology participated in Anatolian Eagle. The first three units entered service with the Turkish Armed Forces on 29 August 2021. There are currently nine units, six series products, and three prototypes. With its fuselage and wing design, the Bayraktar Akinci platform is a strategic platform that can carry various payloads and cargos. The drone is equipped with dual artificial intelligence avionics that support real-time signal processing, sensor fusion, and situational awareness. It also has electronic support systems, dual-satellite communication systems, air-to-air radar, collision avoidance radar, and synthetic aperture radar. The drone is capable of performing individual operations that fighter jets also perform and can be used in air-to-ground and air-to-air attack missions. Akıncı is considered Turkey's most advanced and sophisticated drone and has recently successfully completed another important stage in the munitions integration process. According to Baykar, the drone has completed a firing test with the domestically developed KGK-SIHA-82 ammunition. The Bayraktar Akıncı UCAVs, which were added to the inventory in August 2021, are currently being actively used by security forces for operational tasks. So far, six Bayraktar Akıncı UCAVs have been put into service.

The Bayraktar Akıncı is a High-Altitude Long-Endurance (HALE) Unmanned Combat Aerial Vehicle (UCAV). It has a maximum takeoff weight of about 6,000 kg and carries a payload of 1,500 kg. The operational maximum altitude is between 30,000 and 40,000 ft.

Bayraktar AKINCI is capable of conducting operations that are performed with fighter jets. It carries electronic support systems, dual satellite communication systems, air-to-air radar, collision avoidance radar and synthetic aperture radar.

Bayraktar AKINCI can be used in air-to-ground and air-to-air attack missions as well.

With its triple redundant electronics hardware and software systems Bayraktar AKINCI is capable of carrying the following payloads:

- Mini Smart Munition MAM-L
- Mini Smart Munition MAM – C
- Cirit Missile
- L-UMTAS Missile
- Mini Smart Munition Bozok
- MK-81, MK-82, MK-83 Guided Bombs (JDAM)\
- Wing Assisted Guided Bomb MK-82
- Air-to-Air Missile Gokdogan and Bozdogan
- Stand-Off Missile SOM-A

Bayraktar Akıncı High Attitude Long Endurance combat drone.

Overflight of a Bayraktar Akıncı UCAV.

▲ Pakistan Air Force C-130E *Hercules* assigned to 6 (ATS) Squadron.
▼ Turkish Air Force CN235M-100 assigned to 202 Filo.

Pakistan Air Force IL-78MP *Midas* multipurpose aerial-refuelling tanker or transport aircraft. ▲
Turkish Air Force CN235M-100 assigned to 125 Filo. ▼

Two F-4E-2020 *Phantom IIs* assigned to 111 Filo performed a couple of overflights but did not participate in the exercise.


111'SQUADRON
"PANTHERS"
Celebrating
70TH Anniversary of
NATO
YZB.Ş.ÇADIRCI
YZB.Ş.YALÇIN
II
TRIBUTE TO OLD
PHANTOM PHIGHTERS

The Turkish Air Force's SOLO TÜRK aerial demonstration impressively demonstrated the dynamic performance of the "old" F-16.

GRIFONE 2022

ARTICLE BY MARCO MUNTZ

The 2022 edition of the Italian search and rescue (SAR) exercise GRIFONE took place between 13 and 17 June in the Province of Piacenza in Northern Italy. Each year, in cooperation with the Corpo Nazionale Soccorso Alpino e Speleologico, the Aeronautica Militare (Italian Air Force) organizes three national and one international SAR exercise, called SATER and GRIFONE (Griffin) respectively. The international aspect of GRIFONE includes the participation of neighboring countries and the presence of observers from all over the world. This year, observers from five different countries were present at the military reserve base San Damiano to witness the exercise aimed to consolidate and improve procedures, techniques, and cooperation between all participating teams with one common goal in mind, to save human lives.

Multinational agreement

GRIFONE is planned and executed by the Aeronautica Militare and has its origin based on two agreements. The international agreement SAR Mediterraneo Occidentale (SAR MED.OCC.) was signed in 1978 between Italy, France, and Spain to support each other in aerial search and rescue operations, both on land and at sea. The SAR MED.OCC. agreement encourages all participating countries to exercise together at least once per year, with the objective to enhance both coordination and collaboration. The second is an agreement between the Stato Maggiore Difesa (Italian Ministry of Defence) and the Corpo Nazionale Soccorso Alpino e Speleologico (CNSAS – National Alpine Rescue Corps) to organize and conduct rescue operations in close cooperation in case of any aircraft accident. The Italian Armed Forces are responsible for all support in the air, mainly helicopters, while the CNSAS has sections all over Italy and contributes to such a mission with manpower and equipment. Also, Italian law enforcement agencies like the Guardia di Finanza, Polizia di Stato, and Carabinieri as well as the Vigili del Fuoco can be called upon to assist in an emergency situation.

Italian Army Aviation UH-205A-1 MEP assigned to 54° Gruppo Squadroni / 4° Reggimento AVES.

Organizing rescue operations

Planning of GRIFONE 2022 started more than six months before the actual exercise, the first meeting with the Prefettura di Piacenza (Piacenza prefecture) was already held in February. The previous edition of GRIFONE was conducted on the island of Sardinia in September 2021. Every year, GRIFONE is organized in a different region in Italy to offer training in as many different areas as possible, each one with its own specific geographical features. Also, this way, more people can participate to train and ultimately improve their skills in a specific field of expertise in the complex chain of search and rescue operations.

A vast area in the northern Apennine Mountains (Appennino Piacentino), covering over 2,500 square kilometers, was allocated as the zone of operation for this year's exercise. Former 50° Stormo airbase Piacenza-San Damiano served as Deployed Operating Base (DOB) for logistic and administrative support. Within the airbase, a fully equipped heliport was set up, the so-called Posto Base Avanzato (PBA). The PBA is a temporary airport close to the area of operation to minimize flight times, using all assets in the most efficient way possible as time is a decisive factor in the successful outcome of a rescue mission. The Comando

The flight line at Piacenza-San Damiano during GRIFONE 2022 comprising an Italian Navy MH-101A, Spanish Air Force NH-90, and a Carabinieri UH-139D in the front.

The blue-white colored AB-212 belongs to the 'Servizio Aereo della Polizia di Stato' which still has 21 AB-212s at its disposal, allocated to seven different Reparti Volo (flight units), scattered all over Italy. The Bologna-based 3° Reparto Volo has four AB-212 assigned, which are being operated alongside the AB-206. The AB-212, which participated in GRIFONE 2022, MM81651/PS-89, was acquired by the Polizia in July 1989.

The Italian Army Aviation UH-205A-1 MEP is assigned to 54° Gruppo Squadroni / 4° Reggimento AVES "Altair". The Reggimento (Regiment) consists of two Gruppi, both equipped with the veteran AB-205A, designated UH-205A in service with the Aviazione dell'Esercito (AVES). The 34° Gruppo Squadroni "Toro" is based at Venaria Reale nearby Torino, Piemonte, while its sister squadron, 54° Gruppo Squadroni "Cefeo", operates from Bolzano in Trentino-Alto Adige. Regardless of its age, the UH-205 is well capable of carrying out a variety of missions with emphasis on operations in the mountains, the main territory of the 4th Regiment. In preparation for deployments to Afghanistan to support Task Force La Fenice, ten AB-205s were modified to AB-205A-1 MEP – Mission Equipment Package in 2009. The upgrade was centered around the installation of the SIAP (Single Integrated Air Picture) self-protection suite, which included missile warning sensors, chaff and flare dispensers, and an infra-red (IR) guided missile countermeasure device (IRCM-144). The engine nozzle was replaced to accommodate an IR suppressor to cool engine exhaust gases. Other modifications included a reinforced floor and the installation of a Doppler radar integrated with GPS and radar altimeter for a better handling in darkness and brown-out conditions. All ten UH-205A MEP variants are believed to be still in service including MM80530, which was present at San Damiano. The Huey conducted night flights as well on the second day of LIVEX, using the helicopter's NVG capability. The remaining AB-205s will be replaced by the skids-equipped AW-169M, which will be delivered to the AVES from 2024.

Italian Army Aviation UH-205A-1 MEP assigned to 54° Gruppo Squadroni / 4° Reggimento AVES.

Logistico dell'AM (Italian Air Force Logistic Command) is responsible for all operational support. Verona-Villafranca based 3° Stormo, assisted by the 1° Reparto Tecnico Comunicazioni di Linate, provided personnel, equipment, and infrastructure to establish a fully autonomous heliport. Support included fuel supply, fire services, air traffic control, meteo service, an operations room, and staff to direct helicopter ground maneuvers and assist in (dis)embarking of the rescue teams. All air traffic movements were controlled from a mobile control tower, complete with measuring equipment to collect meteorological data relevant for flight. Also, ground equipment was provided, such as a temporary hospital, a field kitchen, generators, sanitary facilities, tents, and corresponding furniture. During operations at such a remote heliport, a team from the Rescue Coordination Centre (RCC) of the Comando Operazioni Aerospaziali (COA) based in Poggio Renatico, Ferrara province, is responsible for command, control, and coordination of all flying assets. The CNSAS manages the units on the ground such as all rescue and medical assistance teams, either with a civil or military background. During GRIFONE 2022, about thirty ground assets were managed and directed by CNSAS. The majority of the rescue teams were drawn from the Corpo Nazionale Soccorso Alpino e Speleologico from the Emilia Romagna region, which included squadre cinofile, units specialized in search operations using dogs. A delegation from 16° Stormo, "Fucilieri dell'Aria", was tasked with securing and protecting the PBA as well as emergency areas. Other units present to conduct searches on the ground originated from the Aeronautica Militare, Esercito Italiano (Italian Army), Guardia di Finanza (Customs Police), and the Corpo Nazionale dei Vigili del Fuoco (National Fire Fighting Corps). The Punto Medico Avanzato (PMA), an advanced field hospital, had been set up for training purposes for the duration of the exercise, however, it also served as a first aid location. Two ambulance vehicles, staffed by paramedics, were also present. Medical assistance, both in-flight and on the ground, was provided by a multi-agency team, composed of Infermiere Volontarie della CRI (voluntary nurses of the Italian Red Cross), 3° Stormo medical personnel working at the PMA, and medics from the Servizio Sanitario Emergenza Urgenza 118 (emergency health services 118) from Piacenza.

Air assets

In total, eleven helicopters and one fixed-wing aircraft were deployed to Piacenza-San Damiano Air Base to participate in GRIFONE 2022. Helicopter units represented all three branches of the Italian Armed Forces, three law enforcement agencies, the National Fire Fighting Corps, and the Ejército del Aire (Spanish Air Force). The Aeronautica Militare sent one HH-139B from 83° Gruppo CSAR based at Cervia and two TH-500B's from 208° Gruppo. One TH-500B arrived from Frosinone, while the other one was operated by the Squadriglia Collegamenti di Linate. The same unit also provided a U-208A which flew missions from its home base Milano-Linate. The Marina Militare dispatched a single 1° Grupelicot MH-101A from nearby Sarzana-Luni. The oldest helicopter present was an Esercito Italiano UH-205A-1 MEP from 54° Gruppo Squadroni, 4° Reggimento AVES "Altair", Bolzano. Four rotary assets were provided by three Italian law enforcement agencies. The Guardia di Finanza participated with one UH-169A from the Sezione Aerea di Rimini and a PH-139D from the Centro di Aviazione at Pratica di Mare. The Carabinieri deployed one of its two UH-139Ds to San Damiano, assigned to the 4° Nucleo Elicotteri, Pisa-San Giusto. The Polizia di Stato was present with an AB-212 from Bologna-Panigale based 3° Reparto Volo. Located at the same airport, the Reparto Volo di Bologna dei Vigili del Fuoco participated with an AW-139. An AB-412 of the same unit was also scheduled to join but due to technical issues and an operational commitment to provide standby coverage for fire-fighting in Cecina, Tuscany, it was canceled. This year's edition of GRIFONE was also attended by a contingent of the Spanish Air Force to train with their Italian counterparts. One NH-90TTH and one CN235M VIGMA from 803 Escuadrón, based at Madrid-Cuatro Vientos and Madrid-Getafe respectively, were deployed to San Damiano for the international SAR exercise. The contribution of both Spanish types to the 14th edition of GRIFONE was rather unique. It was the first time a Spanish Air Force NH-90 participated in any exercise abroad, while the CN235M VIGMA is specialized in maritime SAR and surveillance rather than search over land, which is the principal purpose of the GRIFONE exercises.

Training together

The majority of the participating helicopters and CN235 arrived at San Damiano on Monday, 13 June, one day ahead of the actual exercise (Live Exercise – LIVEX). However, the Spanish NH-90TTH already made the eight-hour journey to Italy the day before, requiring two fuel stops at Girona, Spain, and Nice in France. Finally, the Marina Militare MH-101A made the short transfer flight from Luni on Tuesday morning. GRIFONE 2022 started with on-ground instructing of CNSAS rescue teams by helicopter crews on procedures to safely and efficiently embark and disembark their specific type of helicopter. If applicable, also the correct operation of the rescue winch was briefed and trained. Early Tuesday

afternoon, the actual two-day joint training exercise kicked off when the first helicopters departed with CNSAS units for their short flight to the operations area south of San Damiano.

On the first day of LIVEX, various simulated emergency scenarios had been prepared with an emphasis on the search and recovery of injured and missing persons, both tourists and hikers, in difficult terrain. On Wednesday, all teams were engaged in an operation to locate the crash site of a transport plane and rescue its crew and paratroopers onboard after contact was lost over mountainous terrain. To add to the reality of the scenario, a part of this rescue operation was conducted at night. In total, six flights were carried out in darkness by the HH-139B, MH-101A, UH-205A, PH-139D, and AW-139, enabling flight crews to use their helicopter's NVG capability. Instead of participating in the rescue effort at night, the Vigili del Fuoco AW-139 was tasked with the collection of equipment from Cervia AB on the Adriatic coast. In two days, approximately 50 sorties were flown in which 44 flight hours were accumulated including five hours at night. The majority of the helicopter sorties were related to the transportation of rescue units and the search for and recovery of victims. A specific mission was assigned to the Spanish CN235M VIGMA, which acted as a communication bridge between the helicopters and units on the ground by circling over the search area well above the operating altitude of the helicopters. Without airborne radio relay, communication between ground stations and rotary assets could easily be impaired or not even be possible due to the influence of high terrain, when conducting SAR operations in the mountains. The long endurance of the CN235 can also be very useful in these kinds of missions. Thursday was kept as a backup for the Live Exercise if the flight program

Italian Navy MH-101A assigned to 1° Grupelicot

The Marina Militare, or Italian Navy, operates 22 EH-101's in four different versions comprising ten model 110/MPH (Maritime Patrol Helicopter) for anti-surface and submarine warfare, four model 122/HEW (Helicopter Early Warning) for maritime surveillance and early warning, four model 410/MSH (Medium Support Helicopter), and four model 413/ASH (Assault Support Helicopter). Both the MPH and HEW variant are denominated SH-101A while the MSH and ASH variants are referred to as MH-101A. All eight MH-101As are assigned to 1° Gruppo Elicotteri based at Maristaeli Luni, just 10 kilometers east of the large Naval Base of La Spezia in the region of Liguria, Northern Italy. The MH-101As are being used to support special operations, amphibian assault, transport, and (Combat) SAR missions. The EH-101 MSH variant which participated in GRIFONE `22 can take a maximum of 35 fully equipped rescuers. When performing a medical evacuation flight, the large cabin has space for up to 16 stretchers. After the end of each exercise day at GRIFONE, the MH-101A returned to Luni to stay overnight.

Italian Navy MH-101A.

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would have been affected on one of the previous days for whatever reason. In the end, no flights were conducted instead, this day was used for logistic purposes. On the last day of GRIFONE 2022, Friday, 17 June, the media was present at San Damiano to be briefed on the achievements of the exercise and to watch various demonstrations showing the interoperability between helicopter crew, rescue units, and assets on the ground. However, the Spanish delegation and the Frosinone based TH-500B already returned back home ahead of the demonstration flights. After the conclusion of the media day, all remaining helicopters departed San Damiano for their return flight home ending the 14th edition of the GRIFONE exercise.

Learning experience

The main objective of GRIFONE 2022 has been described as the consolidation and refinement of the existing synergy between the Aeronautica Militare and other branches of the armed forces, government services, and civil agencies in search and rescue operations, while constantly enhancing applied techniques and procedures. GRIFONE offers a unique opportunity for all participants to train existing operating procedures and learn from each other's capabilities, knowledge, and methods to carry out a search and rescue mission safely and effectively. During the exercise, CNSAS rescue units had the chance to work with helicopters and learn the characteristics of different models. Even though current fleet renewals are concentrated on the same type of helicopter, mainly the AW-139, there are certain differences in cabin layout, equipment, and procedures among the various operators, which need to be addressed. Also, the configuration of the AW-139 depends on the type of mission as not all equipment can be carried at the same time. Various elements of a typical SAR mission involving helicopters could be trained by CNSAS rescuers such as the entry and disembarkation with equipment, the use of the winch at height, recoveries at height including the use of stretchers, and the transportation of victims to the temporary heliport. Although helicopter crews are well-trained professionals in all aspects of a SAR mission, flying in mountainous

1 UH-169A MM81965/502 Sezione Aerea di Rimini

On 21 May, 2021, UH-169A MM81965 "Volpe 502", was officially assigned to the Sezione Aerea di Rimini. With the arrival of an additional two UH-169As at the Centro di Aviazione at Pratica di Mare, "Volpe 502" was redirected to the Rimini based flight section. It is the latest unit to have received the type, which operates alongside two classic NH-500MD's until more AW-169s will become available. In total, 22 AW-169s have been purchased by the Guardia di Finanza, intended to standardize its rotary fleet. The initial six AW-169s, denominated UH-169A, all have a fixed, wheeled undercarriage, while sixteen still on order will be equipped with fixed skids. The Guardia di Finanza is launch customer of the new subtype, which was developed following specific acquisition requirements. Delivery of the initial batch of the skid-equipped AW-169M is scheduled for this summer, starting to replace the remaining NH-500s, AW-109s and AB-412s still in service with the Servizio Aereo di Guardia di Finanza.

2 PH-139D MM81961/413 Centro di Aviazione

The Servizio Aereo della Guardia di Finanza operates 20 AW-139's in total, two PH-139A's and eighteen PH-139D's, acquired in three different batches of six helicopters each. The final PH-139D (Patrol Helicopter) to be delivered, "Volpe 420", is still present at the Leonardo factory in Vergiate conducting test flights, most probably related to the certification of the latest avionics and software. The PH-139D which attended GRIFONE, MM81961 "Volpe 413", was the first AW-139 to appear in the new color scheme in 2019, originally designed for the AW-169 model. All Sezioni Aeree (flight sections) in Southern Italy operate the AW-139, except for the Sezione Aerea di Palermo, which is still equipped with the AW-109N Nexus.

AW-139 of the Reparto Volo Bologna

To modernize its rotary fleet, the Vigili del Fuoco ordered an initial eight AW-139s, followed by another ten helicopters. With the arrival of the AW-139, capacity has been significantly enhanced compared to the AB-412 it replaces. It is flying faster, is better equipped, and has a higher take-off weight. After the assignment of the first two AW-139s to the Centro Volo at Rome-Ciampino, the Reparto Volo di Bologna was the first actual flight unit to receive the new AW-139 in December 2019. "Drago 151", which participated in GRIFONE, was delivered to Bologna two years later, in late December 2021, as the second AW-139 for the unit based here. This helicopter had been involved in the combined search operation of the missing AW-119 Koala in the Apennine mountains the week ahead of GRIFONE 2022. During the exercise, "Drago 151" flew multiple sorties with rescue teams on board. The helicopter also conducted night operations on the second day of LIVEX, as it was tasked with the collection of equipment from Cervia.

terrain is demanding. There is a certain risk involved here due to sudden changes in wind direction and speed while engine performance is affected by an increase in density altitude, especially when operating at high weights. This certainly needs to be taken into account when positioning the helicopter for winch operation or land on elevated terrain. Skills, effective communication, and coordination between pilots, technician, winch operator, and rescuers will determine the successful outcome of such a mission, competencies which can be trained in particular during exercises like GRIFON. Also for the Soccorso Alpino Emilia Romagna (SAER), it has been a fruitful exercise. Next to the participation of the ground rescue teams, SAER was tasked to plan intervention scenarios in cooperation with the Aeronautica Militare and coordinate all search and rescue operations on the ground. Also, new elements were added to GRIFONE such as the employment of the Spanish CN235M VIGMA, which participated for the first time. This year's foreign observers came from Albania, Algeria, Libya, Morocco, and Uzbekistan. They had the opportunity to exchange ideas and methods while learning about the different aspects of a search and rescue operation as demonstrated at GRIFONE. As they were mainly interested in techniques and procedures used by the Rescue Coordination Centre, the observers remained at the Posto Base Avanzato instead of witnessing the actual search and rescue operations in the mountains. In total 450 persons participated in GRIFONE 2022 to exercise together and get prepared in the best way possible to be able to respond effectively to any type of emergency call.

Emergency call

Barely a week ahead of this year's edition of GRIFONE, a large search operation was launched for a missing AW-119 Koala with seven people on board. The AW-119 had departed Lucca airport, Tuscany, for a flight to the Province of Treviso on 9 June, when contact was lost while crossing a densely wooded area of the Apennines on the regional border between Tuscany and Emilia Romagna. The Aeronautica Militare almost immediately received a request from the Modena prefecture to help coordinate a full search operation. In the following days, more than 10 helicopters assisted in the search, including HH-139s from the Aeronautica Militare, a Guardia Finanza HH-412, and UH-169A while the Vigili del Fuoco responded to the scene with an AB-412 and an AW-139. On the ground, various teams comprising approximately 100 professionals and volunteers from the CNSAS, Protezione Civile, Vigili del Fuoco, Carabinieri, and Guardia di Finanza were deployed. The search was hampered by bad weather, difficult terrain, and a lack of any signal reception from neither the emergency locator transmitter (ELT) nor any mobile phone. Moreover, it was likely that the helicopter had diverted from the planned route due to deteriorating weather. Two days later, on 11 June, the search effort had already entered its third day, a hiker discovered scattered debris close to Monte Cusna and informed the authorities. A Guardia di Finanza HH-412 operating in the area at the time was directed to the specified location to confirm the crash site. This incident shows the importance of a well-coordinated search and rescue operation, exactly what the GRIFONE exercise is all about. Lessons learned from the AW-119 search operation and the actual exercise will surely be implemented in next year's edition of GRIFONE.

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PH-139D of 4° Nucleo Elicotteri

PH-139D MM81967 coded CC-02 is one of two AW-139s currently operated by the Raggruppamento Aeromobili di Carabinieri. Both AW-139s were purchased to support operations of the Special Forces of the Arma dei Carabinieri. A different, darker color scheme was applied, which is more adapted to special operations. The PH-139D present at San Damiano, "Fiamma 02", was delivered to the Carabinieri in May 2020 and is assigned to 4° Nucleo Elicotteri at Pisa-San Giusto, in support of the 1st Paratroopers Regiment "Tuscania". However, all kinds of missions are being trained by PH-139D crew such as assisting in emergency situations as demonstrated at GRIFONE 2022.

PH-139D of 4° Nucleo Elicotteri

Italian Air Force TH-500Bs assigned to 208° Gruppo / 72° Stormo

The light and agile Breda-Nardi NH-500E, designated TH-500B in Italian military service, can only take two members of a CNSAS rescue team at the same time due to its small cabin. However, when rapid intervention is required, the velocity of the TH-500 is highly beneficial to be on the emergency site quickly. In SAR operations, the TH-500B is tasked with both, search missions and the transport of rescuers. Although the TH-500B is predominantly used for training cadets by 72° Stormo at Frosinone, a couple of these helicopters are assigned to other units including the Squadriglia Collegamenti di Linate for liaison, surveillance, and continuation training.

Ialian Air Force HH-139B of 83° Gruppo CSAR / 15° Stormo

This HH-139B MM82030/15-74 is one of the latest additions to the HH-139 fleet operated by 15° Stormo. The CSAR helicopter was delivered to Cervia from the Leonardo factory at Vergiate in early December 2021. In total, 17 HH-139Bs were ordered to augment 13 HH-139As already in service with the Aeronautica Militare. Deliveries of the HH-139B started in November 2020 and were completed by the end of January 2022. Compared to the HH-139A, the Bravo version features a double rescue winch, a new radar, new electro-optics, a mission console in the cabin, and Phase 8 software release providing better mission capabilities. The HH-139A, in service since March 2012, will be upgraded to the same standard as the HH-139B in terms of onboard systems and avionics. Modifications include the installation of a double Breeze-Eastern HS16600 winch, an Engine Wash Kit, and the implementation of an Automatic Link Establishment (ALE) in the HF radio transceiver system. The retrofit program will be carried out between 2022 and 2025 to all 13 HH-139A's at a total cost of € 61.5 million.

Spanish Air Force NH-90TTH assigned to 803 Escuadrón

The very first NH-90TTH for the Ejército del Aire was handed over to 803 Escuadrón following an official ceremony at Airbus Helicopters in Albacete on 16 October 2020. All new Spanish NH-90TTH's are first being ferried from the factory at Marignane, France, to Albacete, Spain, for modifications before delivery. By February 2022, six NH-90TTH's had been delivered to 803 Escuadrón at Cuatro Vientos, replacing the Super Puma in use by the SAR unit since December 1982. After having achieved Initial Operational Capability (IOC) in December 2021, 803 Escuadrón commenced 24/7 SAR alert duties with the new type, named "Lobo" (wolf) in service with the Ejército del Aire. The NH-90TTH which participated in GRIFONE 2022, HD.29-18, was assigned to 803 Escuadrón in May 2021. This squadron is the only SAR squadron in the Ejército del Aire tasked with both SAR and Combat SAR missions. GRIFONE 2022 was the very first time an Ejército del Aire NH-90TTH participated in an international exercise outside Spain.

Main image Spanish Air Fore CN235M-100 VIGMA assigned to 803 Escuadrón

The Ejército del Aire (Spanish Air Force) operates eight CASA CN235M VIGMA's (Vigilancia Marítima – maritime surveillance), all converted transport aircraft. The first CN235 VIGMA, denominated D.4 in Spanish military service, was assigned to 803 Escuadrón at Getafe in February 2008. The aircraft is equipped with different sensors providing data to the onboard Full Integrated Tactical System or FITS. This system integrates all sensor information together with navigation and mission-specific data displayed at two separate consoles. The primary sensor is the AN/APS-504 search radar attached to the lower fuselage, providing a 360-degree azimuth coverage. The advanced sensor suite enables the CN235 VIGMA to undertake both maritime surveillance and SAR missions over land and at sea during day and night. The 2022 edition of GRIFONE was the first time the Spanish CN235 participated in the international SAR exercise. The VIGMA provided a communication bridge between helicopters and units on the ground in mountainous terrain.

Inset Italian Air Force SIAI S-208M assigned to 60° Stormo / Squadriglia Collegamenti di Linate

Besides the NH-500E, the Squadriglia Collegamenti di Linate is also equipped with the SIAI S-208M for similar tasks such as training, liaison, and surveillance flights. In combined search and rescue operations as practiced during GRIFONE, the S-208M, designated U-208A, can carry out surveillance flights over the search area to serve as a communications platform.

STORM TIDE 22

REPORT BY KRIS CHRISTIAENS

From 5 to 16 September 2022, the large-scale military exercise STORM TIDE took place in Belgium. In this exercise, the Belgian Special Operations Regiment (SOR) conducted a fictitious Non-Combatant Evacuation Operation (NEO). Numerous resources were deployed and different units from the land, air and medical components contributed to the success of this simulated evacuation exercise. STORM TIDE 22 was the most important military exercise for the Belgian Army in 2022, with a total of 790 military personnel participating. This was also the first time the Airbus A400M military transport aircraft was used during a military exercise of such magnitude.

A Non-Combatant Evacuation Operation (NEO) is carried out, when Belgian citizens in another country immediately need to be evacuated due to a dangerous security situation. The purpose of a Non-Combatant Evacuation Operation (NEO) is to evacuate Belgian nationals to a safe area as quickly as possible. The

Two Belgian Air Force A400M transport aircraft on final approach at Weelde AB, which simulated a foreign country where Belgian citizens were waiting for their evacuation.

A Special Forces team is ready to be picked up by a Belgian Air Force NH90 TTH helicopter.

importance of such an operation once again became very clear in August 2021, when, thanks to Operation RED KITE, more than 1,400 Belgians and beneficiaries were evacuated from Kabul airport in Afghanistan in a matter of days. During the evacuation of Kabul, Belgian Armed Forces established an airlift to Pakistan, using C-130 military transport aircraft from the 15th Air Transport Wing. Practicing such complex evacuation operations is therefore very important to further align collaboration and processes. By practicing and training this, Belgian Armed Forces and other services involved will be able to help Belgian compatriots who find themselves in difficult situations or in danger even faster in the future.

During STORM TIDE 22, the fictional foreign country was simulated at the Weelde AB and for this occasion was named "Ongu". Finally, on 12 September, three Airbus A400M transport aircraft from the 15th Air Transport Wing flew from a Forward Mountain Base (Koksijde Air Base) to Weelde AB, where 160 paratroopers jumped out of the aircraft to take control of the airfield. The paratroopers were from the 3rd Paratroopers Battalion based in Tielen and the 2nd Commando Battalion based in Flawinne and are officially part of the Special Operations Regiment (SOR). The Special Operations Regiment (SOR) is a regiment of the Land Component of the Belgian Armed Forces and consists of six units specialized in special operations and rapid response. After dropping the paratroopers, the A400M then also brought equipment and vehicles, such as Rapid Reaction Vehicles (RRV) to Weelde AB, so that paratroopers could easily move outside the airfield to pick up compatriots in need. In addition, medical incidents were simulated and coordinated by the 14th Medical Battalion.

After the paratroopers took control of the airfield, this location served as a Forward Operating Base from which Belgian civilians could be evacuated to Belgium. To make this exercise as realistic as possible, the Belgian Armed Forces also worked with the Belgian Federal Public Service Foreign Affairs, which was responsible for managing and controlling the lists of people who could be received at the Reception Centers. In this large-scale exercise, the Belgian civilians to be evacuated were played by reservists and about 200 students of the Defense and Security study program. For these students, this was the perfect moment to see Belgian military personnel at work close up and they also had the opportunity to fly with the Airbus A400M out of the fictional hostile territory. After the reservists and students were onboard the A400M transport aircraft at Weelde AB, they were flown to the Forward Operating base at Koksijde AB. To transport and support the paratroopers in the fictitious hostile territory around the airfield, NH90 TTH and A109 helicopters from 17th and 18th Squadrons of the 1 Wing participated in this exercise.

Rapid Reaction Vehicles (RRV) are loaded into an A400M to be transported to the 'foreign' airfield.

Paratroopers with a Rapid Reaction Vehicle (RRV) are securing the area around an A400M which is waiting with engines running for the Belgian citizens to be evacuated.

Another Belgium A400M has just arrived to fly fellow citizens to safety.

The evacuees are on their way to the waiting A400M.

The first A400M with evacuees on board takes off.

SPOTTED AT NORDHOLZ

PHOTO-REPORT BY RALF JAHNKE

The "NATO Naval Air Station Nordholz", as it is officially called, is located on the German North Sea coast near Cuxhaven and is the last remaining naval air station of formerly five German naval air bases. Several Bundeswehr (German Armed Forces) reforms since the end of the Cold War made this reduction necessary. The last reform in 2012 brought MFG 5 from Naval Air Station Kiel-Holtenau to Nordholz. Since then, Nordholz has been home to Marinefliegergeschwader 3 "Graf Zeppelin" (MFG 3 – Naval Air Wing 3), operating eight P-3C Orions and two Do-228LMs, as well as MFG 5 with its helicopter component consisting of Sea King Mk. 41, Sea Lynx Mk.88A, Sea Lion NH-90NTH, and an EC-135 for training purposes. In addition, "Top Aces", a defense contractor providing Red Air services, is currently operating out of Nordholz, due to construction works at their home base Wittmund AB. All in all, there are currently a large number of aircraft and various types at Nordholz.

Both naval air wings are currently in transition to new aircraft and helicopters. MFG 5 has already received the first eleven NH-90NTH *Sea Lion* (Naval Transport Helicopter) to replace the aging Sea King Mk.41. A total of 18 helicopters of this type are currently being procured for transport and reconnaissance missions as well as SAR service, all of which are to be delivered by Airbus by the end of the year. From 2025, the next NH-90 variant will follow, with a total of 31 NH-90NFH Sea Tigers (Naval Frigate Helicopters) replacing the MFG 5's Sea Lynx Mk.88A, which have been in service for over 40 years. Together with the Army's NH-90TTH (Tactical Transport Helicopter), the Bundeswehr will then be the largest operator of the NH-90 fleet with 131 examples in three versions.

MFG 3 will also receive a new maritime patrol aircraft (MPA). The decision has been made in favor of the Boeing P-8A Poseidon. Starting in 2025, five aircraft will replace the eight P-3Cs that were purchased second-hand from the Netherlands as recently as 2006. This will reduce the planned service life of the P-3C by 10 years. Previously, all modernization projects on the P-3C Orion were halted for future service.

A P-3C *Orion* of Marinefliegergeschwader 3 returns from a mission to its home base Nordholz.

AIRCRAFT OF MFG 5

The Marinefliegergeschwader 5 (MFG 5) operates eight P-3C *Orion*s.

P-3C *Orion*

The P-3C *Orion* maritime patrol aircraft is the Bundeswehr's largest combat aircraft. The *Orion* searches for submarines with sonar buoys and a magnetic anomaly detector and engages them with air-deployed torpedoes. The maritime reconnaissance aircraft serves in domestic waters as well as in remote theaters of operations such as the Horn of Africa.

Do-228LM

The DO-228 LM is known as "oil hunter". The aircraft operate daily over the North and Baltic Seas to detect ships that are polluting the water and, in cooperation with civilian German authorities, ensure that German coastal waters remain clean.

HELICOPTERS OF MFG 5

The Marinefliegergeschwader 5 will replace its Sea Lynx Mk.88A from 2025 with the NH-90NFH *Sea Tiger*.

Sea Lynx Mk88A

MFG 5's Sea Lynx Mk 88A anti-submarine helicopters are based on frigates and are an integral part of the ship's weapon system. They generally operate in tandem for their primary mission: One Lynx carries a sonar system, and the second torpedoes, significantly extending the combat range of their ship. The Lynx is also used to support sea policing operations through airborne inspection of suspicious watercraft and if necessary deploy boarding teams.
The Sea Lynx was introduced in 1981 and is scheduled to be retired from service in 2025.


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In 2013, Sea Lynx 83+20 was painted with a special color scheme to celebrate 100 years of naval aviation in Germany.

EC 135

Since 2015, the EC 135 has been used for pilot training. These civilian helicopters are contracted from DL Helicopter Technik GmbH, which also provides maintenance. This enables young naval aviators to gain flying experience in the maritime environment before they continue with the training on their respective weapon systems.

Sea King Mk41

The Sea King Mk41 helicopters and their successor Sea Lion NH-90NTH are tasked with "Search and Rescue" – 365 days a year, 24 hours a day. They are scrambled by the Rescue Coordination Center in Glücksburg in northern Germany. The helicopters are on standby on the islands of Helgoland and Borkum and at Rostock-Warnemünde.
These multi-purpose helicopters embark on the Navy's task force supply ships, primarily to transport material and personnel from there or to fly reconnaissance missions. Last but not least, they support the special forces and specialized forces of the German Armed Forces at missions in coastal areas or over the sea. The Sea King has been in service since 1972 and is nearing the end of its operational life.

The Sea King 89+68, photographed in June 1980, is still in active service with the MFG 5.

NH-90NTH

As a naval version, the Sea Lion NH-90NTH has significant structural differences compared to the basic version. It has a harpoon to secure itself on ship flight decks and an automatically folding rotor to fit into the shipboard hangar. As an onboard helicopter, it can be embarked on task group supply ships, but it can also land on any other Navy ship with a flight deck. The Sea Lion's sensors include a 360-degree sea surveillance radar, infrared and video cameras combined with a laser rangefinder, and sensors to detect enemy radars. A tactical console processes the sensor data and shares it with other ships and aircraft in the fleet. This equipment also turns the versatile Naval Transport Helicopter into a reconnaissance helicopter.

TOP ACES

Top Aces

Top Aces Inc. is a defense contractor based in Montreal, Quebec, that provides air training services to various air forces. They operate a fleet of modernized fighter aircraft to provide Red Air threat replication, Joint Terminal Attack Controller (JTAC) training, practice munitions dropping, air-to-air gunnery training, and naval target towing profiles for the Canadian and German military.
Top Aces was founded in 2000 by three former Royal Canadian Air Force CF-18 fighter pilots. In 2014, the company signed its first contract to provide airborne training services for fast jets with the German Armed Forces. The German Top Aces, seven single-seat A-4N *Skyhawk*s, a twin-seat TA-4J *Skyhawk*, and six former Luftwaffe (German Air Force) Alph Jets are stationed at Wittmund AB. Due to major construction works over the next two years at their home base Wittmund AB, Top Aces has temporarily relocated to Nordholz.

Flight line with single-seat A4-N *Skyhawk*s and one twin-seat TA-4J *Skyhawk*.

This A-4N returns from a target towing mission, where German Air Force fighter pilots are firing live rounds at a targetthat is towed at a distance of about 500 m behind the *Skyhawk*.

Single-seat A4-N *Skyhawk*.

Top: Single-seat A4-N *Skyhawks*.
Above: Twin-seat TA-4J *Skyhawk*.

Single-seat A4-N *Skyhawk* taxiing back to the flight line.

Top Aces Germany operates six ex-German Air Force Alpha Jets.

The Marinefliegergeschwader 3 operated the Breguet Atlantic maritime patrol aircraft until 2010. The German Navy received its first of a total of 20 Atlantics in 1996. They were replaced by second-hand (ex Netherlands Navy) P-3C *Orions*.

Sikorsky H-34 G III of Marinefliegergeschwader 5 photographed in 1986. Today this helicopter serves a gate guard at the naval air station Nordholz.

SIAF 2022 AND MIG-29 FAREWELL

REPORT BY IGOR BOZINOVSKI

Have you ever heard of Malacky (read: Malacki)? Well, the author of this article did not either until the moment he put that place in his 2022 traveling calendar with the goal to visit the Slovak International Air Fest (SIAF, Medzinárodné letecké dni) on 27 and 28 August 2022 in order to personally say goodbye to MiG-29 (NATO reporting name: Fulcrum) jet fighters of the Air Force of the Armed Forces of the Slovak Republic (Vzdušné sily Ozbrojených síl Slovenskej republiky).

Being a small town and municipality in western Slovakia, some 35 km north of the capital Bratislava, Malacky was part of the Kingdom of Hungary from the second half of the 10th century until 1918. These days, it is located on the left side of the Bratislava-Brno-Prague highway and is a home to some 20,000 inhabitants.

Some 12 km east of Malacky, there is a small village that being named Kuchyňa (read: Kuhina, literally meaning "kitchen") is home to the Malacky-Kuchyňa air base (Letecká základňa Malacky-Kuchyňa). This base is only 60 km away of Vienna and is a seat of Slovak Air Force's 46th Wing (46. krídlo Kuchyňa, 46. k KU), named under General Milan Rastislav Štefánik. The Wing's subordinated transport squadron is armed with a pair of Leonardo C-27J Spartan and six Let L-410 Turbolet transport planes. The L-410 fleet is a mix of one L-410FG aerial photography plane and five L-410UVP-E (one -E14 and four -E20) short-range transporters possessing short take-off and landing (STOL) characteristics.

Formation-takeoff of two Slovak Air Force MiG-29AS *Fulcrum*s.

The King is dead, long-live MiG-29!

The focus of this year SIAF was on the retirement of Slovak MiG-29 fighter aircraft, after Slovak Prime Minister Eduard Heger said on 3 July 2022 that Bratislava plans to donate 12 MiG-29s and 30 T-72 Main Battle Tanks (MBT) to the Armed Forces of Ukraine (Zbroini syly Ukrainy). This statement was lately downgraded by the Slovak Defence Minister Jaroslav Naď who emphasized that there should be no speculation about any donation of the MiG-29 fighters to Ukraine, especially after Slovak defense ministry informed that nation's Fulcrum fleet is still worth approximately EUR 300 million and no donation of such value could be made. With this said, and with Ukraine seemingly to be the most probable destination for Slovak Fulcrums, it seems that Ukraine is facing options to either buy the jets from Bratislava or this transfer to be arranged by some other state on behalf of Kyiv. Compensation with delivery of other military equipment for the Slovak armed forces is certainly one of the reasonable options in place.

Commenting the retirement of Fulcrums during SIAF, Naď said: "The MiG-29s have a long good record of service in the Slovak Air Force to the benefit of protecting Slovak airspace. Our pilots have logged over 20,240 flying hours on the aircraft, both during exercises and operations. However, for Slovakia, there are no prospects for the operation of Soviet-era equipment into the future. With their operability and war fighting capability degraded by low reliability, these air assets are incompatible with our NATO allies and can no longer be upgraded." He went on to point out that operating the required MiG-29 capabilities under the current circumstances would be very demanding – logistically, economically and personnel-wise.

Despite being extremely well maintained and subject to limited but good modernization, Slovak MiG-29s are no doubt jets that would be of little combat value for Kyiv. Especially in the ongoing war where Russian Air and Space Forces (Vozdushno-kosmicheskiye sily) are increasingly expanding the domination of the Ukrainian airspace. Still, these aircraft – in case they really end-up in the war-torn Ukraine – would strongly demonstrate Slovak solidarity with their neighbors in war, would further show NATO commitment to assists Ukraine in fighting the Russian Federation, and would be a significant morale booster for the Ukrainian Air Force (Povitriani Syly Ukrainy) and the people of Ukraine.

Altogether, 24 single- and twin-seat MiG-29s were delivered to Slovakia as part of the division of the Czech and Slovak Federative Republic's property and the settlement of the Russian debt towards Bratislava. Thus, after the dissolution of Czechoslovakia, the newly established country of Slovakia received its share from the former Czechoslovak Air Force, including nine single-seat MiG-29A fighters and one MiG-29UB two-seat trainer. Furthermore, between 1993 and 1996, the Slovak Air Force acquired another 14 Fulcrums from Russia, as a part of settlement of the Soviet debt. Eleven of these 24 aircraft were overhauled and modernized to NATO standards in the 2004-2006 period by the Russian RAC MiG and

The ceremonial water salute marks the end of the Fulcrum operations in Slovakia.

Slovak Air Force MiG-29AS.

involved Western companies that helped equipping the planes with Rockwell Collins navigation and communication systems, a BAE Systems identification friend-or-foe (IFF) system, a new glass cockpit with LCD multi-functional displays, and a new digital mission computer. The armament, however, was not modernized and modernized MiGs continue using the same type of missiles, inherited from their previous owner, the Czechoslovak Air Force, that ceased to exist on 31 December 1992.

As of 30 August 2022, Slovak Air Force had nine modernized single-seat MiG-29AS (0619, 0921, 2123, 3709, 3911, 6124, 6425, 6627 and 6728) and two modernized twin-seat MiG-29UBS (1303 and 5304) fighter jets with the 1st Tactical Squadron of the 81st Wing (1. Bojová letka/81. Kridlo) at Sliač/Tri Duby air base in central Slovakia. These aircraft have projected an end of service life between 2029 and 2035. Next to these 11 jets, there are also three non-modernized MiG-29s (single-seat MiG-29As 0820 and 5113; and twin-seat MiG-29UBS 4401) that are kept stored at Sliač.

The honor to mark the end of the Fulcrum carrier in Slovakia during SIAF was given to five single-seat MiG-29AS jets that appeared at Malacky – four (0921, 2123, 6124, 6627) participated in the flying program and one (6425) was exhibited in the static display. The ceremonial water salute marking the end of the Fulcrum operations in Slovakia was organized for the MiG-29AS 0921.

The emotions among the Slovak visitors who came to see operational MiG-29 for the last time, were so overwhelming that long after the official air show program was over, people were still sitting on the ground around the exhibited MiG-29AS 6425, literally crying while watching the sunset over the most powerful fighter plane that has ever defended the Slovak airspace. The security of the air show was gentle with those visitors and did not rush to push them out of Malacky-Kuchyňa air base.

Slovak Air Force MiG-29AS.

Neighbors know each other in trouble

The grounding of the Slovak MiG-29s after over 30 years of service was done in parallel to the signing of a Joint Declaration by the Slovak Defence Minister Nad', Czech Defense Minister Jana sernochová and Polish National Defense Minister Mariusz Błaszczak on Shared Commitment to Protect Slovak Airspace for 16 months.

Under the agreement signed during SIAF on 27 August 2022, the Czech and Polish air forces will patrol Slovak skies from 1 September 2022 to 31 December 2023. The Czech Republic, with its JAS-39C Gripen jets, and Poland with its F-16C Fighting Falcon jets, will provide air assets and crews in the Quick Reaction Alert (QRA) role to quickly respond in the case of violations of Slovakia's airspace, while Slovakia will provide the so-called Host Nation Support (HNS) that includes refueling, air navigation services, and assets protection, if needed.

The arrangement, which could be extended in time by the signatories, provides Slovakia with QRA capability for free from its neighbors and obliges Bratislava to pay only for the fuel the interceptors will burn on an interception mission, should any of the jets be really scrambled to intercept any unexpected intruder into Slovak airspace. This concept will backfill the tactical fighter capability until Slovakia regains them again, once the 14 U.S.-made Lockheed Martin F-16V Block 70/72 Fighting Falcon multi-role jets currently on order are delivered and enter operational service with the Slovak Air Force's 1st Tactical Squadron at Sliač as a replacement for the retired MiG-29 fleet.

The first F-16 aircraft were originally reported to be delivered to Slovakia in 2022 and 2023, but this would now be delayed to at least 2024 after earlier this year, Lockheed Martin company informed about issues with their F-16 production. Once delivered, however, Slovak F-16s would be the most modern and most capable Fighting Falcons in Europe.

Slovak Government Flying Service's Airbus A319-115 (OM-BYA) and Fokker 100 (OM-BYC) airliners.

Czech-mate solution for the Slovak lead-in trainer needs

Apart from the emotional focus on the Slovak MiG-29s, SIAF was an event that also sealed the fate of the Slovak Air Force's aging L-39 Albatros fleet with little noise. The Slovak Air Force's 2nd Training Squadron of the 81st Wing (2. Výcviková letka/81. Kridlo) at Sliač now has four L-39CM (5251, 5254, 5301 and 5302) modernized training and two L-39ZAM (4703 and 4707) modernized armed training and light attack jets. To replace this old fleet that is expected to reach the end of its service life in 2026, Slovakia is currently seeking up to ten advanced training aircraft that are expected to cost $ 500 million. The new jets are needed by Bratislava, which intends to retain an indigenous training capability, which will reduce costs when the new F-16s enter service.

The main fight for Slovakia's future Fighter Lead-in Trainer is expected between Aero Vodochody Aerospace's L-39NG advanced training and Korea Aerospace Industries (KAI) FA-50 fighter/attack aircraft.

Korea's state-owned procurement agency – Defense Acquisition Program Administration (DAPA) – announced on 3 October 2021, that a Memorandum of Understanding had been signed between KAI and the state-owned Slovak, Trenčín-based aircraft maintenance company Leteckých Opravovní TrenčíN (LOTN) about potential industrial compensation deals, should the FA-50 be selected by Slovakia.

Main image: Aero L-39CM.
Insets: Aero L-39NG.

While the exact details of KAI's offer remain confidential, the DAPA release indicated that South Koreans intend to deliver a total of ten aircraft for around $500 illion, under an arrangement that also includes industrial compensation. Aero's offering on the other hand, consists of eight L-39NGs, themselves based on the venerable L-39, and "long-term strategic cooperation" that includes access to modern simulators in the Czech Republic and significant industrial participation by Slovakia in the L-39NG program. Aero's offer is particularly attractive to Bratislava for several reasons, not least of which cost. Reportedly, a newly built single-engine L-39NG costs only $10 million and has lower operational costs than its competitors, including the single-engine FA-50 and twin-engine Leonardo M346. Thus, Aero's offer is widely seen as the most competitive, given the familiarity of the aircraft with the Slovak's legacy L-39s, relative costs and generous industrial terms.

This year, SIAF traditionally had a very strong presence of Aero and demonstration flights of its L-39NG prototype with serial 0476/16-7004. In addition, the show further strengthened the L-39NG perspective as "the only logical choice for the Slovaks". To this end, an agreement on strategic cooperation between Aero Vodochody Aerospace and LOTN was concluded on 27 August 2022 which concerns, among others, the production in Slovakia of rear parts of the fuselage and external fuel tanks for L-39NG. This incentive is part of Aero's plan to increase the L-39NG production rate.

"Aero is suffering from a lack of people (read: qualified workforce). We started the serial production of L-39NG last year and at today's rate, we have capacity to produce 12 aircraft annually. We plan to increase production to 17 aircraft from 2024 and we have an even greater ambition as we would like to go up to a production rate of 24 aircraft per year", Viktor Sotona, the President & CEO of Aero, informed at SIAF. Sotona also said that his company plans to have two parallel production lines, with the second one to be in Trenčín or within the Kunovice-based Aircraft Industries Company, formerly known as Let Kunovice civil aircraft manufacturer known for production of the L-410 Turbolet.

As of June 23, 2022, the Hungarian company SI 13 Aero Zrt. has become the majority owner of Aero, based in Odolena Voda. However, Czech systems integrator and defense and security technology provider Omnipol, based in Prague, will retain a minority stake in the Czech aviation company, which was founded 103 years ago in February 1919.

The Show

Although SIAF was excellently organized, it was relatively poorly attended by Slovaks and aviation fans from all over the world. Also, the flight program deviated significantly from the schedule announced on the official website and there were sometimes very long breaks between two flying displays, this particularly on 28 August. However, SIAF was again an excellent chance to see up close all aircraft serving the Slovak Air Force.

Noted flying in the skies over Malacky were the following Slovak military aircraft: L-39CM (5254), MiG-29AS (0921, 2123, 6124, 6627), L-410UVP-E20 (2721), C-27J (1962), Mi-17M (0845), and UH-60M Black Hawk (7642 and 7639). The flying program was also supplemented by Slovak Government Flying Service's Airbus A319-115 (OM-BYA) and Fokker 100 (OM-BYC) airliners as well as by the Mi-171 (OM-BYU) and Bell 429 Global Ranger (OM-BYD) helicopters. The COMPACT Skydive & Flying parachute team took to the air and jumped from An-2R biplane (OM-KIK), while added attraction was the flying of Aero L-29 Delfin (OM-FLP) jet piloted by Jozef Pivarči.

The Slovak participation in the static saw four operational military aircraft: L-39CM (5251), MiG-29AS (6425), L-410FG (1521), C-27J (1931), and UH-60M (7640). Also exhibited were long-retired MiG-21MA Fishbed-J jet fighter and nearby parked An-24 (5803) and An-26 (3208) transporters.

The static display was enriched by various Slovak ultralights: Shark Aero (OM-S443) used by the 19-years-old Zara Rutherford for flying all round the world between 18 August 2021 and 20 January 2022; Tomak Aero Viper SD-4s (OM-M730 and OM-M731), Zenair CH601 Zodiac XL (OM-M235), BRM Aero Bristell (OM-M244) and Skyper GT9 (OM-M754).

The Slovak Air Force currently has nine Sikorsky UH-60M *Black Hawk*s in service.

PZL-Mielec Lim-2, a Polish license-built MiG-15bis. The aircraft served until 1993 with the Polish Air Force.

Main image: Czech Air Force Mi-8S *Hip*. **Inset:** Mi-35 *Hind*. The tiger color scheme was applied in 2016 on the occasion of the NATO Tiger Meet.

1

The international aviation guests

The Czech Air Force participated in the flying program with Mi-8S (0836) VIP, Mi-171Š (9813) transport/assault and Mi-35 (3366) assault helicopters in addition to a Saab JAS-39C Gripen (9245) fighter jet. The Czech military presence in the static saw two aircraft: Aero L-159T1+ ALCA light multi-role combat aircraft and CASA C-295M transport plane. Also in the static was the Czech civilian L-29 (01/OM-SLK).

The Polish presence was also notable with a Polish Air Force F-16D (4083) and a C-295M (015) aircraft taking part in the flying program, while presenting an F-16D (4080) and C-295M (016) in the static display. The Polish Navy also had one of its An-28TD Bryza 1TD (0723) twin-engine light turboprop transport plane on static display.

The most spectacular flying display at SIAF was by the Turkish Air Force (Türk Hava Kuvvetleri) single-ship aerobatic demonstration team SoloTürk. For this purpose, two F-16C Block 40 (88-0021 and 88-0025) were deployed to Malacky, both belonging to the 141 Filo (Squadron) "Anatolian Wolves" operating from the 4th Main Jet Base Akıncı, located near Ankara.

The most spectacular visitors to SIAF were a pair of United States Air Force (USAF) Lockheed Martin F-22A Raptor fight jets (05-4090 and 10-4193) deployed at Malacky on 27 August only. The very bad weather with heavy rain and thunderstorm in the morning of that day kept the author of this article in his hotel long enough to miss the Raptor flying program.

The German and Italian air forces were present in the static display only. The German Air Force contingent consisted of a pair of Airbus H145s and Sikorsky CH-53GA Sea Stallion (84+89) helicopters in addition to a Panavia Tornado IDS (45+66) and Airbus A400 (54+23) aircraft. The Tornado was displayed together with the EUR 1 million Taurus KEPD 350 air-launched cruise missile (1,400 kg), equipped with a 481 kg MEPHISTO (Multi-Effect Penetrator HIghly Sophisticated and Target Optimized) warhead and with an official range of over 500 km. The Italian pride was "defended" at SIAF by two Eurofighter Typhoon EF-2000A jet fighters, with serials 4-10/M.M.7273 and 4-1/M.M.7286.

The SIAF flying program featured some very attractive civilian participants: The Flying Bulls aerobatic team flew with four XtremeAir Sbach 342 (XA42) planes (OK-FBA, OK-FBB, OK-FBC and OK-FBD); a Polish historical jet duo consisted of a WSK-Mielec Lim-2 (MiG-15bis) single-seat jet (602, SP-MIG) and a WSK-Mielec SBLim-2 (MiG-15UTI) twin-seat jet (006, SP-YNZ); the Hungarian Heliforce PZL-Świdnik Mi-2 (HA-BCL) and Polish-private Bolkow Bo.105P PAH-1 (SP-YBO) aerobatic helicopters demonstrated excellent flying; while outstandingly attractive flying was traditionally provided by the Hungarian acrobatic pilot Zoltán Varas in his MX Aircraft MXS (N540XX) aerobatic aircraft.

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1 Mi-171 of the Slovak Government Flying Service.
2 Polish Air Force C295M assigned to 8.BLTr (13.el).
3 Royal Air Force Hercules C4 assigned to 24/47 Sqn.
4 Slovak Air Force C-27J assigned to 46. Kridlo Kuchyna.


88-0025
RESCUE/KURTAR
AIR FORCE

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1 Polish Navy An-28TD Bryza 1TD.
2 German Air Force Tornado IDS.
3 Taurus KEPD 350 air-launched cruise missile (1,400 kg), equipped with a 481 kg MEPHISTO (Multi-Effect Penetrator HIghly Sophisticated and Target Optimized) warhead.
4 Polish Air Force F-16D.
5 An-2R bi-plane.

CHANGES AT VOLKEL AB

ARTICLE BY JORIS VAN BOVEN

On 30 June 2022, the Royal Netherlands Air Force ("Koninklijke Luchtmacht") celebrated three big changes for Volkel AB:

- The organizational change into the 'Air Combat Command'
- The resurrection of 313 squadron
- The arrival of the Lockheed Martin F-35 *Lightning II*

Four-ship formation of Lockheed Martin F-35A *Lightnings II*s.

Air Combat Command

The Royal Netherlands Air Force (RNLAF) has two operational fighter bases, Leeuwarden AB in the north and Volkel AB in the south, plus the fighter control center AOCS (Air Operations Control Station) based at Nieuw-Milligen, located in the center of the Netherlands.

All three organizations ceased to exist as separate entities on June 30th and they were combined into one command, the "Air Combat Command", under the command of Commodore Johan van Deventer. The RNLAF commander Lieutenant General Dennis Luyt handed over the new "Air Combat Command" banner to the new AAC commander Commodore Johan van Deventer.

Handover of the banner of the new Air Combat Command to its new commander.

F-35 Arrival

With the official arrival of the Lockheed Martin F-35, Volkel AB now has two squadrons with two fighter jet types. 312 squadron is flying the Lockheed Martin F-16 and 313 squadron the F-35. For the next two years, 312 squadron will keep on flying the F-16 and then, they will convert to the F-35 after the retirement of their F-16s.

Piloted by Lt. Col. Niels Hussen, the F-35 (coded F-024) taxis to the place of the ceremony.

313 Squadron

The 313 squadron is the Dutch Tiger squadron, present at many NATO TigerMeets throughout the years.
On 18 December 2020, the 313 squadron was temporarily disbanded and stopped flying the Lockheed Martin F-16. With a formation flyby, this moment was celebrated (see next pages).
Then, the pilots and the crews converted to the Lockheed Martin F-35 at Leeuwarden AB. On 30 June 2022, the 313 squadron was resurrected as an F-35 squadron at its home base Volkel AB.
Lieutenant-Colonel Niels Hussen flew the F-35 (coded F-024) in a formation of four F-35s and taxied after landing to the ceremonial location. There, he held a speech to celebrate the resurrection of the 313 squadron.

The airbase's fire department gives the F-35 a wet welcome.

Fly-over of six F-16s on the occasion of the temporary disbandment of 313 Squadron on 18 December 2020.

VISITORS AT MALTA INT'L AIRPORT

PHOTO-REPORT BY ANTHONY F. SEYCHELL

CASA C295W of the Royal Thai Army. This aircraft was delivered to Thailand in mid 2016. The Ministry of Defense of Thailand ordered another C295W from Airbus. With the delivery planned for 2023, the Thai military will then have three of these aircraft, which will be used for various missions such as passenger and cargo transport, MEDEVAC, and by paratroopers.

▲▼ Royal Netherlands Air Force Airbus A330 MRTT.

Royal Air Force Atlas C1 (A400M) assigned to 1312 Flt. ▲

Belgian Air Force A400M assigned to 20 Squadron. ▼

▲ French Air Force EMB121AA assigned to EAT00.319.
▼ French Air Force TBM-700A assigned to ET00.041.

Irish Air Corps CN235M MPS (maritime patrol aircraft). ▲
Italian Air Force P-72A MPA of 88° Gruppo. ▼

▲ Embraer A-29 *Super Tucano*s passing through Malta Int'l Airport on their ferry flight to Turkmenistan, where they will serve with the Turkmenistan Air Force. ▲
▼ Leonardo HH-139B. The helicopters are assigned to 15° Stormo and are used for a range of missions including SAR, fire-fighting, and Slow Mover Interceptor training exercises. ▼

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1 Tunesian Air Force C-130J *Hercules* assigned to 11 Sqn.
2 Tunesian Air Force C-130B *Hercules* assigned to 21 Sqn.
3 Royal Norwegian Air Force C-130J *Hercules* 335 skv.
4 French Air Force C-130H *Hercules* assigned to ET02.061

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▲ U.S. Navy C-40A assigned to VR-58.

Spanish Air Force A310 assigned to 451 Squadron. ▲

▼ Islandic Coast Guard Dash 8 MPA.

U.S. Navy C-26D Metro 23 assigned to Sigonello AOD. ▼

THE LIFE AQUATIC

BY A. T. ROBERTS

Naval Aviation's Influence on the Air Force

Throughout its history, Naval Aviation has occasionally encountered disadvantages when it comes to maximizing the performance of certain airframe designs; particularly with planes not built from the ground up as a naval aircraft. "Navalizing" an airframe — whether strengthening its landing gear, requiring increased fuel/range, or limiting overall size for flight deck considerations — can have the unfortunate side-effect of truncating an aircraft's full potential. Some notable examples of this disadvantage are the North American FJ-2/3/4 Fury, which never lived up to the standard set by their F-86 Sabre archetype, as well as the never-fielded General Dynamics-Grumman F-111B.

On occasion, sometimes the situation has been reversed; the U.S. Air Force has included several purpose-built naval aircraft in its inventory over the years. Though the McDonnell-Douglas F-4 Phantom ii and LTV Corsair II are two of the more well-known examples, one aircraft in particular truly lives up to this not-built-for-the-service-flying-it peculiarity; not just by operating from the water, but on it as well.

Designed to combat the growing threat of Soviet submarines, Sikorsky built the SH-3 Sea King in the late 1950s. Since its primary goal was to hunt and kill an underwater menace, the Navy had the foresight to attach an amphibious requirement to the design, which Sikorsky readily incorporated. Though more famous flying boats come to mind, whether it be WWII-era Catalinas or Martin P5M Marlins, the Sea King and later variants were the U.S. military's last amphibious aircraft. One specific version that flew into the 1990s was the U.S. Air Force's CH-3 and HH-3 Jolly Green Giants. Instead of limiting the Air Forces utilization of the airframe, the naval helicopter and its amphibious feature enhanced the services usage of the craft. Though the rear-loading ramp was actually a modification request for a never-materialized U.S. Marine Corps assault variant, the Air Force recognized the helicopter's potential as a combat search and rescue platform. In this capacity, it excelled during the Vietnam conflict and throughout the latter-half of the Cold War; utilizing a four-man crew of pilot, co-pilot, engineer, and gunner. Additional crew members consisted of Air Force Pararescue Jumpers, simply known as PJs.

Though the side door-operated hoist precluded the necessity to land in the water to affect an aquatic rescue (nor would this method be practically utilized in a combat scenario), the Navy, Air Force, and Coast Guard's Pelican variant continued to use the helicopter's amphibious capability throughout its service life. An example of the inter-service versatility of the helicopter was exercise Chili Flag '90, a joint U.S. Air Force-U.S. Navy training operation for both branches' special forces. In the photographs below, an Air Force CH-3E Jolly Green of the 1550th combat crew training wing is seen floating, with rotors fully stopped, in Elephant Butte Lake, New Mexico. Behind the open ramp of the helicopter, a U.S. Navy SEAL team can be seen approaching the floating helicopter,

Photo SSgt. Mark Johnson, USAF

preparing to load… maybe dock would be a better word. The second photo is the interior of the Jolly Green, showing the tight squeeze of the SEAL zodiac and crew inside.

Photo MSgt. D. N. Craft, USAF

Though the H-3 Jolly Greens were eventually replaced with the larger HH-53 Super Jolly Greens and other variants, the loss of the water landing capability was the end of a truly unique era of the Air Force flying, in origin, naval/amphibious airframes.

Using the amphibious feature of the helicopter to its greatest effect was the U.S. Coast Guard. Unconcerned with the combat-related issue of hanging around the same area for too long, the Coast Guard was able to put their Pelicans in the water for civilian search and rescue when, pending on the conditions, hoists were unavailable or too dangerous. Retired Coast Guard Captain Peter Pringle recounts just such an incident:

"We were sent to evacuate an injured fisherman from a boat about 200 miles east of Cape Cod. The wind and seas were dead calm, but there was a thick fog from the surface to about 300 feet as a result of the warm air overlying the cooler water. We located the vessel with no trouble and although we could see it from above, the surface visibility was about 1/8 mile. The helicopter's weather radar was only good down to about ¼ mile, however, and we were concerned that making an instrument approach to a hover wouldn't get us close enough to see the boat without the possibility of hitting it. Consultation with the fishing boat's captain revealed that his radar was good to 100 yards or so, and that he had been able to see us clearly on the radar during our previous approach. We made another instrument approach and landed on the quiet Atlantic. The fishing boat motored up to us until we had visual contact at 1/16 of a mile or so, and we completed the medical evacuation without incident." (1)

Photo U.S Coast Guard

Today, there are currently no amphibious aircraft flown in any branch of the U.S. military; nor does there seem to be any on the drawing board in the near future. However, lessons can be learned from the example of an amphibious naval helicopter, modified and flown by the Air Force, thus expanding the scope of their mission sets. In an era of astronomical budgets for new, technologically advanced and cutting-edge aircraft, sometimes an already existing platform can be re-purposed, even across service lines, to achieve success.

(1) https://cgaviationhistory.org/hangar-flying/pelican-tales-the-last-of-the-coast-guards-amphibious-aircraft/

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