

# ARCHIVED REPORT

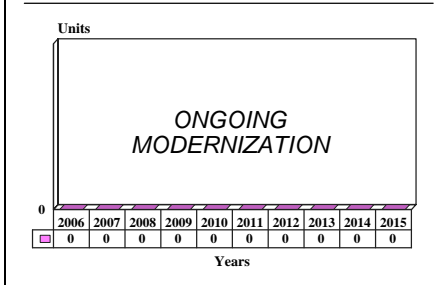
For data and forecasts on current programs please visit  
[www.forecastinternational.com](http://www.forecastinternational.com) or call +1 203.426.0800

## Rockwell International B-1B - Archived 1/2007

### Outlook

- Re-engined, upgraded variant proposed as interim USAF bomber
- Aircraft being reoriented to conventional bombing role

10 Year Unit Production Forecast  
2006 - 2015



### Orientation

**Description.** Four-engine, supersonic, intercontinental-range, strategic nuclear and conventional strike aircraft.

**Sponsor.** Air Force Aeronautical Systems Division, Wright-Patterson AFB, Ohio, USA.

**Status.** Production completed in 1988; continuing modernization.

**Total Produced.** Rockwell produced four B-1As and 100 B-1Bs. A total of 67 B-1Bs remain in service.

**Application.** Intercontinental strategic nuclear attack. Initial aircraft mission was as a low-altitude nuclear attack penetrator. Current primary missions are strategic nuclear and conventional strike.

**Price Range.** Total estimated program cost: \$28.20 billion. B-1B FY86 unit cost listed as \$205 million. Average unit flyaway price is \$178 million. Total program unit cost was \$282 million.

### Contractors

Boeing Advanced Information Systems, <http://www.boeing.com>, 3370 Miraloma Ave, Anaheim, CA 92803 United States, Tel: +1 (714) 762-0463, Fax: +1 (714) 762-0884, Email: [wwwmail.boeing2@boeing.com](mailto:wwwmail.boeing2@boeing.com), Prime

GE Transportation Aircraft Engines, <http://www.geae.com>, 1 Neumann Way, Cincinnati, OH 45215-6301 United States, Tel: +1 (513) 243-2000, Fax: +1 (513) 786-1568

### Technical Data

**Design Features.** Cantilever low-wing, blended wing/body with variable-geometry wing outer panels. Fuselage is conventional aluminum/titanium structure and of area-ruled shape. Tail section is conventional

cantilever design of titanium and aluminum alloys. Tricycle-type, retractable landing gear is used with anti-skid braking system. Engines are located in twin pods under each wing center section.

Dimensions	Metric	U.S.
Length	44.80 m	147.0 ft
Height	10.36 m	34.0 ft
Wingspan Spread	41.755 m	137.0 ft

	<u>Metric</u>	<u>U.S.</u>
Swept	26.51 m	87.0 ft
<b>Weight</b>		
Design max gross weight	216,366 kg	477,000 lb
Weight, empty	83,621 kg	184,350 lb
Max payload	56,699 kg	125,000 lb
<b>Performance (approximate)</b>		
Max level speed(a)	Mach 1.2+	Mach 1.2+
Max range, unrefueled	9,815+ km	5,300+ nm
<b>Propulsion</b>		
B-1A (4)	GE Aircraft Engines F101-GE-100 two-spool augmented turbofan engines, rated 133.4 kN (30,000 lbst) each at maximum augmented power. Maximum dry thrust rating is approximately 73.4 kN (16,500 lbst) each.	
B-1B (4)	GE F101-GE-102 twin-spool augmented turbofan engines, rated 133.4 kN (30,000 lbst) each at maximum augmented power level. Maximum dry thrust is approximately 80 kN (18,000 lbst) each.	

**Armament**

Internal capacity in a nuclear role for up to eight AGM-86B ALCMs, 24 AGM-69A SRAMs, 12 B-28 or B-43 free-fall nuclear bombs, or 24 B-61 or B-83 bombs; or in a non-nuclear role, for up to 84 Mk 82 or 24 Mk 84 bombs, all on rotary launchers.

Eight external stores stations can carry an additional 14 ALCMs or SRAMs, eight B-28s, 14 B-43/B-61/B-83s, 14 Mk 84s, or 44 Mk 82s. Provision for carrying auxiliary fuel tank/tanks in weapons bays.

(a)For B-1B at 15,239 m (50,000 ft). B-1A maximum speed was in excess of Mach 2.2.



B-1B LANCER

Source: U.S. DoD

## Variants/Upgrades

**B-1A.** Initially conceived in the mid-1960s as a replacement for the Boeing B-52 and the aborted North American Aviation XB-70 Valkyrie Mach 3 bomber, the B-1A entered the development cycle in 1970 when Rockwell and GE were awarded contracts to develop

the B-1A and F101 engines, respectively. Four prototypes were produced.

The B-1A was a high- and low-level supersonic penetrator with a maximum dash speed of 2.2 Mach and

a highly advanced ejection capsule for the flight crew. During the development phase, the low-level Mach 2.2 supersonic dash speed was eliminated from the requirement to reduce costs. Canceled by the Carter administration in 1977, the program was resurrected by President Ronald Reagan in 1981. Low-level research and development continued between 1977 and 1981.

**B-1B.** The B-1B has 80 percent commonality with the B-1A and is similar in appearance. It retains the variable-geometry wing of the B-1A but has a structural strength increase for a design max gross weight of 216,366 kilograms. Radar absorption materials were used to reduce its radar cross-section to 1/10 of the B-1A, and the engine inlets are fixed as opposed to the variable units of the original B-1. Fourteen Air

Launched Cruise Missiles (ALCMs) can be carried externally along the fuselage, and more missiles and additional fuel can be installed in a modified forward weapons bay. Much improved electronics systems for both offensive and defensive situations are installed, including highly accurate inertial navigation, an AFSATCOM system, modern forward-looking and terrain-following radar, ALQ-161 electronic counter-measures, and ALQ-153 tail warning radar.

## Program Review

**Background.** The U.S. Air Force/Rockwell B-1 bomber has been one of the most controversial military programs of the post-World War II era. The aircraft originally evolved from a series of studies begun in 1962 and was defined three years later as the Advanced Manned Strategic Aircraft. The B-1 was designed to replace the Boeing B-52 as the third leg of the Triad defense concept, which also consisted of the hard-sited Minuteman ICBM and the Trident SLBM. Prior to its merger with Rockwell, North American had built two XB-70 Valkyrie flying prototypes, but the Air Force was not allowed to pursue production of this bomber, as official planning led by Secretary of Defense Robert McNamara had shifted from the high-speed, high-altitude concept to low-level penetration missions, which were beyond the XB-70's capabilities. Indeed, it was thought that the entire concept of high-altitude intercontinental strike aircraft had been rendered obsolete by the Soviet Union's advances in surface-to-air missiles and development of the Mach 3 class MiG-25 Foxbat interceptor. These two Soviet developments ultimately led to termination of the XB-70 and the launch of an entirely new bomber program.

In 1970, Rockwell and General Electric were selected as finalists for the B-1 airframe and engine development awards, respectively. Rockwell built four flight test and a single ground test aircraft. The first B-1 test flight took place in December 1974; the fourth unit flew in February 1979.

As the program continued, costs spiraled alarmingly. Much of the cost increase was due to the enormous inflation of the time and the unusually high-performance requirements established by the Air Force. Two of the most expensive B-1A requirements were the escape capsule and the aircraft's ability to escape from Soviet airspace at speeds up to Mach 2.2 after delivering its payload.

The Air Force sought to pare costs in a number of areas, such as eliminating one flying prototype and one dynamic test unit, reducing the number of developmental engines from 40 to 27, replacing the originally planned escape capsule for the crew with conventional ejection seats, and elimination of the proposed Low Light Level TV system in favor of a less expensive infrared system. The Air Force also eliminated the high-speed dash requirement, which greatly reduced the cost of airframe development. President Jimmy Carter's long-range planning did not favor the B-1, and in 1977, he canceled the program. Testing and development of the aircraft were allowed to continue at a low level. President Carter favored the use of stand-off weapons, in particular the Air Launched Cruise Missile. He even considered the use of huge cruise missile and ICBM-carrying transports such as the C-5 and 747.

**B-1 Revival.** During the fall of 1980, the B-1 scenario changed with the election of Ronald Reagan to the presidency. In September 1981, the Reagan administration announced that it intended to procure some 100 B-1B aircraft, variants of the earlier Rockwell machine. The first operational aircraft was delivered to the Air Force in October 1985; the final delivery took place in April 1988. Initial Operational Capability was achieved in October 1986 with a squadron of 15 aircraft.

**B-1B Modifications.** The B-1 is the subject of a multiphase Conventional Munitions Upgrade Program estimated at \$2.8 billion. This program involves integration of the Joint Direct Attack Munition into the B-1, a project also requiring upgraded avionics, onboard computers, and refit of the Global Positioning System receivers. Phase III will see integration of follow-on systems such as the Joint Stand-Off Weapon.

The Air Force plans to fund a number of upgrades to the aircraft's ALQ-161 electronic defensive system, and

these projects are currently estimated to cost \$187 million through the end of this decade.

Proposed B-1R - Boeing has proposed a B-1 Regional (B-1R) modification, which would feature new sensors, possibly including advanced electronically scanned array radar and FLIR sensors. This is one of several options presented to USAF in response to requests for an interim bomber that could become available around

2018. The B-1R would also be re-engined with Pratt & Whitney F119 powerplants to boost its speed to about Mach 1.6.

It should be noted that the B-1R is but one of several concepts on offer, none of which has been approved or funded thus far.

## Funding

### U.S. FUNDING

	<u>FY03</u> <u>QTY</u>	<u>FY03</u> <u>AMT</u>	<u>FY04</u> <u>QTY</u>	<u>FY04</u> <u>AMT</u>	<u>FY05</u> <u>QTY</u>	<u>FY05</u> <u>AMT</u>	<u>FY06</u> <u>(Req)</u> <u>QTY</u>	<u>FY06</u> <u>(Req)</u> <u>AMT</u>
B-1 Mods		101.4		99.4		8.7		27.9
RDT&E		150.4		82.3		83.7		132.5
Total		251.8		181.7		92.4		160.4

All \$ are in millions.

## Recent Contracts

<u>Contractor</u>	<u>Award</u> <u>(\$ millions)</u>	<u>Date/Description</u>
Rockwell Collins	\$3.6	Feb 2004 - Development of full-color multifunction B-1 cockpit displays.

## Timetable

<u>Month</u>	<u>Year</u>	<u>Major Development</u>
Nov	1969	RFPs issued
Jun	1970	Rockwell selected as airframe finalist
Late	1972	Assembly of first prototype begun
Oct	1974	First prototype rolled out
Dec	1974	Prototype first flight
Jun	1977	B-1 production plans canceled
Feb	1979	Fourth prototype flies
Apr	1981	Last of four prototypes placed in active storage
Sep	1981	B-1 program reinstated
Sep	1984	First B-1B rolled out
Oct	1984	B-1B first flight
Jun	1985	First B-1B delivered to USAF SAC
Oct	1986	IOC
Apr	1988	Delivery of 100th and final B-1B
Apr	1990	B-1B named Lancer

## Worldwide Distribution

U.S. Air Force 67

## Forecast Rationale

The U.S. Air Force had retired 33 B-1Bs, reducing the size of its fleet to 60 aircraft. The Congress then appropriated \$17 million in FY04 funds to regenerate 23 of the 32 aircraft. USAF agreed that some B-1Bs could be returned to service and ultimately the service and the Congress settled on bringing seven back into service, providing for an active fleet of 67 aircraft.

USAF is looking at several options to come up with an interim bomber to enter service around 2018, and Boeing has proposed a B-1R (regional), re-engined with

the F119 engines as power the F/A-22. This aircraft would be capable of near-Mach 2 speeds, with sufficient fuel for a 3,000-mile mission radius. The FB-22 derivative of the F/A-22 fighter is another option; an early decision does not appear likely, even if funds are available.

There have also been some discussions regarding upgrades to the B-1B to enable it to deploy laser weaponry in the coming years.

## Ten-Year Outlook

---

No additional B-1Bs forecast.

\* \* \*