

# ARCHIVED REPORT

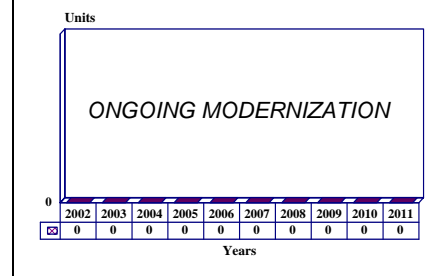
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## Israel Aircraft Industries Kfir - Archived 4/2003

### Outlook

- IAI upgrading Kfirs for Ecuador and Sri Lanka
- Very little remaining retrofit potential

10 Year Unit Production Forecast  
2002-2011



### Orientation

**Description.** The Kfir fighter/bomber is a delta wing, single-engine aircraft developed from the Mirage 5.

**Sponsor.** Heyl l'Avir (Air Force of Israel).

**Contractors.** Israel Aircraft Industries, Ben Gurion Airport, Tel Aviv, Israel.

**Status.** Kfir production ended in 1986.

**Total Produced.** Approximately 215 aircraft in all versions.

**Application.** Fighter/Bomber, Interceptor, Operational Trainer.

**Price Range.** Approximately \$7 to \$8 million; two-seat variant, approximately \$14 million.

### Technical Data

#### (IAI Kfir C2)

**Design Features.** Cantilever low-wing monoplane of delta planform, with conical camber. Two-section elevons on each trailing-edge. Small hinged plate-type airbrake above and below each wing. Detachable swept-back canard surfaces above and forward of each wing, near top lip of each air intake. All-metal area

ruled fuselage. Cantilever tail with hydraulically actuated powered rudder. Triangular section dorsal air scoop extending forward from base of tailplane for afterburner cooling. Tricycle landing gear, one wheel per unit. Single seat except in trainer version, which seats trainee and instructor in tandem.

#### Dimensions

	<u>Metric</u>	<u>US</u>
Length	15.65 m	51.25 ft
Height	3.20 m	10.5 ft
Wingspan	8.22 m	27 ft

#### Weight

	<u>Metric</u>	<u>US</u>
Empty, Interceptor <sup>(a)</sup>	7,285 kg	16,060 lb
Max Combat TO	16,200 kg	35,715 lb
<b>Capacities</b>		
Fuel, Internal	2,572 kg	5,670 lb
External	3,075 kg	6,780 lb
<b>Performance</b>		
Max Speed <sup>(b)</sup>	Mach 2.35	1,516 mph
Ceiling, Combat Config.	17,680 m	58,000 ft
Range <sup>(c)</sup>	768 km	415 nm

**Propulsion**

Kfir C2 (1) GE Aircraft Engines J79-J1E turbojet rated 79.62 kN (17,900 lbst).

**Armament**

Two IAI 30 mm DEFA cannons with 140 rounds each, nine hardpoints for up to 5,775 kilograms (12,730 lb) of stores. Interceptor can carry four Shafrir 2 infrared homing missiles in addition to drop tanks. In ground-attack configuration, two 363-kilogram (800-lb) or two 454-kilogram (1,000-lb) bombs, four 227-kilogram (500 lb) bombs, and an air-to-surface missile (Rafael Luz-1, Maverick, Hobos, or similar weapon) under fuselage, napalm, IMI rocket pods, or Shrike anti-radiation missiles. One ECM pod is commonly carried.

<sup>(a)</sup> Estimate

<sup>(b)</sup> Above 11,000 meters (36,000 feet).

<sup>(c)</sup> C2 ground attack configuration, internal fuel plus 3,000 liters (11,356 gallons) externally, and approximately 1814 kilograms (4,000 pounds) of armament.

## Variants/Upgrades

Kfir. Initial version. Twenty-seven aircraft produced, equipping two squadrons. Twenty-five were later leased to the US Navy and Marines for dissimilar air-to-air combat training (designated F-21A) and returned to Israel in late 1989.

Kfir-C2. Improved Kfir, with addition of canard surfaces, a small strake on each side of the nose, and an extended “dogtooth” leading edge on each wing, all to enhance maneuverability and low-speed handling

characteristics. Later versions of the C2 have Elta EL/M-2001B radar in an extended nose. TC2 is a two-seat version of C2, with an 8.4 meter (27.5 ft) plug-in forward fuselage and lengthened downward angled nose.

Kfir-C7. Improved version (and a conversion) of the C2 with an increased range and payload-carrying capacity. New avionics and HOTAS (hands on throttle and stick) installed. TC-7 is a two-seat version.

## Program Review

**Background.** The Kfir can be described as a second-and-a-half generation Mirage 5: the Israel Aircraft Industries (IAI)-built Neshar, predecessor of the Kfir, was basically a simple copy of the Mirage 5 and was not a partial redesign. The Neshar was powered by an Atar 9C turbojet and had domestically developed avionics systems. As described above, the Kfir incorporates several design changes to enhance maneuverability and mission capabilities.

The Israelis had experimented with re-engining a Mirage IIIJ with a General Electric (GE) J79 during the late 1960s. When France stopped the shipment of Mirage 5s to Israel in 1968, Israel decided to produce the Neshar copy of the Mirage 5. After the 1968 French arms embargo, the USA became the predominant supplier of arms and arms technology to a quickly developing Israeli defense industry. The J79 was now readily available.

In 1973, the first prototype of the Kfir was flown (although a Nesher was tested with a J79 in 1971), shortly before the Yom Kippur War. By 1974, IAI was already producing a new version of the Kfir, although it was not announced publicly until July 1976. Designated Kfir-C2, this version features a number of improvements designed to enhance the aircraft's air combat performance. A two-seat version of the C2, designated Kfir-TC2, was first flown in February 1981 and is currently in service. The C7 version superseded the C2 during mid-1983 and continued in production through 1986. Much of the Kfir fleet has been grounded due to budget pressures, though most of the fleet is being updated to C7 standard.

The C7 was designed to fill the gap between the C2 and the Lavi fighter. The C7 is a conversion of the C2. The C7 has an increased combat radius of 419 nautical miles in the interception role, 476 nautical miles (with 60 minutes loitering time) in the combat air patrol role, and 640 nautical miles in the ground attack role. The C7 is equipped with the WDNS 341 weapons delivery and navigation system and a computerized stores manage-

ment and release system (SMRS). These systems increase weapons delivery accuracy greatly (better than 5 miliradians circular error probability (CEP) when weapons release is computer controlled). Weapons delivery, flight, and navigational information appear on a head-up display. The C7 is normally fitted with an EL2001 ranging radar but can also mount Elta's EL/M 2021 pulse Doppler radar with look up/look down capability, Doppler sharpened mapping, terrain avoidance/following, and over-water search modes.

Production of the Kfir has been terminated. However, IAI continues to convert C2 aircraft to C7 standard and production could be resumed at short notice. In the mid- to late 1980s, the US Navy leased two squadrons of Kfirs as aggressor trainers. The service redesignated the aircraft as the F-21A. These aircraft have since been returned to Israel. Under the lease agreement, IAI provided the aircraft at no cost, while the Navy paid for maintenance, support, and spare parts.

Periodic sales of used Kfirs continue at a low level; Ecuador recently obtained six aircraft, while Sri Lanka acquired eight ex-Israeli Air Force units.

## Funding

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The Kfir modernization effort is being funded by Israel Aircraft Industries.

## Recent Contracts

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No recent contracts.

## Timetable

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<u>Month</u>	<u>Year</u>	<u>Major Development</u>
Sep	1971	Initial Salvo flight
	1972	Production Nesher deliveries begun
Oct	1973	Nesher reported in combat
Apr	1975	Kfir unveiled
Jun	1976	C2 unveiled
	1977	C2 available for export
	1983	C7 deliveries begun
Sep	1984	US Navy F-21A contract finalized
Aug	1986	USMC F-21 contract signed
	1990	All F-21 Kfirs back in Israel

## Worldwide Distribution

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The Kfir is in service with air arms of the following countries:

<b>Colombia</b>	11
<b>Ecuador</b>	12

Sri Lanka

12

## Forecast Rationale

IAI is reportedly in the final stages of updating about 10 Ecuadorian Kfirs and is also modernizing eight Kfirs recently acquired by Sri Lanka.

In 2001 IAI offered to lease Brazil 12 ex-IDFAF Kfirs for a five-year period as an interim measure until the

Latin American nation begins receiving its yet-to-be-selected new F-X fighter. It remains to be seen whether this offer will be taken up by Brazil. We see very little in the way of potential retrofit opportunities for the Kfir.

## Ten-Year Outlook

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No further production of Kfir is forecast.

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