

Bomber for the ages

Boeing's workhorse B-52 bomber has been on active duty for more than five decades—with no plans to retire soon

By Eric Fetters-Walp

When the last B-52 Stratofortress rolled off Boeing's production line in Wichita, Kan., in 1962, the aircraft already was the centerpiece of the U.S. strategic bomber fleet during the Cold War.

The world has changed dramatically since then, yet the B-52 remains a workhorse for the U.S. Air Force, and that isn't likely to change anytime soon. Already operational for more than half the era of powered flight, the B-52 is slated to stay in service until 2040.

"It's been an amazingly resilient airplane as it has aged. It has turned out to be very robust when it comes to accepting changes and upgrades," said Dale Clevenger, B-52 capability team manager, Flight Mechanical Systems in Wichita.

Since the B-52 first took to the skies, Boeing has helped to maintain and update the aircraft, assisting the Air Force with both regular maintenance and major overhaul phases—integrating the latest technology. Through it all, the fleet has performed well, said Scot Oathout, Boeing's director of B-52 programs.

"The flexibility and pure elegant design of the aircraft allowed that to happen," Oathout said. "We have capitalized on keeping the platform flexible."

The relationship between Boeing and the Air Force was reaffirmed last fall with a contract to modernize the B-52 weapon system and related components over an eight-year period. That contract alone could be worth nearly \$12 billion.

Meanwhile, Boeing also is providing engineering services and upgrades, as well as advanced communications technology, for the B-52 fleet. In 2010, the first B-52 outfitted with Combat Network Communications Technology, or CONECT, flew and tested the system, which allows for more networked and instant communication. Boeing also has a contract to design future capability allowing B-52s to communicate via secure broadband satellites.

Mandy Trainer, contracts administrator for the B-52, explained that Boeing's partnership with the U.S. Air Force is a close one, with Air Force personnel installing most of the upgrades.

"We have the expertise to assist the government if they need it during modification work," she said. "However, we are usually tasked to do the design and development and/or sustainment engineering."

Boeing also commonly performs first-of-type modifications for complex installations. Additionally, Boeing performs aircraft tracking, aircraft-on-ground technical support, emergency repairs



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— U.S. Air Force Maj. Steve Walden, B-52 commander with Detachment 1 of the 53rd Wing at Barksdale Air Force Base, La.

PHOTOS: (Below) A B-52H assigned with the U.S. Air Force 2nd Bomb Wing taxis into position for takeoff at Barksdale Air Force Base, La., while a B-52H (pictured at top) from Minot Air Force Base, N.D., comes in to land. **U.S. AIR FORCE (Inset)** The crew of a B-52 based at Barksdale maneuvers it into position for aerial refueling from a KC-135 Stratotanker. **U.S. AIR FORCE**





and in-flight emergency support for the fleet of 76 B-52H aircraft. In all, about 350 employees in Wichita support the B-52 program, with a handful on location at Tinker Air Force Base in Oklahoma and Barksdale Air Force Base in Louisiana.

Dennis Roemer, a systems engineer on the B-52 CONECT program in Wichita, said it's a unique challenge to keep the 20th-century bombers up to date for the 21st-century Air Force.

"In order to meet new mission requirements for the Air Force, the work we do here is to keep pace with new and emerging technologies and bring the best of those to the warfighter," said Roemer, who's worked on B-52 development and sustainment programs for 23 years. "We work closely with the Air Force requirements community, aircrew and maintenance personnel to continually improve the B-52 and its mission and to ensure that the systems installed are reliable and meet the life-cycle requirements established by the Air Force."

With swept wings, eight jet engines paired two by two, and a long, thin fuselage, the B-52 looks like nothing else in the skies. It also has a two-story flight deck, with navigators sitting

under the pilots in a windowless level. "It's an aircraft that needs no introduction," said Maj. Ken Theis, a radar navigator with the 49th Test and Evaluation Squadron at Barksdale Air Force Base. "We've taken it to air shows all over the world, and you don't need to tell people what aircraft this is."

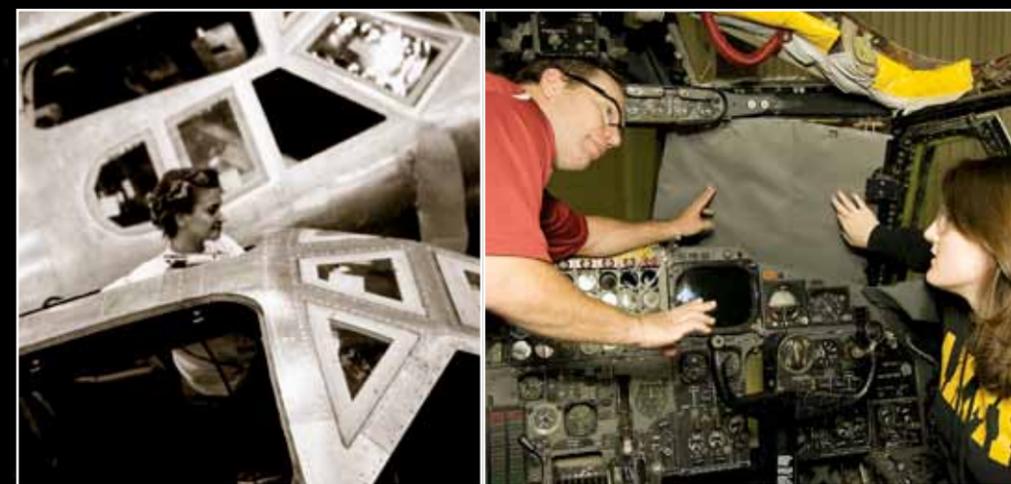
Maj. Steve Walden, B-52 commander with Detachment 1 of the 53rd Wing at Barksdale, said the aircraft has less automation and fewer creature comforts compared with newer fighters and bombers. But he's proud to be part of its legacy.

"It's a privilege to fly it, knowing how long it's been in service, how many other aviators have flown it and how well it's served in combat over the years," Walden said.

Ted Bates got to know the B-52 as an airman in 1965, when he performed nuclear weapons maintenance on the aircraft. A decade later, after joining Boeing, he helped with the engineering details for what was then called a "midlife" modernization of the fleet. Now a Technical Fellow and systems engineer with Boeing Defense, Space & Security's Maintenance, Modifications and Upgrades unit in Wichita, Bates helps to figure out how to successfully integrate

"The bones of the aircraft are remarkably unchanged, thanks to years of careful maintenance."

— Ted Bates, Technical Fellow and systems engineer, Boeing Defense, Space & Security



PHOTOS: (Top) An early production B-52 rolls out of Seattle's Boeing Plant 2 in December 1954. **BOEING ARCHIVES (Insets, from left)** A production employee works on the flight deck of a B-52C at the Seattle plant in October 1956. **BOEING ARCHIVES** Matthew Yost, a B-52 engineer, left, and engineering intern Jennifer Hoffman discuss a prototype curtain they hold in front of a B-52 cockpit window at Tinker Air Force Base, Okla. The curtains are designed to block the blinding light resulting from a nuclear explosion. **U.S. AIR FORCE**



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the latest technology into nuclear-capable B-52s.

“You really have 70 years of technology on this plane simultaneously,” Bates said, noting it ranges from pre-transistor vacuum tubes to digital equipment. “But the bones of the aircraft are remarkably unchanged, thanks to years of careful maintenance.”

Lessons learned from other Boeing programs have helped the B-52 fleet stay operational, according to Bates. For example, aging polymers on the aircraft, including coatings inside the fuel tanks, presented a special challenge. But expertise developed in Boeing’s maintenance programs for the C-130 proved applicable to the B-52.

With the new contract to keep upgrading the B-52 fleet, Trainer said, the plan is to move forward with installing advanced communications capabilities. These encompass new radios, monitors and computer terminals for the aircraft. Also on the horizon is the potential replacement of the B-52’s strategic radar, which was last updated in the 1980s.

Boeing also is helping update the weapons carried on the B-52.

Jeff Claybrooks, program manager for B-52 weapons programs, said activity has begun to bring the latest smart weapons into the

aircraft’s payload bay. It already can carry GPS-guided Joint Direct Attack Munitions and laser-guided bombs on its wing pylons.

To save money and time, Boeing tries to solve sustainment issues with the aircraft while adding new capabilities. For example, Boeing and the Air Force will add a needed modification to cool the aircraft interior while performing another update.

“We look for ways to be smart with the taxpayers’ dollars while enhancing the airplane and resolving basic issues,” said Jim Kroening, development programs manager for the B-52 team in Wichita.

That flexibility in the B-52 platform to incorporate modifications and updates through the years has been its ultimate strength—and the reason it’s still serving well, Clevenger noted. When it comes to aircraft availability, he added, the Boeing B-52 is still the most reliable bomber in the Air Force arsenal.

Brian Werner, Engineering manager, B-52 Sustainment program, said generations of Boeing employees can take credit for that.

“It’s an incredible achievement by Boeing design that it’s still relevant, useful and reliable,” Werner said. ■

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PHOTOS: (Above) A B-52 from the 2nd Bomb Wing at Barksdale Air Force Base, La., deploys a Boeing Joint-Direct Attack Munition during a weapon systems evaluation held at Eglin Air Force Base, Fla. **U.S. AIR FORCE**

(Insets, from left) Staff Sgt. Ben Norton of the 2nd Aircraft Maintenance Squadron checks the engine of a B-52 at Barksdale Air Force Base, La., during an operational readiness inspection. **U.S. AIR FORCE** Staff Sgts. Dustin Hyden and Doyle Atkinson of the 36th Expeditionary Maintenance Squadron upload naval mines onto a B-52’s wing-mounted ordnance rack at Andersen Air Force Base in Guam in preparation for an aerial mine-laying exercise. **U.S. AIR FORCE**

B-52 Stratofortress at a glance

Production run: 1951–1962 in Wichita, Kan., and Seattle. A total of 744 were built in all versions.

Current U.S. Air Force fleet: 76

Primary mission: Long-range heavy bomber that can carry up to 70,000 pounds (31,750 kilograms) of mixed ordnance

Engines: Eight Pratt & Whitney TF33-P-3/103 turbofan engines

Flight speed: Mach 0.84, or 625 miles per hour (1,000 kilometers per hour)

Range: 8,800 miles (7,650 nautical miles, or 14,160 kilometers)

Wingspan: 185 feet (56 meters)

Length: 159 feet (48 meters)

Maximum takeoff weight: 488,000 pounds (221,350 kilograms)

Crew: Five

Notable: The B-52 won the National Aeronautic Association’s Collier Trophy for 1955. The aircraft’s combat operations include all major U.S. offensives since Vietnam in the 1960s.