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## **The B-2 Spirit Stealth Bomber Turns 20**

*A revolution in airpower and the product of an enduring partnership made its first flight on July 17, 1989. Now it prepares for many more decades of service to the nation.*

In the late 1970's, the U.S. Department of Defense became concerned that improvements in adversary air defense systems might soon make the nation's conventional, "non-stealthy" bomber force obsolete. The U.S. government visualized having an aircraft that could travel long distances, penetrate enemy air defenses undetected, drop its large payload of weapons and return safely.

To meet this goal, the government drew upon the lessons learned from earlier projects sponsored by the Defense Advanced Research Projects Agency (DARPA) to develop "low observable" aircraft. These projects included HAVE BLUE, the demonstrator aircraft for what would become the Lockheed Martin-produced F-117 Stealth Fighter, and TACIT BLUE, a low-observable prototype developed by Northrop Grumman.

In September 1980, the Air Force issued a request for proposals for the "Advanced Technology Bomber (ATB)" (later to be renamed the B-2 Spirit) to a Northrop /Boeing team and a Lockheed /Rockwell team. Even though Northrop considered itself to be primarily a developer of tactical aircraft (e.g. F-5 E/F Tiger II), its proposal for a low-observable, long range bomber was judged to be superior to the Lockheed proposal by the Air Force

Northrop was awarded the ATB contract in December 1981. The contract covered delivery of two structural-test airframes and six production aircraft, which would be used for the B-2 flight test program. The initial plan envisioned production of 132 ATBs, including those first six aircraft.

The B-2 features an all wing design: it has no fuselage and no vertical tail. This design approach eliminates much of the surface area that would cause drag on a conventional aircraft. It also eliminates many of the surfaces and edges from which radar energy would normally reflect. An all-wing design also spreads out the weight of aircraft so that more lifting power is available where the lift actually occurs.

The B-2 was designed and built by a strong, collaborative partnership between Northrop Grumman and the Air Force. Every major development team within the program included both government representatives and members of the Northrop Grumman-led contractor team.

The B-2's design was changed in the mid-1980s when the mission profile was changed from strictly high-altitude to also include low-altitude, terrain-following missions. The redesign delayed the B-2's first flight by about one year and added to the program's cost.

Key milestones in development, delivery and deployment history of the B-2 include:

- **November, 1981** — Northrop Grumman awarded contract to develop the Advanced Technology Bomber, which would be renamed the B-2 Spirit stealth bomber.
- **November, 1988** — First public viewing (roll-out) of the B-2, Palmdale, Calif.
- **July, 1989** — First flight of the B-2 (AV-1, "Spirit of America"), Palmdale, Calif. with Northrop test pilot Bruce Hinds and USAF Col. Richard Couch at the controls.
- **Oct, 1990** — First flight for AV-2, the first of the five evaluation aircraft
- **May, 1992** — Air Force/Northrop-led contractor team wins the Collier Trophy, aerospace's most prestigious award for the design, development, production and flight testing of the B-2
- **April, 1993** — 509<sup>th</sup> Bomb Wing activated at Whiteman AFB, Mo.
- **Dec, 1993** — First operational B-2 stealth bomber, *The Spirit of Missouri*, delivered to Whiteman AF, on 90<sup>th</sup> anniversary of first manned flight by the Wright brothers.
- **March 1996** — Congress awards funding to convert upgrade AV-1 to a fully operational aircraft raising size of fleet to 21 aircraft.
- **April, 1997** – B-2 fleet reaches initial operational capability
- **March, 1999** – The B-2 saw its first operational use during Operation Allied Force, a NATO mission to re-establish peace in Kosovo and Serbia. Two B-2s flew more than 31 hours from Whiteman AFB, attacked multiple targets, and then flew directly back to Whiteman AFB. It was the first time that the U.S. carried out a sustained bombing campaign from its own soil. The B-2s from Whiteman

flew less than one percent of the total missions but dropped 11 percent of the bombs.

- **October 2001** – During Operational Allied Force (OAF), the B-2 was the first to enter Afghan airspace and the first to strike terrorist targets deep in Afghanistan. OAF also saw the B-2 conduct the longest aerial combat mission in history: 44 hours.
- **March, 2003** – During Operation Iraqi Freedom, B-2s were deployed to and flew combat sorties from a forward base of operations for the first time. Six B-2s destroyed 92 targets in the opening hours of the air campaign.
- **Dec, 2003** – B-2 fleet reaches full operational capability.
- **July, 2009** – U.S. Air Force and Northrop Grumman celebrate the 20<sup>th</sup> anniversary of the first flight.

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