



# Poland's Pilot Training

The Polish Air Force has been developing new and independent pilot training programmes in recent years. **Paul Gross** and **Patrick Roegies** explain why and how



*Above: Designed to operate from less than perfect airstrips the TS-11 was equipped with 'mudguards' on the engine intakes Paul Gross*

The Polish Armed Forces have been going through rapid changes since joining NATO in 1999. Nowadays, the Siły Powietrzne or Polish Air Force operates a quickly-decreasing number of older Soviet-era aircraft and helicopters, combined with an expanding fleet of modern indigenous and western hardware.

The effect of this transition has been significant for the jet-pilot training programme, and has required a different approach. The acquisition of eight Alenia Aermacchi M-346 Masters, destined to replace the venerable PZL TS-11 Iskra, is a step in the right direction. The M-346 is seen as progress on many levels, significantly improving the preparation of cadets for flying Poland's new aircraft.

## The origin of Polish jet pilot training

Poland's jet pilot training programme dates back to the late 1950s, when Poland started operating MiG-15 and licence-built MiG-17 aircraft, referring to these aircraft as Lim-1 and Lim-2, respectively.

Lim represented the abbreviation of 'licensed fighter'. The aircraft were manufactured by WSK-Mielec, which was later renamed PZL (Polish Aviation Works) Mielec. The first Lim-5 was built on November 28, 1956.

As the Polish Air Force preferred not to send its cadets to Russia for training, it developed its own jet-pilot training system. Initially, it received a number of original MiG-15bis and Czech-built MiG-15UTI aircraft for its domestic training programme.

The training programme comprised basic flying training, advanced flying training and lead-in fighter training. Upon completion, and integration into the Air Force, the Lim-1 and Lim-2 aircraft were used for advanced-flight training and lead-in fighter training.

The dual-seat trainer versions, referred to as SBLim-1 and SBLim-2 aircraft, have had a long operational life, being used for the training programme until 1991, when the final Lim were withdrawn from use, and all jet-training tasks transferred to the TS-11 Iskra.

The first production model of the TS-11, designated as the TS-11 Iskra bis A, was followed by various iterations until 1987, when the final delivery of the TS-11 Iskra bis D took place. Several subtypes were used for training tasks, and recently the final remaining aircraft have been withdrawn from use.



*Last checks before take-off are performed by ground crew on a PZL-130 Paul Gross*

*Above: The introduction of the M-346 within the Polish Air Force had a rough start, but it is now fully implemented in the advanced flight training at Dęblin Paul Gross Top: The Emblem of the 4th Flying Training Wing Polish Air Force*

Between 1993 and 1994, domestic-designed-and-built, propeller-driven PZL-130 Orlik aircraft were added to the inventory of training aircraft. Both the TS-11 and PZL-130 had been the backbone of the jet-pilot training programme until last year.

**Becoming a NATO member**

After Poland became a full member of NATO in 1999, the Polish Air Force started re-assessing its capabilities, and concluded that the Air Force comprised large numbers of ageing, Soviet-designed fighter and fighter bomber aircraft that needed to be modernised to the 'NATO standard'. This resulted in the gradual withdrawal of ageing aircraft like the Mikoyan Gurevich-designed MiG-21 and MiG-23, while keeping the Mikoyan Gurevich MiG-29 and Sukhoi Su-22 within its operational inventory.

Soon after the reunion of both Germanys, the Polish Air Force acquired additional MiG-29G and MiG-29GT's from Germany, and a few aircraft from the former Czech Republic. In the mid-noughties, western fighters began making their way into the fighting force.

The MiG-29 Fulcrum remains Poland's air-defence backbone to this day. Originally, between 1989 and 1990, nine MiG-29 Fulcrum-A and three MiG-29UB aircraft were delivered. This fleet has since been supplemented with ten former Czech aircraft (nine MiG-29A and one MiG-29UB) in 1995, and 27 former German

aircraft (23 MiG-29G and four MiG-29GTs) in 2005. A total of 30 remain in active service.

Also in service is a fleet of Su-22 Fitter ground-attack aircraft. Delivered between 1984 and 1990 they're a strong-but-ageing asset. From the original 110 delivered (90 Su-22M-4 and 20 Su-22UM-3K) only 32 remain in service.

The first acquisition of western designed and built aircraft took place between 2007 and 2008, when 48 Block 52+ F-16's were integrated into the operational inventory.

This aircraft mix creates a varied demand at the training institutions and, as an interim solution, part of the training programme was conducted in the United States, for the cadets selected to operate the F-16.

After successfully completing their basic training on the PZL-130 and TS-11 Iskra in Poland, the cadets are transferred to Randolph Air Force Base for the next stage of pilot training, operating the Raytheon T-6 and Northrop T-38C.

Cadets selected to operate the MiG-29 and Su-22 complete their standard domestic programme, starting with basic training on the PZL-130 II, and followed by basic jet training on the M-346.

With the M-346 now operational and available in sufficient numbers, the Polish Air Force plans to return its jet-pilot training back to Poland, regaining their independence and ability to remain self-sufficient.



*If the cadet in this Da20 has succeeded in this phase of training and selection he may now possibly be one of the first cadets to have his jet training on the M-346 Paul Gross*

**Organisational Structure**

Nowadays, the Polish Air Force jet-pilot training is centralised at the Polish Air Force Academy (PAFA), in co-operation with the 4th Flying Training Wing, headquartered at Dęblin Air Base.

The 4th Flying Training Wing is under direct control of the Air Force Commander. The mission of the 4th Flying Training Wing is to provide flight training for the PAFA cadet-pilots on jet-trainers, helicopters, turbo-prop and transport aircraft.

The training of the cadets is provided at the 41st Air Training Base Dęblin

and the 42nd Air Training Base Radom.

Both the 60th Squadron and 66th Squadron are based at Radom Air Base, and equipped with the PZL-130 II.

In Dęblin, the training is provided by the 58th Squadron, equipped with the TS-11, and 48th Squadron equipped with the M-346.

When the M-346 aircraft were received in 2018, and assigned to the 48th Squadron, this squadron was working up its M-346 programme and preparing to receive its first class of cadets, who started their training in early-2019.

**Selection procedure**

All cadets have to pass the first stage of their training, which comprises a screening programme at an aero club. The future student will have to perform approximately 20 flying hours. During this phase, it is determined whether the cadet has the talent and skills to complete the training. The cadets that succeed pass on to PAFA.

**Theoretical and practical**

The current air force training system consists of three main stages. The first stage is a mixed

stage, comprising four semesters of theoretical and practical courses performed by PAFA. This is followed by practical courses delivered by the 4th Flying Training Wing.

The practical courses provided by PAFA consist of 126 flight hours at the Academic Air Training Centre. Cadets are trained up to the private pilot licence (PPL) level. During this stage, cadets will operate light aviation aircraft, mainly the Diamond Aircraft DA20 Katana and Cessna 152. These aircraft are civil registered and the instructor team consists mainly of former Polish Air Force pilots. After completion of the fourth semester, the cadet will be transferred to the 4th Flying Training Wing to start practical military flying training.

The second stage is performed by the 42nd Air Training Base in Radom and includes 140 hours on the turboprop PZL-130. Upon successful completion, the student will transfer to the third stage of their training, by being trained for a year performing advanced flight training on the TS-11 at 41st Air Training Base in Dęblin. The advanced stage consists of 130 flying hours. After completion, the cadets will be promoted to second lieutenant rank and receive their master degree wings, following a total of 396 flight hours. During the course, many hours are spent on PZL-130 and TS-11 flight simulators. 2019 was the last year that TS-11 Iskra training took place, as the new advanced jet trainer, the M-346 Bielik, was introduced.



*2019 was the last year the TS-11 was used for cadet training. Here instructor and cadet walk towards their ride, recognisable by its colour scheme as a former Polish Navy example Paul Gross*



*Above: The airfield of Radom close to the outskirts of the city and fully equipped for use by commercial airlines. During 2015 and 2016 it was used commercially, but since then no scheduled commercial flights have been carried out Paul Gross Below: One of the original Czechoslovakian-built MiG-15UTI trainers was assigned to the 45 LPSz-B squadron based at Babimost Air Force base in the early nineties. The squadron was assigned fighter bomber tasks and training tasks Patrick Roegies*



Deblin air base is known for its favourable flying climate for much of the year. Locals say it's because of its proximity to the Wisla river Paul Gross



The first group of cadets from the Air Force Academy started their training on the M-346 in March 2019, and it ran until the end of November 2019. The group consisted of four cadets. This group successfully completed the entire syllabus, including the flying programme. The next group, of six cadets, started their training in March 2020 and should complete it by December 2020.

### The M-346 Master

After a very long process, starting as early as 1976, the M-346 was selected on 20 December 2013 to replace the TS-11. The Iskras were initially going to be retired by 2009, but the tender's submission date moved all the way back to October 2010.

Some major hurdles were overcome during this extended period of time. At the start, one of the designs considered was the domestically designed and built M-92 Iryda. After a long operational test and evaluation process, it was only used in operational service for a short period, between 1992 and 1996. The process was finally abandoned as a result of a fatal accident and budgetary cuts.

Another setback in the search for a TS-11 successor was the cancellation of the original Lead in Fighter Trainer (LIFT) tender process in

2011. With this, the Polish Air Force abandoned its original demand for a dual-role combat capability for the new trainer, which meant the specification had to be redefined. This process was completed in a short timeframe, and a new tender was initiated. The possible alternatives that were assessed were the BAE Systems Hawk, Korea Aerospace/Lockheed Martin Golden Eagle and the Aero Vodochody L-159.

The sub-sonic Hawk is the most popular western-built jet trainer in the world and new variants remain in production. NATO doctrine has long marked Hawks as secondary air patrol assets in times of conflict and the type can be armed with a variety of weapons. This would fit the dual-role requirement very well. Poland was reportedly examining proposals to buy some of Finland's Hawk trainers, but the trainer competition dragged and the Finnish Air Force's 49 Hawk Mk 51 trainers which were available were expected to reach the end of their lifespans by 2019. Polish officials believed the Finnish Hawks could remain in operational service until 2025, but that would still mean just five to ten years of additional operational service, allied with higher maintenance costs.

The second alternative, the T-50 Golden Eagle from Korea Aerospace/Lockheed Martin, appeared to fulfill all the requirements at first glance. It's a fully-supersonic trainer like the T-38 and could be modified to make it a cheap but effective reserve fighter force in times of need. It also offers the prospect of improving relations with a growing Asian economy and is backed by the same American firm that sold

Poland its F-16 aircraft.

International setbacks in the UAE and Singapore hurt the type, but a win in Indonesia and a dual-role buy from Iraq have solidified its competitive position.

The T-50 remains a strong contender for any country that wants swing-role capability, but its price tag exceeded the Polish Air Force budget.

The sub-sonic L-159 trainers are capable aircraft, fully-westernised and NATO-compatible. They were designed from the outset as combat aircraft, and can be fitted with targeting pods and Paveway laser-guided bombs, AIM-9L/M Sidewinder air-to-air missiles, and the usual assortment of guns, rockets, and conventional bombs. They can operate from austere bases if needed, and are easy to maintain.

### Other options

The L-159 was also offered in the initial tender and Aero Vodochody was prepared to bid again for the second tender. The Czech Republic had even said that they'd be willing to offer Poland the use of Czech Air Force trainers as an interim step. Exceeding the intended withdrawal from use date of the Polish Air Force TS-11 fleet. Add in the Czech Republic's proximity, and it seemed like a compelling offer.

The main problem was a poorly-constructed tender, that created far too much financial risk and uncertainty, forcing Aero to drop out of the competition.

The Russian-designed Yak-130 was an obvious non-contender in this process, given Russia's history in Poland.

The Italian Alenia M-346 is mostly sub-sonic, but has limited low-supersonic capability. The M-346 has become a consistent contender in advanced trainer competitions. They are the result of a joint programme with Russia that also produced the very similar Yak-130, which is Russia's next generation trainer and light attack aircraft. Unlike the Yak-130, however, the M-346 is only a jet trainer; its light attack version is 'under development'.

When the initial order for eight M-346 was placed in February 2014, an option for four additional aircraft was included. Next to the eight aircraft, the purchase package included

The last surviving TS-11s in military service will be the aircraft assigned to Team Iskra, although their long term future is far from certain Hans Antonissen



### Simulated Weapons

The list of simulated armaments is extensive and emphasises the importance of weapons simulation within the M-346 programme. It includes:

- Air-to-air missiles AIM-9X class and AIM-120C class;
- Air to-ground missiles AGM-65G2 class;
- 70 mm unguided rockets;
- AGM-154C JSOW class armament;
- AGM-84 class anti-ship missiles;
- AGM-88 HARM class missiles;
- Laser guided 500lb bombs (GBU-12E/B Paveway II class);
- Laser guided 2000lb bombs (GBU-24 Paveway III class);
- GPS/INS guided 500lb bombs (GBU-38 JDAM class);
- GPS/INS guided 2000lb bombs (GBU-31 JDAM class)
- Classic 500lb bombs (Mk 82 class);
- Classic 2000lb bombs (Mk 84 class)

Additionally, an M-61 like cannon is integrated in this simulated weapons suite.

### M-346 Timeline

In March 2017, it was decided that the ETTS would be upgraded by July that year. Following this upgrade, the remaining six M-346 were delivered by December 2017, completing the order of eight aircraft.

One year later, on 27 March 2018, it was announced that Poland ordered four additional M-346s, to be delivered before the end of 2020. This contract, for over €115m, also included a support package for maintenance and support of the aircraft and simulator. Moreover, the deal included options for the future delivery of a further four aircraft plus support package. This option was translated into an actual order nine months later, on 14 December 2018. The total cost of this last order was €130m and includes the delivery of another four airframes, a support package and an upgrade of the preceding twelve airframes to NATO STANAG 4193 Edition 3 IFF standard.

These last four M-346 are currently being delivered, completing a total of 16. Serial numbers 7709 to 7712 were assigned to this final batch. The first aircraft, serial number 7709, was delivered to the Polish Air Force October 5, 2020, followed by the second aircraft serial number 7710 on October 20, 2020. The third aircraft has been seen flying in full colours and assigned serial number 7711, but has not been delivered yet. The fourth and final aircraft has not been noted yet.

the delivery of simulators and other training systems, spare parts, and technical support. However, this was not the end of the process. After receiving the first two M-346 on November 14, 2016, the Polish Air Force concluded as early as December 2016 that the Embedded Tactical Training System (ETTS) was not properly functioning. The weapon simulation system is a very important feature of the M-346 training syllabus and several issues became apparent during commissioning. The only actual payload that could be carried were small and simple 12kg SUU-20 training bombs. All other armament could however be simulated by the ETTS.

### Minding the gaps

The TS-11 was designed in the 1960s, to fill the gap between the piston-engined TS-8 Bies training aircraft and the newly-acquired MiG-21. With the introduction of the F-16 in 2007, a further gap became apparent, caused by the

technological developments in military aviation. The gap between the 60s technology of the TS-11 and the fourth-generation F-16 Block 52 turned out to be significant. The shortfalls forced the Polish Air Force to reorganise its training programme for the F-16 pilots, because of a lack of technological and simulator capabilities. This caused an accelerated need to replace the TS-11. With the introduction of the M-346, the gap between that jet trainer and the F-16 has been closed, given the enhanced capabilities that the M-346 delivers.

However, the enhanced capabilities of the M-346 might create another gap for pilots converting to it from the PZL-130 Orlik II!

According to Major Moskal, commander of 48th Squadron, only after training on M-346 is in full swing, will an operational evaluation prove whether a new gap actually exists and what the extent of that gap might be. That aside, the M-346 trainer delivers a range of new techniques and opportunities for pilot training and is, as Major Moskal says: "Almost perfect".

### The future

Poland has developed a pilot-training programme that is designed to its own exacting requirements. The result of the domestic training programme is an independent and professional air force capable of controlling its influx of new pilots. Both in NATO exercises, and in operational situations, the Polish Air Force has proven that its competences are fully compliant with the standards NATO expects.

With its jet-pilot training programme becoming fully-independent from 2019 onwards, the Polish Air Force once again has a unique position within NATO.

With a few exceptions, most European NATO Air Forces depend to some degree on the US Air Force. This may be cost-efficient and practical, but it also makes them dependent on a foreign nation, and one that has proven to be a fickle partner in recent times.

With the acquisition of the M-346, the Polish Air Force clearly stated its intent to remain independent. That stance will offer new opportunities in the near future, thereby assuring a steady flow of top-quality new jet pilots to its air force for many years to come. **AFM**



Part of the training syllabus is touch and go's at various air bases. Here a M-346 is seen during one of the first touch-and-go's at Radom Air Base during spring 2018 Paul Gross



Part of the package that the Polish MoD bought from Leonardo Aerospace is several years of on the job support by senior Italian M-346 instructor pilots. Here the Italian instructor can be recognised by his blue flight suit Paul Gross