

## B-25 Mitchell

### B-25 Mitchell



USAAF B-25C/D

**Type** Medium bomber

**Manufacturer** [North American Aviation](#)

**Designed by** John Leland "Lee" Atwood

**Maiden flight** [19 August 1940](#)

**Introduction** [1941](#)

**Retired** 1979 (Indonesia)

**Primary user** [United States Army Air Forces](#)

**Number built** 9,984

The **North American B-25 Mitchell (NA-62)** was an [American](#) twin-engined [medium bomber](#) manufactured by [North American Aviation](#). It was used with devastating effect against [German](#) and [Japanese](#) targets in every combat theater of [World War II](#). The aircraft was named the "Mitchell" in honor of General [Billy Mitchell](#), an early air power pioneer and advocate of an independent [United States Air Force](#). The B-25 Mitchell is the only American military aircraft named after a specific person. By the end of its production, nearly 10,000 B-25s in numerous models had been built. These included a few limited variations, such as the [US Navy](#)'s PBJ-1 patrol bomber and the [Army Air Forces](#)' F-10 [photo reconnaissance](#) aircraft.

### Design and development



Flight Performance School also included work in evaluating the performance of this B-25 Mitchell medium bomber

The B-25 was a descendant of the earlier [XB-21](#) (North American-39) project of the mid-[1930s](#). Experience gained in developing that aircraft was eventually used by North American in designing the B-25 (called the NA-40 by the company). One NA-40 was built, with several modifications later being done to test a number of potential improvements. These improvements included [Wright R-2600](#) radial engines, which would become standard on the later B-25.

In [1939](#), the modified and improved NA-40B was submitted to the [United States Army Air Corps](#) for evaluation. This plane was originally intended to be an attack bomber for export to the [United Kingdom](#) and [France](#), both of which had a pressing requirement for such aircraft in the early stages of World War II. However, those countries changed their minds, opting instead for the also-new Douglas [A-20 Havoc](#). Despite this loss of sales, the NA-40B re-entered the spotlight when the Army Air Corps evaluated it for use as a [medium bomber](#). Unfortunately, the NA-40B was destroyed in a crash on [11 April 1939](#). Nonetheless, the type was ordered into production, along with the Army's other new medium bomber, the Martin [B-26 Marauder](#).

### Early production



Mitchell production in Kansas City in 1942

An improvement of the NA-40B, dubbed the NA-62, was the basis for the first actual B-25. Due to the pressing need for medium bombers by the Army, no experimental or service-test versions were built. Any necessary modifications were made during production runs, or to existing aircraft at field modification centers around the world.

A significant change in the early days of B-25 production was a re-design of the wing. In the first nine aircraft, a constant-[dihedral](#) wing was used, in which the wing had a consistent, straight, slight upward angle from the fuselage to the wing tip. This design caused stability problems, and as a result, the dihedral angle was nullified on the outboard wing sections, giving the B-25 its slightly [gull wing](#) configuration. Less noticeable changes during this period included an increase in the size of the tail fins and a decrease in their inward cant.

A total of 6,608 B-25s were built at North American's [Fairfax Airport](#) plant in [Kansas City, Kansas](#).

A descendant of the B-25 was the [XB-28 Dragon](#), meant to be a high-altitude version of the B-25. Despite this premise, the actual aircraft bore little resemblance to the Mitchell. It had much more in common with the [B-26 Marauder](#).

## Operational history



Lt. Peddy and crew, showing how many people were required to keep a B-25 flying



B-25Bs [on the](#) USS *Hornet*



A B-25C being refueled



B-25 in low-level "[skip-bombing](#)" mission in New Guinea



B-25G Mitchell from the AAF TAC Center, Orlando, Florida, [17 April 1944](#)

The B-25 first gained fame as the bomber used in the April [1942 Doolittle Raid](#), in which 16 B-25Bs, led by the legendary Lt. Col. [Jimmy Doolittle](#), took off from the carrier [USS Hornet](#) and successfully bombed [Tokyo](#) and four other Japanese cities without loss to themselves. However, 15 of the planes subsequently crash-landed in Eastern [China](#) en route to their recovery fields in that country. These losses were the result of fuel exhaustion, stormy nighttime conditions with zero visibility, and the lack of electronic homing aids at the recovery bases. Only one B-25B landed intact; it came down in the [Soviet Union](#), where its five-man crew was interned and the aircraft confiscated. Fortunately, 71 of the

80 Doolittle Raid crewmen survived their historic mission and eventually made it back to American lines.

Following a number of additional modifications, including the addition of [Plexiglas](#) windows for the navigator and radio operator, heavier nose armament, and [de-icing](#) and anti-icing equipment, the B-25C version was released to the Army. This was the second mass-produced version of the Mitchell, the first being the lightly-armed B-25B used by the Doolittle Raiders. The B-25C and B-25D were identical, the only difference being their location of manufacture. The B-25C was built in [Inglewood, California](#), while the B-25D was made in [Kansas City, Kansas](#). A total of 3,915 B-25Cs and B-25Ds were built by North American during World War II.

Although the B-25 was originally designed to bomb from medium altitudes in level flight, it was used frequently in the [Southwest Pacific theater](#) (SWPA) on treetop-level [strafing](#) and parafrag (parachute-retarded fragmentation bombs) missions against Japanese airfields in [New Guinea](#) and the [Philippines](#). These heavily-armed Mitchells, field-modified by Major Paul Irving "Pappy" Gunn, were also used on strafing and skip-bombing missions against Japanese shipping trying to re-supply their land-based armies. Under the leadership of Lt. Gen. [George C. Kenney](#), B-25s of the 5th and 13th Air Forces devastated Japanese targets in the SWPA from 1942 to 1945, and played a significant role in pushing the Japanese back to their home islands. B-25s were also used with devastating effect in the [Central Pacific](#), [Alaska](#), [North Africa](#), [Mediterranean](#) and [China-Burma-India](#) theaters.

Because of the urgent need for hard-hitting strafe aircraft, a version of the B-25 dubbed the B-25G was developed, in which the standard-length transparent nose and the bombardier were replaced by a shorter, solid nose containing two fixed [.50-calibre machine guns](#) and a 75 mm M4 cannon. The latter was the largest caliber weapon used in an American bomber of the time. The cannon was manually loaded and serviced by the navigator, who was able to perform these operations without leaving his crew station just behind the pilots. This was possible due to the shorter nose of the G-model and the long length of the M4, which allowed the gun's breech to extend into the navigator's compartment. The B-25G's successor, the B-25H, had even more firepower. The 75mm gun was the lighter T13E1 which had been designed specifically for the B-25H. It also mounted four fixed forward-firing [.50-calibre machine guns](#) in the nose, four more fixed ones in forward-firing "blister" mounts on the fuselage sides, two more in the top turret, one each in a pair of new waist positions, and a final two in a new tail gunner's position. Company promotional material bragged that the B-25H could "bring to bear ten machine guns coming and four going, in addition to the 75mm cannon, a brace of eight [rockets](#) and 3000 pounds of bombs."<sup>[1]</sup> Fourteen hundred B-25Gs and B-25Hs were built. The 75mm cannon fired at a muzzle velocity of 2,362 [fps](#), about 720 [m/s](#). Due to its low rate of fire (approximately four shells could be fired in a single [strafing](#) run and relative ineffectiveness against ground targets, the 75mm cannon was sometimes removed from both G and H models and replaced with two additional [.50-caliber machine guns](#) as a field modification.<sup>[2]</sup> The B-25H also featured a redesigned cockpit area, with the top turret moved forward to the navigator's compartment (thus requiring the addition of the waist and tail gun positions), and a heavily modified cockpit designed to be operated by a single pilot, with the co-pilot's station and controls deleted, and the seat cut down and used by the navigator/cannoneer, with the radio operator in the aft compartment operating the waist guns.<sup>[3]</sup>

The final version of the Mitchell, the B-25J, looked much like the earlier B, C and D models, having reverted to the longer nose section as used in those types. The less-than-successful, 75 mm cannon was deleted on the J model. Instead, 800 of this version were built with a solid nose containing eight [.50-caliber machine guns](#), while other J-models featured the earlier "greenhouse" style nose containing the bombardier's position. Regardless of the nose style used, all J-models also included two [.50 caliber guns](#) in a "fuselage package" located directly under the pilot's station, and two more

such guns in an identical package just under the co-pilot's compartment. The solid-nose B-25J variant carried an impressive total of 18 .50-caliber guns: eight in the nose, four in under-cockpit packages, two in an upper turret, two in the waist compartment, and a pair in the tail position. No other bomber of World War II carried as many guns. However, the first 555 B-25Js (the B-25J-1-NC production block) were delivered without the fuselage package guns, because it was discovered that muzzle blast from these guns was causing severe stress in the [fuselage](#) next to the muzzles; while later production runs returned these guns, they were often removed as a field modification for that same reason.<sup>[4]</sup> In all, 4,318 B-25Js were built.

The B-25 was a safe and forgiving aircraft to fly. With an engine out, 60° banking turns into the dead engine were possible, and control could be easily maintained down to 145 [mph](#) (230 [km/h](#)). The tricycle landing gear made for excellent visibility while taxiing. The only significant complaint about the B-25 was the extremely high noise level produced by its engines; as a result, many pilots eventually suffered from various degrees of [hearing loss](#) <sup>[5]</sup>.

The Mitchell was also an amazingly sturdy aircraft that could withstand tremendous punishment. One well-known B-25C of the [321st Bomb Group](#) was nicknamed "Patches" because its crew chief painted all the aircraft's [flak](#) hole patches with high-visibility [zinc chromate](#) paint. By the end of the war, this aircraft had completed over 300 missions, was belly-landed half a dozen times and sported over 400 patched holes. The airframe was so bent that straight-and-level flight required 8° of left [aileron](#) trim and 6° of right rudder, causing the aircraft to "crab" sideways across the sky.

An interesting characteristic of the B-25 was that its range could be extended by using one-quarter wing flap settings. Since the aircraft normally cruised in a slightly nose-high attitude, about 40 US gallons (150 l) of fuel was below the fuel pickup point and thus unavailable for use. The flaps-down setting gave the aircraft a more level flight attitude, which resulted in this fuel becoming available, thus slightly extending the plane's range <sup>[6]</sup>.

### **Empire State Building accident**

On Saturday, [28 July 1945](#), at 9:49 am (while flying in thick fog), a B-25D crashed into the north side of [Empire State Building](#), hitting between the 79th and 80th floor. Fourteen people were killed - 11 in the building, along with Colonel William Smith and the other two occupants of the plane.<sup>[7]</sup>

### **[\[edit\]](#) Variants**



B-25C Mitchell



USAAF B-25C/D. Note the early (likely experimental) radar fitted to the nose



B-25J



B-25J warbird

#### B-25

The first version of the B-25 delivered. It was so badly needed that no prototype stages were ordered. The first nine planes were built with constant [dihedral](#) angle. Due to low stability, the wing was redesigned so that the dihedral angle was eliminated on the outboard section. (Number made: 24)

#### B-25A

Version of the B-25 modified to make it combat ready; additions included [self-sealing fuel tanks](#), crew armour, and an improved tail gunner station. No changes were made in the armament. Re designated obsolete (**RB-25A** designation) in [1942](#). (Number made: 40)

#### B-25B

Tail gunner eliminated; dorsal and ventral turrets added, each with a pair of .50-caliber [machine guns](#). The ventral turret was retractable, but the increased drag still reduced the cruise speed by 30 mph (48 km/h). 23 were delivered to the RAF as the **Mitchell Mk I**. (Number made: 120)

#### B-25C

Improved version of the B-25B: upgraded from [Wright R-2600-9](#) radials to R-2600-13 radials; deicing and anti-icing equipment was added; the navigator received a sighting blister; and nose armament was increased to two .50-caliber machine guns, one fixed and one flexible. The B-25C model was the first mass produced B-25 version; it was also used in the [United Kingdom](#) as the Mitchell II, and in [Canada](#), [China](#), the [Netherlands](#), and the [Soviet Union](#). First mass-produced B-25. (Number made: 1,625)

#### ZB-25C

#### B-25D

Identical to the B-25C. The only difference was that the B-25C was made in [Inglewood, California](#), whereas the B-25D was made in [Kansas City, Kansas](#). First flew on [3 January 1942](#). (Number made: 2,290)

#### ZB-25D

#### [XB-25E](#)

Single B-25C modified to test de-icing and anti-icing equipment that circulated exhaust from the engines in chambers in the leading and trailing edges and empennage. The plane was tested for almost two years, beginning in [1942](#); while the system proved extremely effective, no production models were built that used it before the end of World War II. Many prop planes today use the XB-25E system. (Number made: 1, converted)

ZXB-25E

XB-25F-A

Modified B-25C that tested the use of insulated electrical de-icing coils mounted inside the wing and empennage leading edges as a de-icing system. The hot air de-icing system tested on the XB-25E was more practical. (Number made: 1, converted)

XB-25G

Modified B-25C in which the transparent nose was replaced by a solid one, with two fixed .50-caliber machine guns and a 2.95-inch (75 mm) M4 Cannon, then the largest weapon ever carried on an American bomber. (Number made: 1, converted)

B-25G

To satisfy the dire need for ground-attack and strafing aircraft, the B-25G was made following the success of the prototype XB-25G. The production model featured increased armour and a greater fuel supply than the XB-25G. One B-25G was passed to the British, who gave it the name **Mitchell II** that had been used for the B-25C. (Number made: 420)

B-25H

An improved version of the B-25G. It featured two more fixed .50-caliber machine guns in the nose, and four in fuselage-mounted pods; the heavy M4 cannon was replaced by a lighter 2.95-inch (75 mm) T13E1. (Number made: 1,000; Number left flying in the world: 1)

B-25J

The last production model of the B-25, often called a cross between the B-25C and the B-25H. It had a transparent nose, but many of the delivered planes were modified to have a solid nose. Most of its 14–18 machine guns were forward-facing for strafing missions. 316 were delivered to the [Royal Air Force](#) as the **Mitchell III**. (Number made: 4,318)

CB-25J

Utility transport version.

VB-25J

A number of B-25s were converted for use as staff and VIP transports. [Henry H. Arnold](#) and [Dwight D. Eisenhower](#) both used converted B-25Js as their personal transports.

## Trainer variants

Most models of the B-25 were used at some point as training aircraft.

TB-25D

Originally designated **AT-24A** (Advanced Trainer, Model 24, Version A). Trainer modification of B-25D. In total, 60 AT-24s were built.

TB-25G

Originally designated **AT-24B**. Trainer modification of B-25G.

TB-25C

Originally designated **AT-24C**. Trainer modification of B-25C.

TB-25J

Originally designated AT-24D. Trainer modification of B-25J. Another 600 B-25Js were modified after the war.

TB-25K

Hughes E1 fire-control radar trainer (Hughes). (Number made: 117)

TB-25L

Hayes pilot-trainer conversion. (Number made: 90)

TB-25M

Hughes E5 fire-control radar trainer. (Number made: 40)

TB-25N

Hayes pilot-trainer conversion. (Number made: 47)

## US Navy variants

### PBJ-1C

Similar to the B-25C for the US Navy; often fitted with airborne search radar and used in the anti-submarine role.

### PBJ-1D

Similar to the B-25D for the US Navy. Differed in having on a single .50 caliber M2 in the tail turret and beam gun positions similar to the B-25H. Often fitted with airborne search radar and used in the anti-submarine role.

### PBJ-1G

US Navy designation for the B-25G

### PBJ-1H

US Navy designation for the B-25H

### PBJ-1J

US Navy designation for the B-25J-NC (Blocks -1 through -35) with improvements in radio and other equipment. Often fitted with "package guns" and wingtip search radar for the anti-shipping/anti-submarine role.

## Survivors



A B-25 Mitchell at a modern [airshow](#)



B-25J-20 Mitchell (Duke of Brabant Air Force)

B-25 "cut-away" display version of the fuselage.

[Strategic Air and Space Museum](#), [Ashland](#), [Nebraska](#)

B-25C 41-12634

[Southern Museum of Flight](#) in [Birmingham](#), [Alabama](#). Recently recovered from a 1943 crash site at [Lake Murray](#) in [South Carolina](#), in the process of being restored.

B-25D 43-3374 displayed as B-25B 40-2344

[National Museum of the United States Air Force](#) at [Wright-Patterson AFB](#), near [Dayton, Ohio](#), part of a display commemorating the Doolittle Raid.

B-25D "Yankee Warrior"

[Yankee Air Museum](#) Willow Run Airport, Bellville Michigan

B-25D-20

[Liberty Park](#), [Overloon](#), [Netherlands](#). Netherlands Royal Air Force squadron 320, November 1943, retired 1954.

B-25H-1 43-4106 (N5548N) "Barbie III"

Weary Warriors, [Rockford, Illinois](#).



B-25H "Dog Daize"

[New England Air Museum](#), [Windsor Locks](#), [Connecticut](#).

B-25J 43-28147 "Panchito"

B-25J 44-30423 "Photo Fanny"

[Planes of Fame Museum](#), Chino, CA

TB-25J-NC 44-30854 marked as Doolittle's B-25B 40-2344

USAF Armaments Museum, [Eglin AFB](#), [Florida](#). This was the last active B-25 in the USAF inventory, retired in 1959.

B-25J 44-86747

[Eden Prairie, Minnesota](#) (??)

B-25J 44-86747 (N8163H) "Mitch The Witch"

[Palm Springs Air Museum](#), [Palm Springs, California](#)

B-25J 44-86843 "Passionate Paulette"

[Grissom Air Museum](#), Peru Indiana. Aircraft from the Movie Catch-22.

B-25J "Briefing Time"

[Mid-Atlantic Air Museum](#), [Reading](#), [Pennsylvania](#)

B-25J "Miss Mitchell"

[Commemorative Air Force](#), Southern Minnesota Wing, located at Hangar 3, Fleming Field, South Saint Paul, Minnesota.<sup>[8]</sup>

B-25J "Super Rabbit"

[Evergreen Aviation Museum](#), [McMinnville](#), [Oregon](#). Aircraft delivered to the [USAF](#) on [20 June 1945](#). Converted to a TB-25J trainer and sent to the [Royal Canadian Air Force](#) in 1952. On loan to the museum from the private collection of Jim Morgan of [Aumsville, Oregon](#).

B-25J "Grumpy"

[Canadian Warplane Heritage Museum](#), [Hamilton](#), [Ontario](#)

B-25J

[Kalamazoo Aviation History Museum](#) ("Kalamazoo Air Zoo"), [Kalamazoo, Michigan](#). Aircraft with "solid" strafing nose and [dragon](#)-styled [nose art](#) that covers the entire nose.

B-25J

Militaire Luchtvaart Museum (Museum of military aviation), [Soesterberg](#), [Netherlands](#). Aircraft donated by the Republic of [Indonesia](#), painted in livery of 18sqn Royal Netherlands East Indies Airforce.

B-25J

[Alberta Aviation Museum](#).

## Operators



B-25 Mitchell bombers from [No. 18 \(NEI\) Squadron RAAF](#) on a training flight near [Canberra](#) in 1942



## B-25J in 98 RAF Squadron markings

### [Australia](#)

- [Royal Australian Air Force](#)
  - [No. 2 Squadron RAAF](#)

### [Argentina](#)

### [Bolivia](#)

### [Brazil](#)

### [Canada](#)

- [Royal Canadian Air Force](#)

### [China](#)

### [People's Republic of China](#)

- [People's Liberation Army Air Force](#) operated captured Nationalist Chinese aircraft.

### [Chile](#)

### [Colombia](#)

### [Cuba](#)

### [Dominican Republic](#)

### [France](#)

### [Indonesia](#)

- [Indonesian Air Force](#) received some B-25 Mitchell from Netherlands, last example retired in 1979.

### [Mexico](#)

### [The Netherlands](#)

- [Royal Netherlands Air Force](#)
  - [No. 18 \(Netherlands East Indies\) Squadron RAAF](#)
  - [No. 119 \(Netherlands East Indies\) Squadron RAAF](#)
  - [No. 320 Dutch Bomber Squadron](#)

### [Peru](#)

### [Poland](#)

- [Polish Air Forces on exile in Great Britain](#)
  - [No. 305 Polish Bomber Squadron](#)

### [Spanish State](#)

- [Spanish Air Force](#) <sup>[*citation needed*]</sup>

### [Soviet Union](#)

- [Soviet Air Force](#) received a total of 866 B-25s (of types C/D/S/G/J).

## [United Kingdom](#)

- [Royal Air Force](#) received more than 900 aircraft.
  - [No. 98 Squadron RAF](#)
  - [No. 180 Squadron RAF](#)
  - [No. 226 Squadron RAF](#)
  - [No. 342 Squadron RAF](#)
  - [No. 681 Squadron RAF](#)
  - [No. 684 Squadron RAF](#)

## [United States](#)

- [United States Army Air Forces](#)
- [United States Navy](#)
- [United States Marine Corps](#)

## [Uruguay](#) [Venezuela](#)

### Specifications (B-25J)

Data from Jane's Fighting Aircraft of World War II<sup>[9]</sup>

#### General characteristics

- **Crew:** six (two pilots, navigator/bombardier, turret gunner/engineer, radio operator/waist gunner, tail gunner)
- **Length:** 52 ft 11 in (16.1 m)
- **Wingspan:** 67 ft 6 in (20.6 m)
- **Height:** 17 ft 7 in (4.8 m)
- **Wing area:** 610 ft<sup>2</sup> (57 m<sup>2</sup>)
- **Empty weight:** 21,120 lb (9,580 kg)
- **Loaded weight:** 33,510 lb (15,200 kg)
- **Max takeoff weight:** 41,800 lb (19,000 kg)
- **Powerplant:** 2x [Wright R-2600](#) "Cyclone" [radials](#), 1,850 hp (1,380 kW) each

#### Performance

- **Maximum speed:** 275 mph (239 knots, 442 km/h)
- **Cruise speed:** 230 mph (200 knots, 370 km/h)
- **Combat radius:** 1,350 mi (1,170 nm, 2,170 km)
- **Ferry range:** 2,700 mi (2,300 nm, 4,300 km)
- **Service ceiling:** 25,000 ft (7,600 m)
- **Rate of climb:** 790 ft/min (4 m/s)
- **Wing loading:** 55 lb/ft<sup>2</sup> (270 kg/m<sup>2</sup>)
- **Power/mass:** 0.110 hp/lb (182 W/kg)

#### Armament

- **Guns:** 12x .50 in (12.7 mm) [machine guns](#)
- **Bombs:** 6,000 lb (2,700 kg)

## External links

- [Boeing: History -- Products - North American Aviation B-25 Mitchell Bomber](#)
- [Site of the B-25J "Heavenly Body" - detailed B-25 historical overview, many pictures and a forum for asking questions](#)
- [Fantasy of Flight's B-25](#)
- [Russell's Raiders B25 - Jet Alpine Fighter](#)
- [VMB-613 - a marine bombing squadron that used the naval version of the B-25 known as the PBJ-1](#)
- [Militaire Luchtvaart Museum, Kamp Zeist, Soesterberg, Netherlands](#)

## Related development

- [North American XB-21](#)
- [XB-28 Dragon](#)

## Comparable aircraft

- [B-26 Marauder](#)

## Designation sequence

- *Pre-1948 USAAC/F:*
  - *Bomber:* [XB-22](#) - [B-23](#) - [B-24](#) - **B-25** - [B-26](#) - [XB-27](#) - [XB-28](#)
  - *Advanced Trainer:* [AT-20](#) - [AT-21](#) - [AT-22](#) - [AT-23](#) - **AT-24** - [AT-29](#)
  - *Photographic Reconnaissance:* [F-7](#) - [F-8](#) - [F-9](#) - **F-10** - [F-11](#) - [XF-12](#) - [F-12](#)
- *1922-1962 Navy :*
  - *Patrol Bomber:* [PBB](#) - [PB2B](#) - **PBJ** - [PBM/PB2M](#) - [PBN](#) - [PBO](#)
- *Great Britain*
  - [Master](#) - [Messenger](#) - [Meteor](#) - **Mitchell** - [Mohawk](#)
- *Post-1948 USAF:*
  - [TB-24](#) - **TB-25** - [TB-26](#) - [TB-29](#)

## See also