

ARCHIVED REPORT

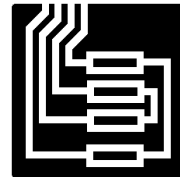
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McDonnell Douglas A-4 Skyhawk - Archived 7/2006

Outlook

- Israel launched avionics upgrade in January 2004; to be completed end-2005
- Bolivia still trying to acquire ex-USN TA-4s

Note: Icons indicate area(s) of current and potential retrofit/modernization activity



Orientation

Description. Single-engine, single-seat, light attack bomber. TA-4 is a two-seat training version.

Developer/Primary Manufacturer. McDonnell Douglas Corp, Douglas Aircraft Co; Long Beach, California, USA.

Current Status. Series production ended in 1979.

Total Produced. A total of 2,960 A-4s were produced (2,405 attack aircraft; 555 trainers).

Application. Ground attack.

Price Range. Malaysian A-4PTM, \$8 million (1982 price); Singapore A-4S re-engining, approximately \$3 million (1988 price estimate).

Technical Data

(A-4M)

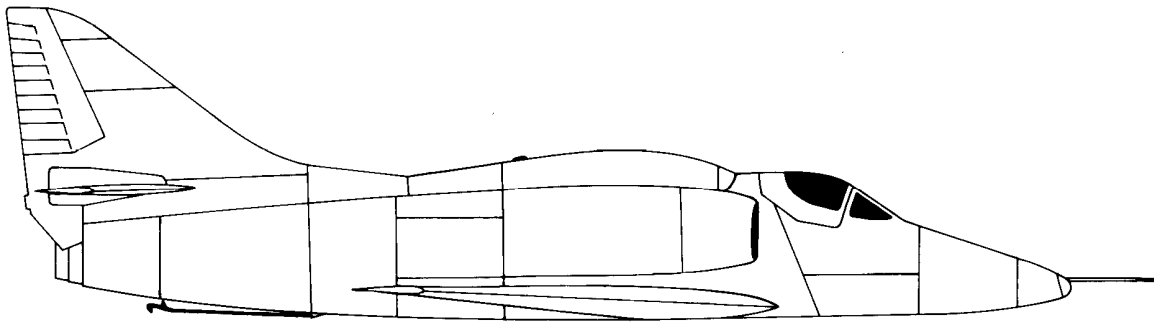
	<u>Metric</u>	<u>U.S.</u>
Dimensions		
Length overall	12.29 m	40.30 ft
Height overall	4.57 m	15.0 ft
Wingspan	8.38 m	27.5 ft
Wing area, gross	24.20 sq m	260 sq ft
Weight		
Empty	4,717 kg	10,400 lb
Max T-O weight	11,567 kg	25,500 lb
Normal T-O weight	11,113 kg	24,500 lb
Performance		
Max level speed (approx.)	1,120 kmph	608 kt
Max ferry range ^(a)	3,225 km	1,740 nm

Propulsion

One Pratt & Whitney J52-P-408 turbojet
 Thrust 49.8 kN 11,200 lbst

^(a) At normal T-O weight with maximum fuel and standard reserves.

Armament. Two 20mm Mk 12 cannon in wing roots; DEFA 30mm cannon available as option. One underfuselage, two inboard underwing, and two outboard underwing hardpoints. Capable of carrying extensive range of weapons, including nuclear or HE bombs, air-to-air and air-to-surface rockets, Sidewinder air-to-air missiles, Bullpup air-to-surface missiles, gun pods, torpedoes, and countermeasures equipment.



McDonnell Douglas A-4N

Source: Forecast International



A-4K Skyhawk

Source: Royal New Zealand Air Force

Program Review

Background. The A-4 Skyhawk light attack bomber has proven itself in several combat actions since deliveries of the aircraft began in 1956, having been deployed in Southeast Asia, the Middle East, and the Falklands conflict.

The A-4, designed in the early 1950s, grew out of internal McDonnell Douglas studies to discover ways to

reduce excessive aircraft weight growth, as well as out of a U.S. Navy need to replace the then-reciprocating-engine-powered attack aircraft. Preliminary design began in early 1952, and authority to begin production was granted in October 1952. Several variants of the A-4 have been produced, in both single-seat attack versions and two-seat trainer versions.

Although out of production, retrofit programs have enabled the A-4 to maintain an adequate target penetration and weapons-delivery ability that satisfies

most Third World countries. These efforts have ranged from re-engining and new avionics to complete remanufacture.

Variants

A-4A. Initial production version. Originally powered by Wright J65-W-4 engine rated at 34.2 kN (7,700 lbt); uprated engines later fitted to all aircraft.

A-4B. Similar to A-4A, but with several improvements, including flight-refueling capability and an improved bomb-delivery system. Powered by Wright J65-W-16A engine rated at 34.2 kN (7,700 lbt); uprated engines later fitted to all aircraft. Several rebuilt for Argentina as A-4P and A-4Q.

A-4C. Improved version of A-4B. Featured longer nose for additional equipment to improve all-weather characteristics. Uprated engines later fitted to all aircraft. Some modified to A-4L configuration.

A-4E. Improved model featuring increased payload and range. Powered by P&W J52-P-6A engine rated at 37.8 kN (8,500 lbt). First flown in July 1961.

A-4F. Attack bomber powered by P&W J52-P-8A engine rated at 41.4 kN (9,300 lbt). Initial prototype first flew in August 1966.

TA-4F. Trainer version of A-4F. Original designation of prototypes was TA-4E.

A-4G. Model similar to A-4F; produced for Australia.

TA-4G. Model similar to TA-4F; built for Australia.

A-4H. Designation of variant built for Israel. Trainer version is TA-4H.

TA-4J. Simplified version of TA-4F. Deliveries to U.S. Navy began in June 1969.

A-4K. Similar to A-4F; produced for New Zealand.

TA-4K. Similar to TA-4F; built for New Zealand.

A-4KU. Designation for variant produced for Kuwait. Similar to A-4M.

TA-4KU. Designation for trainer produced for Kuwait. Similar to TA-4F.

A-4M. Improved version of A-4F for U.S. Marine Corps. Powered by P&W J52-P-408 engine. Initial prototype first flew in April 1970.

A-4N. Light attack version basically similar to A-4M. Ordered by U.S. Navy for Israel.

A-4S. Converted A-4Bs for Singapore. Trainer version is TA-4S.

OA-4M. Forward air control version for USMC. Converted TA-4F trainers.

A-4Y. Proposed modification of A-4M. Never produced.

Funding

During the last fiscal year for which the U.S. Navy received A-4 modifications funding (FY92), safety and readiness improvements were completed for the TA-4's J52-P-6 engine. This effort was intended to improve engine availability rates. No additional funds have since been sought.

Milestones

<u>Month</u>	<u>Year</u>	<u>Major Development</u>
Sep	1953	Construction begins on XA4D-1 prototype Skyhawk
Jun	1954	First flight of XA4D-1
Oct	1956	A-4A deliveries begin
May	1966	Deliveries begin of TA-4F trainer variant
Nov	1970	Initial A-4M delivered to US Marine Corps
Feb	1979	A-4 production ends

Worldwide Distribution

(As of April 15, 2005)

<u>Country</u>	<u>Variant</u>	<u>Total</u>	<u>Avg. Age (Yr)</u>
Argentina (AF)	A/TA-4AR	32/4	39
Brazil	A/TA-4KU	23	28
Indonesia	A-4E/TA-4H/J	14/1/2	39
Israel	A-4N	39	37
	TA-4H/J	20	38
Singapore	A-4S/S1	50	42
	TA-4S/S1	14	42

Opportunities

Israel initiated an avionics upgrade on a reported 50 of its A/TA-4 fleet in 2004, and in March 2005 the first modernized aircraft was unveiled. This upgrade is slated for completion in late 2005.

Singapore is actively seeking a replacement type for its single- and two-seat A-4s, while Argentina plans to place its A-4s in long-term storage to defray the costs of maintaining them in service.

Bolivia continues to seek 18 two-seat TA-4Js from U.S. surplus stocks, but funding constraints have precluded a deal.

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IDFAF Avionics Upgrade. In January 2004 RADA Electronic Industries and the Lahav division of IAI began an avionics upgrade of approximately 50 of Israel's A-4s.

Modifications include a ring laser gyro and GPS-based nav system, HUDs, weapons management and control systems, and an advanced display and control system for the pilot.

Israel's A/TA-4s serve as advanced trainers and lead-in fighter trainers for the F-15 and F-16.

Installation of the new avionics is slated for completion in late 2005.

TA-4J Upgrades. Lockheed Martin Aircraft Argentina, which handled the upgrade of Argentina's 36 A-4s, has been pursuing overhaul, refurbishment, and upgrade opportunities for the 18 TA-4J trainers being sought by Bolivia from surplus U.S. Navy stocks. Funding constraints have thus far precluded a deal.

If such a project goes forward, the upgrade is expected to be similar to that performed on Argentina's Skyhawks.

FI's Opportunity Outlook

Program	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19
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ELECTRONICS

IDFAF Avionics Upgrade

In Progress +==> 50 A/TA-4 (Israel)

TA-4J Upgrade

Speculative <=====> 12-18 TA-4J (Bolivia)

Program	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19
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