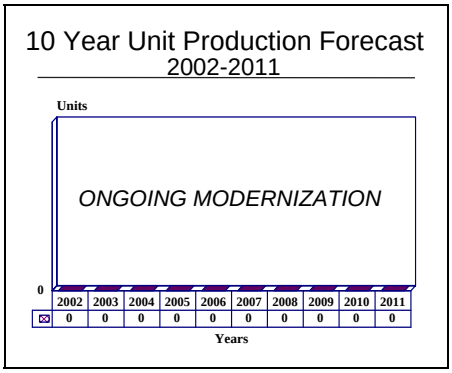
Fairchild A-10 Thunderbolt II - Archived 4/2003

Outlook

- Aircraft will operate into 2028
- Re-engining option expected to prevail over further powerplant upgrades
- GE, Rolls-Royce, Honeywell to vie for re-engining contract



Orientation

Description. A twin-engine, single-seat, close air support aircraft.

Sponsor. United States Air Force, Aeronautical Systems Division.

Contractor. Fairchild Republic Co, Farmingdale, New York, USA.

Status. Production ended in 1984.

Total Produced. A total of 713 A-10s (including six DT&E aircraft), plus two prototypes.

Application. A-10A: Close air support of troops against enemy armor, personnel, and strongholds. Limited secondary missions could include convoy escort, strike, counter-insurgency operations, and battlefield aircraft interdiction.

OA-10: Forward air control and reconnaissance. Secondary mission could include close air support.

Price Range. The FY82 (last year of A-10 procurement) unit cost for the A-10 was $12.1 million.

Technical Data

(A-10A)

Design Features. Cantilever low-wing monoplane with wide chord, deep airfoil section. One-piece constant chord center wing section, tapered outer panels, cambered wing tips. Two-segment, three-position, trailing-edge slotted flaps, interchangeable right with left. Wide span ailerons, made up of upper and lower surfaces that separate to serve as airbrakes. Small leading-edge slat inboard each mainwheel fairing. Redundant, armor-shielded flight control systems. Semi-monocoque aluminum alloy fuselage with four main longerons, multiple frames, and lap-jointed and riveted skins. Cockpit is within a bathtub-shaped armor section inside airframe. Gun mounted below cockpit, ammunition drum and feeder behind cockpit. Cantilever aluminum structure with twin fins and interchangeable rudders mounted at tips of constant chord tailplane. Interchangeable elevators, each with an electrically operated trim tab. Tricycle-type, hydraulic operation landing gear. Main gear retract forward, into housings near mid-wing. Pod-mounted, high-bypass-ratio turbofan engines mounted to the upper rear surface

of fuselage, halfway between wing trailing edges and tail leading edges.

	Metric	US
Dimensions		
Length overall	16.25 m	53.30 ft
Height overall	4.47 m	14.67 ft
Wingspan	17.53 m	57.50 ft
Wing area, gross	47.01 sq m	506 sq ft
Weight		
Operating weight	10,977 kg	24,200 lb
Internal fuel	4,853 kg	10,700 lb
Max gross weight	21,500 kg	47,400 lb
Performance		
Max level speed	682 kmph	368 kt
Max dive speed	834 kmph	450 kt
Ferry range[(a)]	4,002 km	2,160 nm

Propulsion

Fairchild A-10A (2) General Electric TF34-GE-100 turbofans rated at 40.3 kN (9,065 lbst) each.

Armament

One General Electric GAU-8/A Avenger 30 mm seven-barrel cannon in nose, with 1,350 rounds of ammunition. Four stores pylons under each wing and three under fuselage (the centerline and two flanking fuselage pylons cannot be equipped simultaneously). The pylons permit carriage of a wide variety of stores including Maverick air-to-ground missiles, gun pods, jammer pods, drop tanks, bombs, dispenser weapons, and chaff/flare systems. Outer pylons can carry AIM-9L Sidewinder air-to-air missiles.

[(a)] With 50-knot (93 kmph) headwind.

FAIRCHILD A-10 THUNDERBOLT II

Source: US Air Force

Variants/Upgrades

A-10A. Initial production version; only variant to reach production.

N/AW Variant. A lack of sophisticated avionics relegated early A-10s to daytime use in a high-threat environment. With company funds, Fairchild independently developed a two-seat, night/adverse weather (N/AW) A-10 variant. This aircraft, which was converted under a lease agreement from one of the DT&E A-10As, first flew in May 1979. In addition to the pilot, the variant was to carry a weapons system officer responsible for electronic countermeasures, navigation, and target or threat acquisition and designation.

Apart from the lengthened canopy, the most visible difference between the A-10A and the N/AW version was a 20 inch increase in the height of the vertical fins. The N/AW A-10 was to be equipped with the Westinghouse WX-50 multimode radar, a Ferranti Type 105 laser rangefinder, a modified Kaiser head-up display for the pilot, a Litton LN-39 inertial navigation system, a Honeywell radar altimeter, a General Electric low-light-level television, and a modified version of a Texas Instruments AAR-42 forward-looking infrared (FLIR) system. Despite the advantages of the N/AW variant, which extends the operational capabilities of the aircraft, no orders were placed for this version.

A-10B. In August 1981, Fairchild and the US Air Force began development work on the A-10B, a two-seat combat-ready trainer. Although the A-10B resembled the privately funded N/AW variant, it was to be generally similar to the single-seat A-10A. Development of the A-10B was terminated following the deletion by Congress of A-10 procurement funds in the FY83 authorization act.

Program Review

Background. In 1966, the US Air Force Chief of Staff ordered development of an aircraft specifically designed for the close air support (CAS) mission. Air Force planners defined four objectives for this requirement, designated A-X. These were combat effectiveness, survivability, simplicity, and responsiveness. Specifically, the Air Force wanted a reliable aircraft that would be easy to fly and maintain, capable of loitering with large loads of ordnance, and highly maneuverable. The A-X was also required to operate from unprepared landing fields. The CAS mission involves attacking targets in close proximity to friendly forces in support of the battle on the ground. Air Force experience in Southeast Asia demonstrated the need for such an aircraft, since the US inventory at that time did not include a plane built specifically for CAS. The new aircraft would replace the aging or less effective aircraft (Martin B-57s, Cessna T-37s, and Douglas A-1s) that were then used for this mission.

The A-X. The development of the new attack aircraft, designated the A-X, was initiated using a competitive approach with design-to-cost management goals. The Air Force solicited proposals from 21 companies in 1967. Preliminary design study contracts were awarded in April of that year to General Dynamics Corp's Convair Division, Grumman Aerospace Corp, Northrop Corp, and McDonnell Douglas Corp. These studies became the basis of Requests for Proposals (RFP) that were issued to 12 firms in May 1970. In December 1970, the Service selected Northrop and Fairchild Republic Co to develop competitive prototypes under the Pentagon's new fly-before-buy policy. The Northrop entrant was designated the YA-9A, and the Fairchild design, the YA-10A. The competitive fly-off resulted in victory for the Fairchild aircraft, and contracts were subsequently awarded to Fairchild (airframe) and General Electric Co (TF34 engine) for this effort.

However, the A-10 was soon forced to undergo a second fly-off, this time against the LTV A-7D, at the insistence of Congress. The Pentagon declared that this competition, which took place in spring 1974, showed that the A-10 "was generally the more effective aircraft."

A total of 707 production-standard aircraft were delivered to the Air Force, the last in February 1984. (The six DT&E aircraft bring total A-10 production to 713.) Grumman Aerospace Corp, Bethpage, New York, has been working under an Air Force contract to supply engineering services, data, and all relevant materials in support of the A-10 aircraft.

Engine Upgrade/Re-engining. As the A-10 will remain in service well into the second decade of this century, a re-engining effort is anticipated by many. In the fall of 2001, USAF was drawing up the operational requirements for the aircraft, and at that time reportedly was undecided whether a major engine upgrade or a replacement powerplant would be the solution.

GE has proposed derated versions of its CF34 series, Honeywell is reported to be considering offering a

derivative of the AS900/977, while Rolls-Royce may bid a version of its AE 3007L turbofan.

EGI. The Embedded Global Positioning and Inertial Nav System (EGI) is an all-weather nav system providing positioning, velocity, and acceleration data for the aircraft. The EGI will replace the original LN 39 system and provide savings of $18 million per year in maintenance costs.

USAF is refitting 369 aircraft with the EGI in a $190.6 million project, with final installations taking place in late FY03. The first modified aircraft was redelivered to USAF in the spring of 2000.

Precision Engagement Upgrade. The service had been planning a series of precision engagement upgrades, to be performed piecemeal at an estimated cost of $320 million. However, the service has since combined these projects and added others, to be performed in a package for an estimated cost of $226 million.

The Precision Engagement Upgrade now consists of a new digital stores management system, a NATO-compatible Link 16 datalink, a 1760 databus, and cockpit multifunction color displays. The program will also feature the addition of a targeting pod, a DC electrical power upgrade and, possibly, a new Head-Up Display (HUD).

Selection of a targeting pod will depend on funding availability. The choice is between upgrading existing Lockheed Martin LANTIRN pods and procuring the Sniper ATP.

The Precision Engagement Upgrade will also incorporate some structural strengthening in the wing outboard panels and center sections.

Low-rate initial production of upgrade kits is slated to begin in 2004; full-rate production is to start in 2005. Lockheed Martin, which handles the upgrades, has estimated the engineering and manufacturing development (EMD) phase at $74 million, with the production portion to cost about $152 million. USAF plans to wrap up this program in FY08.

Integrated Flight & Fire Control Computer. Begun in FY01, this project was formerly known as the LASTE Upgrade Computer and will involve improvements to the aircraft's digital datalink, digital terrain system, Common Missile Warning System, and MIL-STD 1760 databus/smart weapons.

USAF intends to upgrade 366 aircraft at an estimated cost of $31.5 million through the year 2005.

Countermeasure Set. The A-10's current electronic combat systems are cumbersome, offer no growth capability, and are systematically disjointed. A new single unit will replace all cockpit control units and will offer hands-on control to improve pilot/vehicle interface. The new unit, the ALQ-213, can be programmed with up to 16 different chaff and flare scenarios that can be selected by the pilot. It will also be night-vision compatible, and future threat provisions are incorporated.

USAF launched this effort in FY01 and plans to install the system aboard 212 OA/A-10s during FY03-08 for an estimated $152.3 million.

Funding

Recent and requested funding is as follows:

US FUNDING

	FY00		FY01		FY02		FY03 (Req)	
	QTY	AMT	QTY	AMT	QTY	AMT	QTY	AMT
A-10 Mods		$27.1		38.6		20.7		21.8

All $ are in millions.

Recent Contracts

None noted.

Timetable

Month	Year	Major Development
Sep	1966	Air Force CoS states requirement for new CAS aircraft

Month	Year	Major Development
	1967	Air Force A-X program begun
May	1972	Initial flight of first YA-10A prototype
Dec	1972	Competitive fly-off between YA-10A and Northrop YA-9A
Jan	1973	A-10A selected as winner of A-X competition
Feb	1975	Initial flight of first of six DT&E A-10As
Oct	1975	First flight by a production A-10A
May	1979	First flight of two-seat N/AW variant
Aug	1981	Development on A-10B trainer begun
Mar	1984	Final A-10 delivery

Worldwide Distribution

The United States Air Force/Air Force Reserve/National Guard operate a total of 360 A-10A/OA-10 aircraft.

Forecast Rationale

The US Air Force has combined a series of upgrades into the Precision Engagement Upgrade program to address a number of operational shortcomings of the A-10. The aircraft will soldier on until about 2028, and its mission profile has been expanded widely beyond that for which it was designed.

A major propulsion upgrade is in the works; the service has yet to choose between improving the aircraft's current TF34 or replacing it altogether. GE, Rolls-Royce, and Honeywell are all expected to compete for an anticipated re-engining contract.

Ten-Year Outlook

No further A-10s will be produced.

* * *