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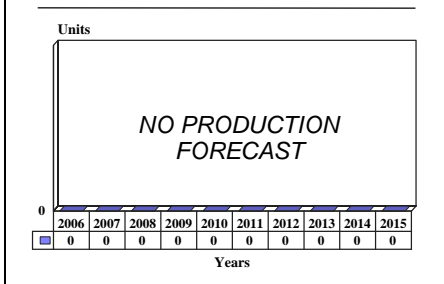
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PZL Mielec I-22 Iryda (Iridium) - Archived 2/2007

Outlook

- No forecast is issued for additional production
- Further developments are awaited

10 Year Unit Production Forecast
2006 - 2015



Orientation

Description. Tandem-seat, twin-turbojet-powered advanced training, light attack, and tactical reconnaissance aircraft.

Sponsor. The government of Poland.

Status. Though currently not in production, the Iryda remains available to order.

Total Produced. Seventeen I-22s of all versions have been produced, including five prototypes. This total does not include two static test aircraft.

Application. Intermediate and advanced pilot training, tactical armed reconnaissance, close support, ground attack, counterinsurgency operations, and anti-surface vessel missions.

Price Range. Estimated to be between \$3.5 million and \$3.75 million, in 2002 U.S. dollars.

Contractors

Polskie Zaklady Lotnicze Sp. z o.o, <http://www.pzlmielec.pl>, ulica Wojska Polskiego 3, Mielec, 39-300 Poland, Prime

Technical Data

(M-93K)

Design Features. Shoulder-wing aircraft bearing a strong resemblance to the Dassault/Dornier AlphaJet. The M-93K employs a two-spar wing with swept leading and straight trailing edges. The trailing edges are fitted with hydraulically actuated flaps. The landing gear is retractable tricycle type with single wheels on each unit. The cockpit is pressurized and air

conditioned using engine bleed air. The main hydraulic system (pressure 3,045 psi) powers the landing gear, wing flaps, airbrakes, tailplane incidence, brake-chute deployment, differential braking of mainwheels, and nosewheel steering. An auxiliary hydraulic system is for aileron control boost. A pneumatic system powers emergency extension of wing flaps, emergency

extension of landing gear, canopy opening and closing, windshield anti-icing, and hydraulic reservoir pressurization.

	<u>Metric</u>	<u>U.S.</u>
Dimensions		
Wingspan	9.60 m	31.50 ft
Overall length	13.22 m	43.37 ft
Overall height	4.30 m	14.11 ft
Weight		
Empty, equipped	4,650 kg	10,251 lb
Maximum TOW		
Clean	6,900 kg	15,211 lb
With external stores	8,600 kg	18,959 lb
Maximum fuel weight		
Internal	1,895 kg	4,178 lb
External	608 kg	1,340 lb
Maximum external stores load	1,800 kg	3,968 lb
Capacities		
Internal fuel	2,430 liters	642 gal
Performance^(a)		
Maximum level speed at 5,000 m	950 kmph	513 kt
Service ceiling	13,700 m	44,940 ft
Climb rate, SL	2,730 m/min	8,957 ft/min

Propulsion

I-22	(2)	PZL-5 SO-3W22 non-afterburning turbojet engines rated 10.79 kN (2,425 lbst) each.
M-93K/M	(2)	PZL-Rzeszow K-15 turbojet engines rated 14.7 kN (3,307 lbst) each.
M-93V	(2)	Rolls-Royce Viper 545 turbojet engines rated 14.7 kN (3,307 lbst) each.

Armament

(M-93K) One 23mm GSz-23L twin-barrel gun in ventral pack, with up to 200 rounds in fuselage. Four wing hardpoints can each handle up to 500 kilograms, but the aircraft's maximum external stores load is limited to 1,800 kilograms. The hardpoints can be fitted with external fuel tanks, gun pods, rockets, bombs, or air-to-air missiles.

Crew/Accommodation

Pilot and instructor in stepped tandem seat cockpit.

^(a)M-93K at clean take-off weight of 5,900 kilograms, unless noted otherwise.

Variants/Upgrades

I-22. Basic two-seat trainer. Powered by SO-3W22 engines.

M-93. I-22 variant. Originally designated **M-92**. First flight of a demonstrator (a refitted I-22 prototype) occurred in December 1992. The M-93 is a combat trainer featuring new engines and improved weapons carriage capability.

The M-93K is powered by K-15 powerplants and is fitted with avionics produced by Thales. Maximum take-off weight with external stores is 8,600 kilograms (18,959 lb). First flight of a production M-93K took

place in July 1994. The M-93V is powered by Rolls-Royce Viper 545 engines; first flight of an M-93V occurred in April 1994. This aircraft was an I-22 prototype refitted with Viper engines. Both the M-93K and the M-93V received type certification in January 1995.

One Iryda version currently marketed is the M-93M. It has a maximum weapons load of 2,075 kilograms (4,575 lb) and a maximum take-off weight of 9,000 kilograms (19,842 lb). The M-93M is equipped with

K-15 engines, Thales avionics systems, and Martin-Baker ejection seats.

Another proposed M-93 version was the M-93R reconnaissance version. However, work has halted on this version.

M-95. Proposed I-22 variant that featured a new wing, a fuselage-mounted gun, an expanded range of external weaponry, and improved avionics. Engine options included the Turbomeca-Snecma Larzac 04-V3, the Rolls-Royce Viper 545, the Rolls-Royce Viper 632, the Rolls-Royce Viper 680, or the PZL-Rzeszow K-15. Proposed M-95 versions included the M-95T combat trainer, the M-95R reconnaissance version, and the M-95M maritime reconnaissance/attack version. Another model, the M-95MS, was to be similar to the M-95M but with capability comparable to the Hawk 200 or the AlphaJet 3. The M-95 program was canceled in 1997.

M-96. Version of the M-93K featuring improvements such as leading edge root extension, leading edge wing slats, and Fowler flaps. A prototype, a modified I-22, made its first flight in December 1996, in partial M-96 configuration. First flight of a modified M-93K in full M-96 configuration occurred in August 1997.

M-97. Proposed single-seat version. The M-97S was a ground attack variant, while the M-97MS was a fighter/

ground attack aircraft. The M-97 program was canceled in 1997.

M-99 Orkan. Proposed single-seat ground attack aircraft. It was a possible alternative to the M-97. The M-99 had 80-percent structural commonality with existing I-22 variants. External payload was 4,000 kilograms (8,818 lb). The M-99A was powered by Rolls-Royce Turbomeca Adour Mk 871 turboprop engines rated 26.8 kN (6,018 lbf) each. The M-99S had two Povazske Strojarnie DV-2 powerplants rated 21.6 kN (4,850 lbf) each, while the M-99SA had two Povazske Strojarnie DV-2A engines rated 25.01 kN (5,622 lbf) each. Povazske Strojarnie is based in Slovakia. Development of the M-99 was canceled in 1997.

Iskra 2. The latest version of the Iryda, the Iskra 2 has the basic Iryda wing but without the leading edge root extensions and Fowler flaps that were part of the M-96 configuration. The Iskra 2 is powered by K-15 engines, and has a Thales avionics suite. Structural modifications include underwing hardpoints that enable carriage of new weapons.

In July 2002, PZL Mielec flew an Iskra 2 for the first time. The aircraft was modified from an existing Iryda.

Program Review

Background. I-22 prototype construction began in 1982 at PZL Mielec. First flight of the initial flying prototype occurred in March 1985, although this aircraft was lost in a January 1987 crash. Four other flying prototypes were produced between 1988 and 1991. Two static test aircraft have also been built.

An order for nine aircraft was placed by the Polish Air Force in September 1991. The initial two aircraft from this order were delivered to the service in October 1992, and a further three were delivered in February 1994. The remaining four aircraft of the order were apparently delivered in the M-93K configuration.

The basic I-22 is powered by two PZL-5 SO-3W22 turbojet engines manufactured by PZL-Rzeszow. In December 1992, flight testing began of a demonstrator for a new I-22 variant, which was then called the M-92 and is now known as the M-93. The demonstrator was one of the original I-22 prototypes re-engined with more powerful K-15 turbojets. The K-15, which is produced by PZL-Rzeszow, can be installed with minimal airframe modification.

PZL Mielec proposed several I-22 derivatives. The M-93K is a combat trainer that has Martin-Baker ejection seats and improved weapons carriage capa-

bility. It also includes K-15 engines. The MAESTRO (Modular Avionics Enhancement System Targeted for Retrofit Operations) nav/attack package from the French company Sagem was test flown on an M-93 in May 1994. The avionics in the package included Sagem's Uliss inertial navigation system, a wide-field-of-view head-up display, a color electronic flight instrument system, and hands-on throttle-and-stick controls. However, Sextant Avionique (now Thales) was chosen in October 1995 to supply avionics for the M-93K. Sextant received a contract in April 1996 from PZL Mielec for the avionics.

In April 1994, one of the Iryda prototypes refitted with Rolls-Royce Viper 545 engines was flown for the first time. The Viper-powered M-93 version is known as the M-93V.

Other proposed I-22 variants have included the M-95, the M-96, the M-97, and the M-99 Orkan. These are described above in the **Variants/Upgrades** section. The M-95, the M-97, and the M-99 have all been canceled.

The Iryda program has gone through some difficulties. In December 1995, the Polish Defense Ministry was proposing a purchase of 40 used AlphaJet trainers from

Germany instead of ordering further Irydas. A Defense Ministry spokesman said at the time that the Iryda did not meet the military's requirements in terms of speed, weapons load, and nav/attack systems capability. The Ministry also felt that the aircraft was too expensive.

Working-level discussions had been held with Germany regarding the AlphaJet deal. In addition to the AlphaJet, other aircraft under consideration were the Aero L-39 and the Saab 105.

However, by the end of 1995, the Polish government suspended the Defense Ministry plan to buy AlphaJets in favor of purchasing the Iryda. The government subsequently redirected funding to support the I-22 program.

Initial I-22s were powered by the PZL-5 SO-3W22 turbojet engine. The SO-3W22's fuel consumption, though, proved to be higher than anticipated. In addition, the aircraft were underpowered. The M-93K/M and M-96 versions are powered by the new K-15 turbojet.

In January 1996, one of the early PZL-5-powered I-22s suffered a fatal crash. The Polish Air Force subsequently grounded its I-22 fleet and refused to place

further orders for the aircraft until design improvements were implemented. In the wake of the accident, some design modifications were pursued, including a reduction in the aircraft's landing approach speed. Since the accident, the Air Force ordered six additional Irydas.

Program Stalled. By late 1997, work on the I-22 program had stalled due to arguments between the Polish Defense Ministry and PZL Mielec over how to proceed with flight testing of the new M-96. Iryda chief designer Marek Potapowicz claimed that the Defense Ministry had agreed that the Polish Air Force would conduct flight testing of the M-96 leading to certification, but that the Ministry refused to begin the work without additional factory testing, which it would not fund. The Defense Ministry argued that when the M-96 was delivered for testing in September 1997, it did not have the required quality control certificate, without which the aircraft is not safe to flight test.

New Company. In 1998, PZL Mielec was subjected to liquidation proceedings. In October of that year, a new business entity was established to replace it called Polskie Zaklady Lotnicze Sp. z o.o. The new company is also referred to as PZL Mielec.

Funding

According to the Polish Defense Ministry, a total of \$300 million had been spent on the Iryda program as of December 1997.

Recent Contracts

None

Timetable

<u>Month</u>	<u>Year</u>	<u>Major Development</u>
Mar	1985	First flight of initial prototype
Sep	1991	First order from Polish Air Force
Oct	1992	Delivery of first two aircraft to Polish Air Force
Dec	1992	First flight of M-92 demonstrator
Apr	1994	First flight of M-93V

Worldwide Distribution

Poland Air Force 11 (in storage)

Forecast Rationale

PZL Mielec has hoped that the Polish Air Force would select the Iskra 2 as its new advanced jet trainer. The service has had a requirement for approximately 50 advanced trainers to replace its TS-11 Iskra fleet.

However, Poland recently asked to join the Advanced European Jet Pilot Training (AEJPT) program, which is a multinational effort to establish a joint advanced pilot training program for European air forces. The future of the AEJPT program is highly uncertain, though, and it could dissolve before operations get under way.

Should this occur, Poland could opt to join another multinational training program such as the NATO Flying Training in Canada (NFTC) program, or it could choose to launch an advanced trainer procurement on its own. In addition to the Iskra 2, other contenders for such an acquisition would include the BAE Hawk and the Aero L-159. Meanwhile, PZL Mielec said in 2002 that several foreign customers had shown interest in the Iskra 2.

No forecast is currently issued for future production of the Iryda/Iskra 2. Further developments are awaited.

Ten-Year Outlook

ESTIMATED CALENDAR YEAR PRODUCTION

Aircraft	(Engine)	<u>High Confidence Level</u>				<u>Good Confidence Level</u>			<u>Speculative</u>			Total 06-15	
		thru 05	06	07	08	09	10	11	12	13	14		15
PZL MIELEC													
I-22(a)	SO-3W22	10	0	0	0	0	0	0	0	0	0	0	0
I-22/M-93/M-96	K-15	7	0	0	0	0	0	0	0	0	0	0	0
Total Production		17	0	0	0	0	0	0	0	0	0	0	0

(a) Does not include static test aircraft.