

Poland's Air Force to Procure New Fighter Aircraft: the 'Harpia' Programme

In the aftermath of the political reforms of the late 1980s and the early 1990s, Poland's policy makers recognised a growing need to procure a new fighter jet aircraft. At the time, the Polish Armed Forces operated only Soviet-built fighter jets of several types such as MiG-21, MiG-23, Su-20 and Su-22 fighter-bombers and a newly introduced MiG-29 fighter. Given the prospect of joining the North Atlantic Alliance, it seemed obvious that the Soviet-era jets would have to be gradually replaced with either brand new or second-hand aircraft fighters built in the West. As far as the latter one is concerned, Poland had several opportunities that emerged from the reduction of troops in NATO member countries in the post-Cold War era. Purchasing F-16A/B and F/A-18C/D was one of the options; however, none of these plans had succeeded in introducing new combat aircraft by the end of the 20th century. In 2003, Poland eventually procured 36 F-16C and 12 F-16D Block 52+ fighters produced by Lockheed Martin. The American company delivered all jets between 2006 and 2008. Currently, all 48 F-16 multirole fighters serve in three tactical squadrons of the Polish Air Force.

Roughly half of the Polish Air Force consists of obsolete fighter aircraft which are incapable of carrying combat operations or have very limited capabilities. The entire fleet of the Soviet-era fighters must be replaced in years to come; therefore the new type of aircraft ought to be selected and procured as soon as possible

Poland's \$3.2 billion deal, including the modernisation of the infrastructure, logistics, weaponry and training, was a tremendous burden on the state budget. Nevertheless, the procurement of the F-16 aircraft has significantly improved capabilities and the aircraft maintenance standards of the Polish Air Force given that the American fighter equipped

with precise strike munitions was to replace obsolete MiG-21bis, MiG-21UM and a number of Su-22 bombers. Furthermore, Poland has become the first former Eastern Bloc nation that procured Western aircraft. Shortly afterwards, both the Czech Republic and Hungary decided to follow Poland and each country leased a squadron of Saab JAS-39C/D Gripen aircraft. Those deals, however, were perceived as a modest investment compared to Poland's procurement programme. The Polish F-16s serve in the 2nd Aviation Wing of the Air Force and are deployed in two air bases. One squadron has been deployed in the 32nd Tactical Air Base in Łask, Central Poland; the other two squadrons operate from the 31st Tactical Air Base in Krzesiny, Western Poland. After the last delivery of the F-16 aircraft in 2008, the Polish Armed Forces had a total of 112 fighters. The policy makers concluded that Poland must maintain this number of operational jets and replace the other 64 Soviet-era fighters in the future.

The procurement of the first three squadrons of the F-16 fighters was perceived as the beginning of the so-called 'westernisation' process within the Air Force. By the late 2010s, the Polish Air Force had two squadrons of the Su-22 fighter-bombers, that is 16 aircraft in each squadron, which had been delivered to Poland in the mid-1980s. Ever since, the Air Force has been in urgent need to replace those obsolete machines with modern aircraft. Despite that the MiG-29 was still considered a relatively modern airplane, this air superiority fighter was not able to meet the requirements of NATO, lacked the multi-role combat capabilities and was expensive to maintain. Therefore, the policy makers planned to replace the MiG-29 fighters in the subsequent phase of the Air Force modernisation programme.

The ageing Su-22 fleet not only was obsolete but also lacked precision-guided munitions. The Ministry of Defence has not acquired guided missiles from the Russian Federation for years, which in turn reduced combat capabilities of the aircraft. The first attempt to replace the Su-22 fighter-bombers was the concept of purchasing from 16 to 32 second-hand F-16s or one or two squadrons. The Dutch F-16AM/BM fighters were considered as a particularly interesting option owing to their modern equipment and well-maintained condition. The decision of the Polish MoD to not purchase those machines ought to be perceived as a mistake given that both the Dutch and the Belgian F-16s were subsequently acquired by Chile and Jordan. The next opportunity to replace the Su-22 aircraft was related to the procurement of an advanced jet trainer within the framework

of the LIFT (Lead in Fighter Trainer) programme. The procurement programme to acquire 16 armed advanced trainers was initiated in 2007. At the time, the MoD did not rule out an option to procure further aircraft in its armed variant in the future. In 2011, however, the LIFT procurement programme was cancelled and subsequently replaced with another one intended to select an exclusively training-purposed airplane. From 2012 to 2014, Poland's Technical Modernisation Programme for 2013-2022, which was approved in December 2012, included another concept of replacing 32 Su-22 fighter-bombers with 16 brand new F-16s for one squadron. According to the Programme, the contract should have been signed by 2018 with deliveries from 2019 to 2022. The Ministry of Defence eventually scrapped the plan in February 2014 and decided to refit 18 out of 32 Su-22 fighter-bombers and extend the service life of the remaining fleet to the mid-2020s.

At the same time, the General Command of the Armed Forces announced a plan to replace the entire post-Soviet fleet of both Su-22 and MiG-29 fighters with 64 fifth-generation aircraft within the framework of the 'Harpia' (Eng. 'Harpy Eagle') programme; the fighters were expected to be delivered from 2016 to 2022. Nevertheless, it was just an empty promise to postpone the decision regarding the procurement of the new aircraft indefinitely. In 2014, the future of the F-35 programme, which is still the only fifth-generation aircraft available on the market, remained in question as far as the cost (at the time, the estimated cost of the aircraft was \$120mIn excluding the engine) and deliveries were concerned.

Certain new concepts emerged after the 2015 general election when the new government announced a plan to revise Poland's defence strategy. In January 2017, the Ministry of Defence resumed the debate about the future of the Air Force. The policy makers pledged to procure up to 96 fighters which meant that the total number of aircraft in the Air Force would increase to 144 airplanes. The MoD planned to acquire a mix of both brand new and second-hand aircraft. The latter option was considered a way to maintain the combat capabilities of the Air Force and buy time to select and introduce the next-generation aircraft. The second-hand F-16s were seen as an interim solution that could establish a homogenous defence system based on a single type of aircraft. The analysis, however, did not specify either the variant of the F-16 fighter (A/B or C/D) or a standard of its equipment. In the Spring of 2017, the plan was abandoned due to the lack of offers. Furthermore, based on the analysis of the Romanian deal that led to the procurement and

subsequent modernisation of 12 ex-Portuguese and ex-American F-16AM/BM fighters, the cost of the modernisation of the second-hand aircraft would be disproportionate to the final outcome. Despite that the previous attempt to replace the Soviet-era fighters ended in failure, the Ministry of Defence continued to seek an alternative solution. On November 23, 2017, the Inspectorate of Armaments eventually announced the beginning of the 'analytical-conceptual' phase of the 'Harpia' programme.

The requirements of the 'Harpia' Programme

According to the document published by the Inspectorate of Armaments, the 'Harpia' programme is supposed to select a fighter that will meet the following requirements:

- a multi-role fighter should be able to effectively engage enemy fighters and support other branches of the Armed Forces;
- the aircraft ought to possess Airborne Electronic Jamming Capabilities.

Based on unofficial sources, a new type of aircraft should be operational by 2024 which means that deliveries are expected to be accomplished between 2022 and 2023. Probably the MoD plans to procure at least 32 fighters for two squadrons. At this moment, it still remains unclear whether Poland will acquire brand new or modernised, second-hand aircraft. Most likely the Ministry of Defence will opt for the former solution; however, the current plan is not limited to the fifth-generation fighters but it also includes the 4.5-generation aircraft. Otherwise, the entire procurement procedure would be pointless given that Lockheed Martin is the producer of the only Western fifth-generation aircraft available on the market. It is worth noting that even Lockheed Martin has also offered the latest variant of the F-16 (Block 70) as well as the F-16V upgrade package for the existing fleet of the Polish F-16s. The F-16V package offers the same standard of equipment as the Block 70. A hypothetical procurement of the 4.5-generation aircraft should not be perceived as a 'capitulation' of the MoD due to the lack of funding. Currently, even the most powerful militaries in the world, such as the United States, are considering the procurement of a more economical F-15 Advanced Eagle.

The latest communiqué of the Ministry of Defence published on November 28, 2018 may suggest that Poland tends to acquire the fifth-generation aircraft. The communiqué states that "Minister of Defence Mariusz Błaszczak urged the Chief of the General Staff to speed up the modernisation programme intended to select the new-generation fighter

aircraft which would significantly improve capabilities of the Air Force as far as air-to-air combat and close air support are concerned. The new fighter will operate in anti-access/area denial (A2/AD) zones using network-centric warfare capabilities in cooperation with the Allied military aviation." This information was published along the approval of the Military Development Programme for 2017-2026 which means that the Ministry of Defence has prioritised the 'Harpia' programme.

Candidates

Five companies have declared their participation in the 'technical dialogue' phase of the programme: Boeing, Lockheed Martin, Fights-On Logistics, Saab Defence and Security, and Leonardo. Furthermore, Elbit Systems EW and SIGINT – Elisra; a consortium of Griffin and Elta Systems; as well as Saab Defence and Security have proposed to provide the electronic warfare systems. Given that the MoD is interested in acquiring brand new aircraft, most likely one of the following fighters could replace the Soviet-era fighters in the Polish Air Force: F-18E/F Super Hornet, F-15 Eagle, F-16 Block 70/72, F-35A Lightning II, JAS 39C/D or E/F Gripen, and Eurofighter Typhoon.

According to the statements of Poland's senior military officials, the Lockheed Martin F-35A is considered the future aircraft of the Polish Air Force. The F-35 programme has been significantly delayed and the current price per unit remains at a relatively high level. Although the F-35 aircraft is not as expensive as it used to be couple years ago, the current estimated unit cost is about \$89mln. By 2020, the price is expected to fall to approximately \$80mln which means that the price of a single F-35 will be comparable to 4.5-generation fighters. The life-cycle cost remains another issue given that in the Autumn of 2018 the Royal Air Force faced a problem with maintaining the stealth coating technology used in the F-35. All these challenges and high-costs of maintenance result from an innovative approach to the aircraft construction and the technological advancement of the programme that caused a significant delay in full-rate production. Lockheed Martin set a goal of producing 15 aircraft a month; currently, however, the company can build up to 8 fighters a month. Even though Lockheed Martin is still far from achieving its target output, the current rate of production is still quite impressive given that other Western producers can produce from 1 to 3 fighters a month. Achieving the

full-rate production is necessary to reduce the unit and the maintenance cost of the F-35A. In 2023, the number of all F-35 in service is expected to reach 1000 fighters; Lockheed Martin has produced 300 aircraft to date. However, the cost per hour of operating the F-35 is approximately \$42,000 compared to approximately \$20,000 for the F-16C. For the sake of comparison, it is worth noting that the cost per hour of a heavy twin-engine F-15 averages \$27,000.

The F-16 Block 70/72 is another option for the Polish Air Force. These fourth-generation fighters have been integrated with various modern systems which were designed based on the experience gained in the F-35 programme. The new systems for the F-16 Block 70/72 include an active electronically scanned array (AESA), the latest electronic warfare systems, as well as modern avionics enhancing pilot's situational awareness. The new variant of the F-16 will be an interesting option particularly for less-wealthy nations who cannot afford the F-35 but are still willing to acquire a brand new fighter. So far, the F-16 Block 70 has been purchased by Bahrain and selected as a new type of aircraft for the Slovak Air Force. On the other hand, several other countries decided to upgrade their F-16 fleet; Greece and Taiwan, for example. The F-16 seems an attractive solution for the Polish Air Force given that the existing infrastructure is compatible with the F-16C/D Block 52+. Furthermore, Polish pilots and aircraft technicians are familiar with this construction whose obvious advantage is also a relatively lower operating cost compared to other types of aircraft. Boeing is another important contender in the 'Harpia' programme. The American company displayed its F/A-18E Super Hornet during the International Defence Industry Exhibition; however, the representatives of Boeing do not rule out that they could also offer some variant of the F-15. Both fighters represent the fourth-generation aircraft standard but are relatively expensive in maintenance due to the twin-engine configuration.

On the other hand, a light single-engine JAS-39 Gripen is considered an economical option. In 2003, SAAB offered the JAS-39 C/D aircraft to the Polish Air Force but was defeated by Lockheed Martin and its F-16 C/D Block 52+ fighter. The main reason of Saab's failure were mediocre features of the aircraft, particularly lower maximum weight of equipment carried by the fighter and a limited ferry range compared to its main contender. Therefore, it is highly unlikely that the JAS-39 C/D could be selected as the new aircraft for the Polish Air Force given that the competition has far more advanced

fighters than in the early 2000s. However, the latest variant of Gripen designated as JAS-39E/F is a much larger aircraft than its predecessor, has a significantly increased internal fuel capacity (by 40 per cent compared to the C/D variant); an active electronically scanned array (AESA) and two additional hardpoints for armament. Therefore, the JAS-39E/F can be perceived as equal to the F-16 Block 70 fighter given that the latest Gripen has been integrated with the most advanced precise-guided munitions in the world produced by European companies. Nevertheless, it is unclear whether the company does not want to reveal the details of their offer or the final proposal has not been accomplished yet.

Eurofighter Typhoon is another important contender in the 'Harpia' programme. This fighter is promoted in Poland by Leonardo whose proposal includes the 'Polonisation' of the aircraft as well as industrial cooperation and participation of the Polish industry in B&R projects. The latter one is related to the project of the European next-generation fighter aircraft proposed by Dassault and Airbus. Eurofighter Typhoon is a heavy fighter which is relatively expensive in maintenance due to its twin-engine design. However, it is a mature, well-designed fighter specialised in air superiority operations, which has also been integrated with a number of armament for air-to-ground and maritime attack capabilities. Eurofighter Typhoon is also the only aircraft in the world with a swing-role capability which allows the fighter to combine different operation tasks in a single mission. This feature could be particularly valuable for the Polish Air Force given the variety of potential threats faced by Poland's military aviation.

Conclusions and recommendations

1. Roughly half of the Polish Air Force consists of obsolete fighter aircraft which are incapable of carrying combat operations or have very limited capabilities. The entire fleet of the Soviet-era fighters must be replaced in years to come; therefore the new type of aircraft ought to be selected and procured as soon as possible.
2. Among the available options there are three single-engine fighters. Two of them, the F-16 Block 70/72 and the JAS-39E/F can be considered as relatively inexpensive in terms of both procurement and maintenance costs. These two options are definitely the most reasonable solution. In both cases, the procurement procedure could be completed in the

near future to avoid delays in other programmes prioritised by the Ministry of Defence, such as the 'Wisła' and 'Homar' programmes.

3. In the near future, the F-35 will remain the only available fifth-generation aircraft that could be acquired by the Polish Air Force. It seems certain that sooner or later Poland will eventually procure this fighter.

4. Currently, the proposal of Leonardo seems the best option for Poland as far as industrial cooperation in the field of research and development is concerned. Procurement of Eurofighter Typhoon could open the door to 'Polonisation' of the aircraft and cooperation in development of the European next-generation aircraft. It is worth noting, however, that other contenders have not revealed any detail regarding the cooperation with the Polish defence industry.

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