

# ARCHIVED REPORT

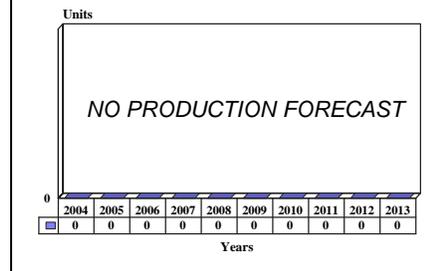
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## Kawasaki T-4 - Archived 2/2005

### Outlook

- Production ended in 2003
- Upgrades to existing T-4s are possible to replace the JASDF T-2 fleet

10 Year Unit Production Forecast  
2004 - 2013



### Orientation

**Description.** Twin-turbofan-powered, tandem-seat intermediate/advanced military training aircraft.

**Sponsor.** Japan Defense Agency; Japan Air Self-Defense Force.

**Contractors.** Kawasaki Heavy Industries Ltd, Aerospace Group; Gifu, Japan. (Kawasaki held a 40 percent share in the program.) Major subcontractors included Mitsubishi Heavy Industries and Fuji Heavy Industries, each with 30 percent of the program.

**Status.** Production ended in 2003.

**Total Produced.** Kawasaki produced 212 T-4s through 2003, including four prototypes.

**Application.** Intermediate and advanced flight training.

**Price Range.** FY98 unit price, \$30.16 million.

### Technical Data

**Design Features.** Cantilever midwing monoplane with swept, downward-canted wing. Cantilever tail section with swept vertical and horizontal stabilizers. Retractable tricycle-type landing gear rides on single

main and nose wheels. The airframe was produced mostly from aluminum alloys with some composite materials (4.5 percent of airframe weight) and titanium. Dual 3,000-psi hydraulic systems are used.

	<u>Metric</u>	<u>U.S.</u>
<b>Dimensions</b>		
Length overall	13.0 m	42.65 ft
Wingspan	9.94 m	32.61 ft
Height	4.60 m	15.09 ft
Wing area, gross	21.0 sq m	226.1 sq ft
<b>Weight</b>		
Weight empty	3,840 kg	8,466 lb
Take-off weight, clean	5,730 kg	12,632 lb
Max design T-O weight	7,500 kg	16,535 lb

	<u>Metric</u>	<u>U.S.</u>
<b>Performance<sup>(a)</sup></b>		
Max level speed at height <sup>(b)</sup>	Mach 0.9	Mach 0.9
Range at Mach 0.75 cruising speed with only internal fuel <sup>(c)</sup>	1,297 km	700 nm

**Propulsion**

T-4 (2) Ishikawajima-Harima Heavy Industries F3-IHI-30 two-shaft axial-flow turbofan engines rated 16.37 kN (3,680 lbst) each.

**Armament**

No internal weapon systems. Two pylons under each wing can each accommodate one 120-U.S. gallon Shin Meiwa expendable fuel tank or various other equipment. One pylon under the fuselage can carry target towing equipment, an ECM/chaff dispenser pod, an air sampling pod, or other equipment. Provision for wing- and centerline-mounted gun pods, practice bombs, and anti-aircraft missiles for weapons training only.

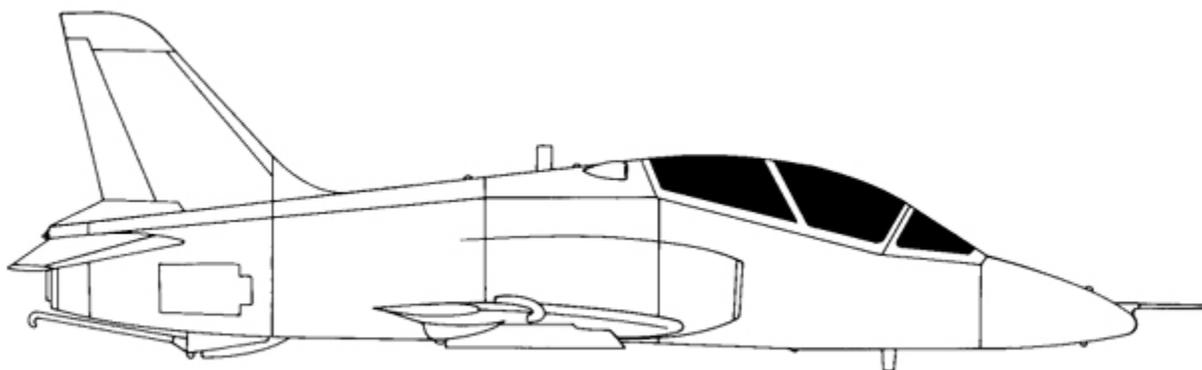
**Crew**

Two, seated in tandem.

<sup>(a)</sup>In clean configuration.

<sup>(b)</sup>At weight of 4,850 kilograms (10,692 lb) with 50 percent fuel.

<sup>(c)</sup>At T-O weight of 5,730 kilograms (12,632 lb).



T-4

Source: Forecast International

## Variants/Upgrades

**Improved T-4 (T-2 Replacement).** The Japan Air Self-Defense Force (JASDF) has been considering replacement of its Mitsubishi T-2 supersonic advanced trainers with an improved version of the T-4. The JASDF currently has approximately 80 T-2s.

Also under consideration by the JASDF is an upgrade of existing T-4s that would increase the life of the aircraft

and permit better preparation of student pilots for transition to the T-2 and then the F-15. The modifications would provide the T-4 with a supersonic training capability. The aircraft would be re-engined with Ishikawajima-Harima F3-IHI-40 powerplants.

## Program Review

**Background.** The T-4 was conceived by the JASDF as a replacement for its Fuji T-1A/B and Lockheed T-33A intermediate jet trainers. The service had a requirement for approximately 200 T-4 aircraft for pilot training, liaison, and other duties. The T-4 made its initial flight in 1985. It is powered by two Ishikawajima-Harima F3 turbofans.

**Subcontractor Base.** While the T-4 was a complete Japanese effort, many of the aircraft's systems were designed by U.S. firms but were license-built in Japan. They included Stencel SIIS-3ER ejection seats and a McCormick Selph canopy jettison system produced by Daicel Chemical Industries. Other T-4 systems included a Clifton Precision onboard oxygen generating system (built by Tokyo Aircraft Instruments), a Kaiser HUD (produced by Shimadzu), a Honeywell air data computer (built by Tokyo Keiki), and a Honeywell Attitude & Heading Reference System (AHRS) (manufactured by Japan Aviation Electronics). Mitsubishi Electric supplied the VHF/UHF communications system; Nippon Electric, the TACAN; and Nagano, the intercommunication set.

The T-4 dates to the late 1970s when Fuji proposed its FT-20 for the M-TX competition, while Kawasaki Heavy Industries proposed its KA-840 design, the latter forming the basis for the T-4. Mitsubishi also entered a design in the competition. In the fall of 1981, the Japan Defense Agency (JDA) selected Kawasaki as the winner of the M-TX competition, at which time the designation XT-4 was adopted. The other Japanese bidders were not left out of the T-4 contract. Mitsubishi was ultimately awarded the responsibility for the center fuselage, engine air intakes, and wing inspection doors; and Fuji the rear fuselage, wings, tailplane, fin, cockpit canopy, and fairings. Kawasaki built the forward

fuselage and ailerons, and performed final assembly. IHI produced the F3-IHI-30 turbofans.

**Initial Problems.** The T-4 did experience some troubles during initial service. In late 1989, the JASDF grounded its T-4s after the aircraft's F3 engines experienced heavy in-flight vibration. Inspections discovered turbine blade damage caused by resonance. The engines were subsequently modified, and the aircraft were returned to flight status. In mid-1991, the JASDF ordered T-4 pilots not to exceed 300 knots following the discovery of faulty altimeter readings.

**Blue Impulse Aerobatic Team.** In 1989, the JASDF decided to replace the Mitsubishi T-2 supersonic trainers operated by the Blue Impulse aerobatic team with the T-4. The T-2 had become a lethargic aerobatic aircraft when compared to others normally seen at air shows around the world. The T-4 brings a higher turn rate and a faster sequence of events to the Blue Impulse routine.

The first T-4 delivery to the Blue Impulse team occurred in 1994. A total of nine were operational for the 1997 air show season.

**T-4 Improvements.** The JASDF will eventually need a new advanced jet trainer to replace its aging T-2 supersonic trainer. An improved version of the T-4 is one possible solution that could eventually replace T-2 aircraft. The T-2 replacement could be a new-production T-4 or an existing T-4 modified to an improved configuration. Among the improvements that might be considered are updated powerplants, modified flight controls, increased wingspan, and a more advanced cockpit avionics suite that would more closely resemble what a Japanese pilot would see in the F-15 and the Mitsubishi F-2.

## Funding

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Through FY00, funding was approved for procurement of 212 JASDF T-4s, including the four prototypes. No additional T-4s have been procured since.

## Recent Contracts

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In early 1995, Smiths Industries received three contracts from the Japanese company Kanto Aircraft Instruments to supply 20 shipsets of a standard flight data recorder for JASDF T-4s, as well as an undisclosed number of voice and data recorders for SH-60J and OH-X helicopters. The combined value of the three contracts was over \$4.0 million.

## Timetable

<u>Month</u>	<u>Year</u>	<u>Major Development</u>
Late	1970s	Fuji, Kawasaki designs initiated
	1979	Prototype XF-3 turbfans funded
Mid	1980	Mitsubishi enters competition
Sep	1981	Kawasaki selected as prime contractor
Apr	1984	Start of prototype construction
Jul	1985	Prototype first flight
	1986	Production startup initiated
Jul	1986	Fourth and final prototype XT-4 delivered
Jun	1988	First flight of production aircraft
Aug	1988	JASDF certifies T-4
Sep	1988	Initial production deliveries

## Worldwide Distribution

Japan Air Self-Defense Force 148

## Forecast Rationale

Production of the T-4 ended in 2003. In March 2003, Kawasaki delivered the 212th and last T-4 to the JASDF.

Eventually, the JASDF will need a replacement for its T-2 advanced trainer. This replacement could be an

improved version of the T-4, whether a new-production aircraft or a modified existing T-4. Another possibility for a T-2 replacement is the two-seat version of the Mitsubishi F-2 combat aircraft. However, at the present time, it is uncertain what aircraft will replace the T-2 in the JASDF fleet.

## Ten-Year Outlook

### ESTIMATED CALENDAR YEAR PRODUCTION

Aircraft	(Engine)	<u>High Confidence Level</u>					<u>Good Confidence Level</u>			<u>Speculative</u>			Total 04-13
		thru 03	04	05	06	07	08	09	10	11	12	13	
KAWASAKI HEAVY IND. LTD T-4	F3-IHI-30	212	0	0	0	0	0	0	0	0	0	0	0
Total Production		212	0	0	0	0	0	0	0	0	0	0	0