



By the end of this decade, Poland will end its long history of employing Soviet-designed fighter aircraft, as it looks to modernize its combat capabilities with a Lockheed Martin F-16 Fighting Falcon and F-35 Lightning II force.

REPORT **Khaleem Chapman**

THIS IS AN extremely important day for Polish military aviation, for Polish fighter pilots, for the security of the Republic of Poland... It greatly strengthens our position among the armed forces [of] the world," said President of Poland, Andrzej Duda, at the signing of a US\$4.6bn contract for 32 Lockheed Martin F-35A Lightning IIs on January 31. Introducing new advanced capabilities, the first example is expected to enter Polish Air Force service in 2024, with the final F-35A scheduled to arrive in 2030.

The procurement marks the end of a long road in Polish military aviation history, as the nation looks to replace the various capabilities it lost in the retirement

of its former Soviet-designed combat aircraft. Poland developed its own military aviation industry in the 1920s and 1930s before it was occupied by Nazi Germany during World War Two and then the Soviet Union until 1989. The arrival of the final F-35A is expected to see the withdrawal of the Polish Air Force's final Cold War-era fighters – the Mikoyan MiG-29 *Fulcrum* and Sukhoi Su-22 *Fitter* – which remain in limited service.

After the fall of the Berlin Wall and the Soviet Union in 1989 and 1991 respectively, Poland became free to choose the military aircraft it procured. In 2006, the nation took delivery of its first Lockheed Martin F-16C/D Block 52+ (F-16C/D-52+) Fighting Falcon in what

Three Polish Air Force F-16C/D-52+ Fighting Falcons fly in formation with a USAF-operated Rockwell B-1B Lancer during a Bomber Task Force Europe training mission over the Black Sea region on May 29, 2020.
Polish Air Force

was the first acquisition of a fighter aircraft since the fall of the Soviet Union.

Poland's aerial combat capability grew with the variety of Soviet fighters it employed during its 45-years behind the Iron Curtain. In 1950, the nation accepted its first jet-powered fighters, the Yakovlev Yak-17 (NATO reporting name: *Feather*) and the Yakovlev Yak-23 *Flora*. The last Soviet-designed fast jet that Poland acquired was the Mikoyan MiG-29 *Fulcrum*, which has one capability that neither the F-16 nor the F-35A has, vectored thrust.

The first Soviet fast jet that saw an evolution in Poland's fighter capability

POLAND'S FIGHTER REVOLUTION



COLD WAR WARRIORS

Poland's *Fitters* and *Fulcrums* are the last remaining fixed-wing combat aircraft of the nation's varied Soviet heritage. The Polish Air Force inducted its first Su-22s in 1984 and, at its peak, it employed 90 single-seat Su-22M4 *Fitter*-Ks and 20 two-seat Su-22UM3K *Fitter*-Gs.

AirForces Intelligence data shows that, as of July 6, 2020, the air arm's *Fitter* fleets stood at 26 Su-22M4s and six Su-22UM3Ks. The air arm's remaining Su-22s are operated by the Polish Air Force's 8 Tactical Air Squadron and 40 Tactical Air Squadron, which were merged in 2010 at the 21 Tactical Air Base in Świdwin, north-western Poland.

The Polish Su-22 fleet can employ a wide variety of weapons systems, including a number of general-purpose bombs, such as the Fugasnaya Aviatsonnaya Bomba-100 (FAB-100, High-Explosive Air Bomb-100), FAB-250 and FAB-500. On top of this, it can be equipped with S-24 and S-25 unguided air-to-ground munitions, and R-60 air-to-air missiles. It can also be fitted with rocket pods, carrying up to 32 S-5 rockets, or four gun pods which house GSh-23L 23mm twin-barrel autocannons. The nation accepted its

first nine examples of the single-seat MiG-29 *Fulcrum*-A and three two-seat MiG-29UBs between 1989 and 1990, completing a small fleet of 12 aircraft. The fleet was later complemented by a further ten former-Czech Air Force MiG-29s (nine *Fulcrum* As and a single MiG-29UB), which were transferred to Poland in December 1995 and January 1996. In June 2005, the Polish Air Force accepted a batch of former Luftwaffe (German Air Force) examples, comprising 18 single-seat MiG-29G *Fulcrum*-Bs and four two-seat MiG-29GTs.

Poland's *Fulcrum* fleet is split between two units and bases. The first – 1 Tactical Air Squadron – strictly operates MiG-29 *Fulcrum*-A and MiG-29UB aircraft from the 23 Tactical Air Base near Minsk Mazowiecki in central Poland. The second – 41 Tactical Air Squadron – operates all four variants from the 22 Tactical Air Base in Malbork, northern Poland.

In an air-to-air role, Polish MiG-29s can be outfitted with R-27R1 radar-guided medium-range air-to-air missiles, along with short range R-60MK and R-73E munitions. The *Fulcrum* can also be equipped for an air-to-ground role, capable of carrying the FAB-100 or FAB-500 general-purpose guided bombs.



Above: A pair of Vermont Air National Guard F-35As pull away after receiving fuel in September last year. Lockheed Martin told CAJ that Lightning offers a 'combination of very low observable stealth, advanced sensors, information fusion and network connectivity – all packaged within a supersonic, long-range, highly maneuverable fighter'.

USAF/TSgt Benjamin Mota

Right: President of Poland, Andrzej Duda, speaks in front of a Lockheed Martin F-35A Lightning II during the signing ceremony on January 31. **KPRP/Krzysztof Sitkowski**

was the Mikoyan-Gurevich MiG-15 *Fagot*, which employed a swept-wing design to achieve high transonic speeds, close to the speed of sound. The MiG-15 is one of two Soviet fighters that Poland produced domestically, the other being the MiG-17 *Fresco*. The company that built, and evolved them, PZL-Mielec, is now owned by Lockheed Martin subsidiary, Sikorsky. Polish-made MiG-15s were known as the Lim series. The first of which, the PZL-Mielec Lim-1, entered operational service with the air arm in 1952. The Lim-2 was flown from 1954 and both variants were finally retired in 1980, for the Lim-1, and 1996 for the Lim-2.

In the 1950s, the *Fresco* provided the next step in capability for the Soviet-era Polish Air Force. The MiG-17PF *Fresco*-D was the nation's first dedicated all-weather interceptor, used specifically in a defensive manner to counter attacking enemy aircraft, which were mainly bombers and reconnaissance aircraft. The *Fresco*-D was powered by a single Klimov VK-1F afterburning turbojet engine – which was capable of reaching high subsonic speeds – and employed the all-weather RP-5 Izumrud radar along with three Nudelman-Rikhter 23mm NR-23 autocannons.

In 1955, the Polish Air Force retired the Yak-23, and a year later, the Yak-17's service

ended. That same year (1956), PZL-Mielec delivered its first Lim-5, a license-built version of the MiG-17. The different *Fresco* variants brought new capabilities to the air arm, allowing it to execute all-weather fighter and ground attack roles, alongside the MiG-17PF's interceptor mission. Hundreds of examples were employed across a number of variants in Polish service, and the Lim-5 evolved into the Lim-6bis before the platform was fully retired in 1992.

With the fall of the Berlin Wall in November 1989, there was a vast reduction in military arms by the Warsaw Pact countries; the nations in central Europe that had been under Soviet control since 1945. The Polish Air Force was no exception and during the 1990s, it withdrew most of its Soviet-designed combat aircraft. The MiG-29 was the last to enter service with the air arm. The last Soviet-built *Fulcrum* arrived in Poland in 1990, completing its small fleet of the type. The country accepted more examples from former Warsaw Pact operators in June 2005 (see *Cold War Warriors* box).

Nuclear capability

In 1963, Poland received an aircraft that became an icon of the Cold War, the Mikoyan-Gurevich MiG-21 *Fishbed*. The Polish Air Force operated 12 examples of the nuclear-capable izdelye 94N variant, along with 120 standard izdelye 94A aircraft. Despite losing the capability



Above: Polish ground crew perform a pre-flight check of a *Fulcrum*-A before a display at RIAT 2015. **Khaleem Chapman**

Below: A Sukhoi Su-22M4 *Fitter*-K peels off from a formation during Exercise Spring Storm at Ämari air base, Estonia, in May 2016. The multi-shade gray livery was applied as part of the platform's SLEP process. **USAF/TSgt Matthew Plew**

following the MiG-21's retirement in 2003, both the F-16 and F-35A can be equipped with nuclear weapons, if required. The *Fishbed* was an all-round, all-weather supersonic fighter-interceptor, which became synonymous with nations behind the Iron Curtain during the height of the Cold War.

Poland took delivery of its first Sukhoi Su-7 *Fitter*-A, a dedicated fighter-bomber with a ground attack role, in 1965. It followed a swept wing design and was capable of reaching supersonic speeds. The service operated three variants of the type, which were eventually withdrawn in 1990. In the early 1970s, the Su-20 – another member of the *Fitter* family – joined the air arm's ranks. It was

developed from the Su-7 and performed the same role but had a notable design difference to its predecessor, employing a variable-geometry (swing-wing) instead of a swept wing.

The Su-20 was flown until 1997, being used in missions such as reconnaissance, which have since been absorbed by the F-16 and the in the future, the F-35A. While the former was designed to be a light fighter for dogfighting, the latter is a more sophisticated stealthy sensor platform, whose enemy's last moments are only seeing the incoming missile.

The F-35's beyond-visual-range (BVR) capability was previously available to Poland with the Mikoyan-Gurevich MiG-23 *Flogger*; the world's most





produced variable-geometry fighter and the first Soviet aircraft to be armed with BVR munitions. Entering service in 1979, 40 examples of the type served the air arm before it was retired in 1999. The nation operated two variants, the single-seat MiG-23MF *Flogger-B* fighter and two-seat MiG-23UB *Flogger-C* for training.

Flying West

In the early 2000s, Poland began its search to replace the capability it was losing with the retirement of its MiG-21 and MiG-23 fleets. The nation sought an aircraft that offered more NATO interoperability and would allow Poland to contribute 48 modern aircraft to NATO Reaction Forces. A competition took place between the Dassault Mirage 2000 Mk II, Saab JAS 39 Gripen and F-16. In the end, Lockheed Martin won the contract for 48 aircraft with its F-16C/D-52+ variant. Deliveries began in 2006 under the \$3.8 billion Peace Sky program.

In November 2006, when the first of the F-16s arrived, the then commander of the Polish Air Force, Lieutenant General Stanislaw Targosz, said: "Acquiring the most technologically advanced F-16s in European NATO will allow us to train together, operate together, fly together and learn from one another. These F-16s enable us to carry out operations as NATO and allow the [Polish] Air Force to become a strong coalition partner." In all, the air arm operates 36 single-seat F-16C-52+ Fighting Falcons and 12 examples of the two-seat F-16D-52+ version. The final aircraft was handed over in December 2008.

While the F-16s replaced the MiG-21 and MiG-23, in the early 2010s, Poland conducted service life extension programs (SLEPs) on its MiG-29 and Su-22 fleets as their viable 30-year

operational service life was reaching its end. Poland is the final Su-22 operator in Europe and the nation had planned to retire its final aircraft in 2015. The Polish Ministry of Defense (MoD) decided to conduct SLEPs on a small number of MiG-29s and Su-22s to allow both types to remain in service until the mid-2020s.

Of Poland's 32-strong Su-22 fleet, 18 examples underwent the ten-year

SLEP process, extending its viable service life to 2024-2025. However, for economic reasons, these aircraft were not modernized to the same degree that the *Fulcrums* were. The Su-22s each received a new RS-6113-2-C2M radio system with an associated communications blade antenna on top of the fuselage. They were also resprayed in a grey multishade camouflage scheme to look more

uniformed alongside Poland's MiG-29 and F-16C/D-52+ fleets.

For the MiG-29s, the SLEP was carried out on 13 *Fulcrum*-As and three MiG-29UBs to keep them in service until 2028, the latter years of F-35A deliveries. The first modernized aircraft was returned to the Polish Air Force in July 2013 and the final aircraft to undergo the process was handed over in November 2014.

The new capabilities gained with the *Fulcrum* SLEP included a new open-architecture avionics suite; mission computer; digital video recorder and databus; Rockwell Collins' RT-8200 ultra and very high frequency radio; an improved inertial navigation system and GPS (global positioning system) navigation; a color multifunction display; an up-front control panel; and a new briefing/debriefing system, which was developed with Israel Aerospace Industries (IAI).

The SLEP process for both types took place at the Military Aviation Works No 2 facility in Bydgoszcz, northern Poland. It was also supported by IAI. Despite all that work, due to three fatal crashes within 18 months and a fourth non-fatal crash in March 2019, for much of last year the Polish MiG-29 fleet was grounded. The *Fulcrum* fleet has become a growing concern, suffering from low reliability, technical issues and poor serviceability.

A declaration made by former Polish politician, Sławomir Preiss, at the 40th meeting of the Senate on October 3, 2013, stated that the Su-22 was the cheapest fixed-wing combat aircraft in the air force's inventory. It is three times cheaper than the MiG-29 and four times less expensive to operate than the F-16. It added that long-term operation of the Su-22 has shown that the type has an above-average reliability, having an

POLAND FORECASTS LIGHTNING

The official procurement order of 32 examples of the conventional take-off and landing version of the Lightning family, the F-35A, made Poland the 12th nation to sign up to the Joint Strike Fighter (JSF) program.

It joins Australia, Belgium, Denmark, Israel, Italy, Japan, the Netherlands, Norway, South Korea, the UK and the US in opting for the platform. Shortly after, Singapore became the 13th nation to order the type.

As with all F-35s, Polish examples will be powered by a single Pratt & Whitney F135 afterburning turbofan engine. The Polish deal includes the delivery of a 33rd powerplant, along with mission-related software, spares/repairs, air/ground training devices and support equipment.

The "F-35 was designed with the entire battlespace in mind, and its advanced capabilities will transform the way the men and women of the Polish Air Force conduct operations," a Lockheed Martin spokesperson told *CAI*.

"With this advanced technology, the F-35 is a multi-role fighter capable of successfully executing any and all

missions, including new missions not traditionally fulfilled by legacy fighter. The F-35's ability to collect, analyze and share data, is a powerful force multiplier that enhances airborne, surface and ground-based assets in the battlespace. It is the most lethal, survivable and connected fighter aircraft in the world, giving our pilots an advantage against any adversary and enabling them to execute their missions and come home safe," the spokesperson added.

Poland will be receiving the new Block 4 version of the F-35A, which will feature software and hardware upgrades. Lockheed Martin told *CAI* that "the upgrades include the anti-ground collision system, increased electronic warfare and computing power, sensor capability, weapons capacity and more. Poland will also continue to receive continued upgrades through the planned modernization and sustainment program providing increased capability, reliability and affordability."

The nation's employment of the F-35A will also strengthen NATO air power capabilities, offering more regional commonality in training, equipment and tactics with other member states. "Additionally, the F-35 will enhance situational awareness for the entire Polish armed forces and strengthen Poland's capability to fulfil their NATO Baltic Air Policing mission, providing valuable information to allied forces in the region," Lockheed Martin added.

POLISH FIGHTING FALCONS

Poland's F-16s are truly multi-role platforms, capable of performing both an air-to-air and air-to-ground role. When performing the latter, the aircraft can be outfitted with GBU-49 Enhanced Paveway II (BLU-133) 500lb laser-guided bombs (LGBs) and GBU-54 Laser Joint Direct Attack Munitions (JDAM) 2,000lb precision-guided bombs. It can also be equipped with a number of unguided general-purpose bombs, including the 500lb Mark (Mk) 82, 500lb BLU-111A/B and the 2,000lb Mk 84 (BLU-117). On top of this, it can employ the AGM-158A Joint Air-to-Surface Standoff Missile (JASSM) and the extended range AGM-158B JASSM-ER.

In an air-to-air role, the F-16s can carry AIM-120C-7 Advanced Medium Range Air-to-Air Missiles (AMRAAM) and AIM-9X-2 Sidewinder Block II short-range air-to-air missiles.

When the multi-role fighter first entered service with the Polish Air Force in 2006, it came with AIM-9X Sidewinder Block I and AIM-120C-5 AMRAAM munitions. A range of 'dummy' versions are also in service with the force for training purposes.

Despite problems with the F-16, which were grounded with faults on multiple occasions during their early years of Polish service, there has been no attritions of the type during its 14-year-long service life so far.

The platform is operated by 3 Tactical Air Squadron and 6 Tactical Air Squadron at the 32 Tactical Air Base in Łask, central Poland. The F-16 constitutes the largest combat aircraft fleet in the air arm's inventory and is currently complemented by the aging Soviet-era MiG-29 and Sukhoi Su-22 fighters.

efficiency ratio of between 70-75%, which is higher than both the *Fulcrum* and F-16. The last attrition of an Su-22 occurred in 2003, when a *Fitter-K* was shot down in a friendly fire incident during an exercise by a Polish-operated 2K12 Kub surface-to-air missile battery. The pilot ejected successfully.

By 2030, Poland's legacy Cold War platforms – the *Fitter* and *Fulcrum* – will have been retired and the nation's westernized combat aircraft fleet will total 80 frontline examples, made up of 48 F-16C/D-52+ Fighting Falcons and 32 F-35A Lightning IIs. Despite there being fewer numbers of the fifth-generation multi-role stealth fighter in Polish service than F-16s, its greater capabilities will reposition the Fighting Falcon to a more widely supportive role.

On the whole, a fleet of 80 combat aircraft is a relatively small force in comparison with some NATO allies that are of a similar size to Poland. As part of the nation's ongoing military recapitalization efforts, the procurement of additional fighters – be it more F-16s

or F-35As – may very well be in the offing over the course of the decade.

In terms of a possible increases in Poland's Fighting Falcon fleet numbers, a spokesperson for Lockheed Martin told *Combat Aircraft Journal* that the company stands "ready to support the Polish Air Force as Poland determines its unique security requirements." When asked about future F-16 capability upgrades, the spokesperson added that "the F-16V is the most advanced F-16 upgrade configuration ever offered, including an APG-83 active electronically scanned array (AESA) radar, upgraded modular mission computer and avionics architecture, new cockpit displays and improved controls. We stand ready to support the Polish Air Force if it chooses to upgrade its F-16s."

What is certain is that lightning is set to strike in Poland in 2024, something which President Duda says "greatly strengthens our position also generally in the international arena, giving us prestige and showing that Poland is an important partner on the European and global scale." ☛

Two *Fitter*-Ks depart Amari air base, Estonia, to conduct air training with the Estonian Defense Force in support of Exercise Spring Storm in 2016. USAF/TSgt Matthew Plew



Lockheed Martin F-16C-52+ – serial 4054 (c/n JC-15) – during a training mission in October 2019. Note the aircraft is outfitted with AIM-9X-2 Sidewinder Block II and AIM-120C-7 AMRAAM missiles. USAF/A1C Duncan C Bevan