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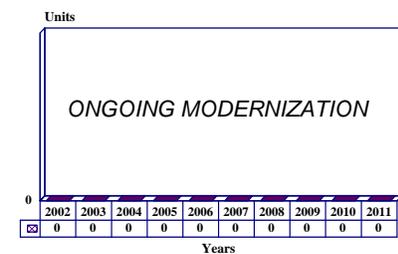
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Boeing B-52 Stratofortress - Archived 2/2003

Outlook

- ECM, avionics upgrades accounting for most B-52 Mod funding
- Re-engining may receive higher priority in outyears, as B-52 will still be flying in 2040
- B-52 Mod funding on rise from FY04 onward

10 Year Unit Production Forecast
2002-2011



Orientation

Description. Intercontinental strategic heavy bomber.

Total Produced. Total of 744 of all types, plus two prototypes.

Sponsor. United States Air Force, Aeronautics Division.

Application. Strategic nuclear strike, conventional strike; cruise missile platform.

Contractor. Boeing Military Airplanes, Wichita, Kansas, USA.

Price Range. 1961 flyaway cost: \$5.4 million.

Status. Series production ended in 1962.

Technical Data

(B-52H)

Design Features. Cantilever high-wing monoplane. Eight engines are mounted in four pairs in podded nacelles. Rectangular cross-section fuselage with embedded canopy. Cantilever tail unit. Electronic

countermeasures blisters around nose and chin. The B-2H has a fuel pod embedded near the tip of each wing.

	<u>Metric</u>	<u>US</u>
Dimensions		
Length overall	48.78 m	160 ft
Height overall	12.20 m	40 ft
Wingspan	56.40 m	185 ft
Wing area, gross	371.6 sq m	4,000 sq ft
Weight		
Max TOW	221,355 kg	488,000 lb

	<u>Metric</u>	<u>US</u>
Performance		
Max speed	1,047 kmph	650 mph
Ceiling	15,244+ m	50,000+ ft
Range ^(a)	16,103+ km	8,690+ nm
Propulsion		
B-52 Stratofortress		
-A	(8)	Pratt & Whitney J57-P-1W.
-B	(8)	P&W J57-P-19W.
-C/D/E	(8)	P&W J57-P-29W, rated at 11,000 lbst each.
-F/G	(8)	P&W J57-P-43W, rated at 13,750 lbst each.
-H	(8)	P&W TF33-P-33, rated at 17,000 lbst each.

Armament

One 20 mm Vulcan multibarrel rotary cannon in tail turret. Short Range Attack Missiles (SRAMs), and nuclear or conventional bombs can be carried in weapons bay. Air-launched cruise missiles (ALCMs), nuclear or conventional ordnance can be carried on wing pylons.

^(a)Max fuel, without in-flight refueling.

Variants/Upgrades

B-52A. Used as development and test aircraft. Powered by Pratt & Whitney J57 engines. Total of three produced. Withdrawn from operational use in early 1960s.

B-52B. Similar to B-52A, but featured a navigation/bombing system. Total of 50 produced; 27 were later converted to RB-52B reconnaissance configuration. All B-52Bs withdrawn from operational use in late 1960s.

B-52C. Substantially improved model. Total of 35 built. Withdrawn from operational use late 1960s.

B-52D. Improved version of C model. Featured aerial refueling capability. Total of 170 produced. Withdrawn from operational use in early 1980s.

B-52E. Featured more advanced navigation and weapons system and new flight deck layout. Total of

100 built. Withdrawn from operational use in mid-1970s.

B-52F. Featured updated J57 engine. Total of 89 B-52Fs produced. Withdrawn from operational use in mid-1970s.

B-52G. Substantially redesigned version. Tail gunner's station moved to forward crew compartment. Provisions to launch stand-off missiles and electronic countermeasures (ECM) decoys. Total of 193 built.

B-52H. Last version to be produced. Powered by Pratt & Whitney TF33 engines. Featured new tail armament (one 20 mm Gatling-type cannon instead of four 12.7 mm machine guns). Total of 102 produced.

Program Review

Background. Originally conceived as a turboprop, the B-52 design was altered radically with the availability of Pratt & Whitney's J57, an axial flow, two-spool turbojet that offered significantly greater performance and fuel efficiency than existing jet engines. Competition for the USAF bomber contract involved both Boeing and Convair, which had already produced the B-36. Convair's entry, designated YB-60, was found to be less capable than Boeing's B-52 in performance and was passed over despite lower cost.

The first B-52 prototype flew for the first time in April 1952. The initial three production aircraft, designated B-52A, were used primarily for test and evaluation at Boeing's facilities to determine and rectify various operational deficiencies. These efforts resulted in the delivery of the first production aircraft to the USAF in 1955. Designated B-52B, these aircraft were virtually identical to the A versions, with the exception of a new navigation/bombing system. A total of 50 were produced. Further improvements took place during the

1950s resulting in C, D, and E versions, of which more than 300 were produced. Improvements included larger underwing drop tanks (C), improved fire control system for tail guns (D), and advanced navigation, bombing, and electronics systems (E).

These improvements brought with them an increase in weight, which in turn necessitated a higher power. Some 90 B-52Fs were produced with uprated J57-P-43W engines. Significant modifications were incorporated into the B-52G model produced from 1958 to 1960. These included a redesigned wing, internal wing fuel tanks, a reduced tail fin, relocation of the tail gunner's position, and provisions to carry air-to-surface Hound Dog missiles and SRAMs. A total of 193 B-52Gs were produced. With the cancellation of the B-70 project, which was intended to replace the B-52, a further and final version was introduced in 1961. Designated B-52H, this version featured Pratt & Whitney TF33 turbofans for greater thrust and lower fuel consumption and various structural changes to permit low-altitude flight without excessive fatigue. The 5 inch tail guns were also replaced with a 20 mm Gatling gun. A total of 102 B-52Hs were produced, the last in June 1962.

All B-52Gs and B-52Hs have been modified to carry Boeing nuclear-tipped AGM-69A Short Range Attack Missiles (SRAMs). These aircraft have also been progressively updated with various improvements, including the ASQ-151 Electro-optical Viewing System (EVS) and Phase VI avionics equipment.

Major current and planned upgrades are as follows:

Re-engining. There have been several proposals to replace the aircraft's present TF33 engines over the years, the most recent plan being to pull the TF33s and retrofit four Rolls-Royce RB211-535s in their place.

Such proposals may look increasingly attractive as the decade progresses, particularly as USAF plans to still be operating the aircraft in 2040.

ARC-210. The ARC-210 multipurpose radio will greatly improve frequency coverage and ECM communications capability for the B-52H. A total of 94 aircraft are to receive this upgrade in a \$33.3 million project scheduled for completion at the end of 2003.

GPS Tacan. A new start in FY97, this project installs a control display unit at pilot and copilot stations, and fits a signal data converter unit to interface with the existing GPS system.

The first modified aircraft was redelivered in the third quarter of FY98, and the last will be completed in early

2004. A total of 94 aircraft are being upgraded under this \$50.0 million project.

B-52 Situational Awareness. USAF has identified a requirement to upgrade the aircraft's electronic countermeasures (ECM) and associated displays in a planned \$175 million program slated to run from FY04-08, inclusive.

Northrop Grumman's Electronics Sensors and Systems Sector will upgrade the B-52's ALQ-155 ECM systems by integrating hardware from the ALQ-135 and ALQ-165 systems to enhance both reliability and maintainability.

Avionics Midlife Improvement. USAF plans to launch the production phase of the \$86 million Avionics Midlife Improvement (AMI) program in 2004, and to complete the effort in 2007.

Boeing Wichita will handle program integration, and the project will focus on adapting existing systems to the aircraft. A new inertial nav system will feature the ring-laser gyro originally developed for the F-117, while the data transfer system and missions computers will be derived from systems built for the B-1B Conventional Munition Upgrade Program (CMUP) Block E by Lockheed Martin's Systems Integration unit in Owego, New York.

The AMI program will also include the Situational Awareness Defensive Improvement program and the ECM Improvement project, both of which are described separately.

ECM Improvement. This \$205.9 million project will upgrade the ALQ-172 systems aboard 86 B-52Hs in an effort slated for completion in early 2010.

Three of the system's line replaceable units (LRUs) will receive new circuit cards resulting in increased memory and mean-time-between-failure (MTBF).

Link 16. The service also wants to install the Link 16 datalink aboard the Boeing bombers during the FY06-15 time frame in a project estimated at \$221 million. USAF currently lists this as a "desired mid-term bomber upgrade." No funding has been authorized.

Databus. In another "desired mid-term bomber upgrade," the Air Force wants to carry out a \$194 million databus improvement to increase the aircraft's internal carriage of smart weapons. This project, if approved, would take place during the FY06-15 time frame.

Funding

The US Air Force continues to fund several B-52 modification projects, and the service also funds an RDT&E program, PE# 0101113F, B-52 Squadrons.

	US FUNDING							
	FY00		FY01		FY02		FY03 (Req)	
	<u>QTY</u>	<u>AMT</u>	<u>QTY</u>	<u>AMT</u>	<u>QTY</u>	<u>AMT</u>	<u>QTY</u>	<u>AMT</u>
B-52 Mods		\$24.6		42.6		17.7		-
B-52 Sqdns		39.7		47.4		66.2		55.8
Total		\$64.3		90.0		83.9		55.8

All \$ are in millions.

Recent Contracts

None noted.

Timetable

<u>Month</u>	<u>Year</u>	<u>Major Development</u>
	1946	Design studies begun
Apr	1952	Initial flight of first prototype
Aug	1954	First flight of B-52A
Jan	1955	First flight of B-52B
Oct	1958	First flight of B-52G
Sep	1960	Initial B-52H produced
Jun	1962	Production ended
Oct	1993	First B-52H with conventional weapons system upgrade delivered to USAF by Boeing

Worldwide Distribution

<u>Country</u>	<u>Total</u>	<u>Type</u>	<u>Avg. Age (Yrs)</u>
United States	93	B-52H	36

Forecast Rationale

The US Air Force plans to operate at least 62 B-52Hs into the 2038 to 2044 time frame, and has initiated an Avionics Midlife Improvement (AMI) upgrade toward this end. The service hopes to begin the production phase of this project in 2004 and to complete planned installations three years later.

USAF wants to retire 30 of the aging bombers, claiming that the consequent cost-savings in maintenance would help to fund the AIM and other anticipated upgrades. The Congress, however, wants the service to maintain the entire fleet in operational status.

Proposals to re-engine the B-52 continue to surface, the most recent plan involving replacement of the eight

TF33s with four Rolls-Royce RB211-535s. As the aircraft continues to age, re-engining may become a viable option (funding permitting).

USAF also plans to update the B-52s with the Global Air Traffic Management (GATM) in a \$155 million project tentatively slated to get underway in 2006, and wants to fit the B-52s with the Link 16 datalink beyond the FY05 time frame, in a project estimated at \$220 million. Plans are afoot to modernize the aircraft's databus under a \$200 million program penciled in for the same period.

Ten-Year Outlook

No production forecast.

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