

# B-17 Flying Fortress

## Museum of Aviation Educator Guide

- Friction lock – set
- Mixture – rich
- Propellers - fully forward
- Flaps - set - 10 degrees
- Engine gauges and suction – check
- Mixture set to maximum percent – recheck
- Flight instruments - Altimeters - check both
- Navigation lights – on
- Strobes – on

*Source: Instrumental Break, "Learning to Fly", Pink Floyd*



Look at the above checklist. It may read as a cryptic dispatch but it is a set of common instructions recognized by nearly all pilots. The in-flight checklist is the basic doctrine by which aircrew members ensure safe flying procedures during normal operations and emergency contingencies. Whether you're flying a Cessna or the Space Shuttle, it doesn't matter if you are doing a routine landing, or fighting an engine fire, a pilot knows to follow the in-flight checklist in any situation.

FLASHBACK, February 1944: During the cold pre-dawn hours, 1,000 bombers of the 8<sup>th</sup> and 15<sup>th</sup> Air Force begin preparations for the world's largest air armada. The Army Air Force had launched large scale missions in the past with 200-300 bombers but Operation Argument, or "The Big Week" as it would be later known, brought strategic bombing to an entirely new scale. The aircraft involved in this massive offensive include the B-24, the B-26, and the B-17. The only way to ensure every part on each of these sophisticated machines was flightworthy was through careful checklist discipline. The Allies filled the skies with 1,000 flying machines; each with 10 crewmembers, each one responsible for verifying the integrity of every part of their aircraft using their checklist.

As momentum of the Allied invasion of continental Europe grew, it became clear that its success would depend in large measure on the Allied Air Force's ability to take out the German Luftwaffe. Hundreds of thousands of allied soldiers' lives would be at risk if air power did not gain air superiority first. Operation Argument would be the Air Force's prime opportunity to achieve air superiority. The targets for the bombers would include: aircraft production factories, supply centers, ball bearing plants, and enemy airfields.

# B-17 Flying Fortress

---

The workhorse of this mighty bomber force, the B-17, had the nickname “Flying Fortress”. The nickname’s origin is disputed. Some say it was because it was bristling with a large number of defensive guns. Others say it was initially developed as a coastal bomber and therefore intended to help create a fortress America. Whichever the case, the term was coined by the press and the name stuck with the Army bomber.

The B-17 had a crew compliment of ten men. Ten lives bonded together in military brotherhood, knowing that each one had to do their job effectively to accomplish their very dangerous assignment and bring all them home to complete the mission.

**Pilot:** He is the airplane commander. He assumes ultimate responsibility for the crew accomplishing its mission. He knows his crew inside and out. He is an expert pilot and can hold the B-17 craft in perfect formation with the squadron’s combat box. He knows all the emergency procedures by heart but still uses the checklist. He can fly the aircraft with two engines out, no hydraulics and over 100 holes in the airframe through any kind of weather. His position is also the aircraft command post where he can direct his gunners towards enemy fighters, organize fire-fighting responses, or send medical supplies to the wounded.

**Co-pilot:** He may be a rookie but is still equally qualified to fly the 4-engine behemoth. The B-17 is truly a complex aircraft and requires two aviators at the controls. His position has the least job satisfaction because his judgement can always be second-guessed by the pilot. His worst fear is that he will someday upgrade to Pilot and will then have to assume the liability of ten lives of his own.

**Navigator:** Berlin may be 700 miles away and there is only one man that knows how to get there. He is an expert at reading maps and dead reckoning. By calculating the aircraft’s airspeed against the expected winds aloft, he can expertly calculate the wind correction angles with stop-watch precision. He is constantly calibrating his instruments and readjusting the course for the route to the target area. If he is off, the whole mission could be in jeopardy. After weapons release, he is the man that knows the way home. When under fighter attack, he mans one of the .50 caliber machine guns.

**Bombardier:** It may take 3 hours to get over the target area, and 3 hours to get home, but the entire mission success rests on the two minutes he looks through his Norden Bombsight. During the final run, he assumes directional control of the bomber from the pilot. He must account for the bomber’s speed, wind drift, bomb spread, and even the atmospheric pressure. His precision will determine whether an enemy ball bearing factory ceases production or another 10-man crew will have to risk re-attacking the same target again. He also operates the forward machine guns.

**Engineer:** Make no mistake, this is HIS airplane and he knows every square inch of it. He probably spent a good deal of time as a crew chief to gain this knowledge. The B-17 was made from intricate technology. It requires the knowledge of a competent crewmember to insure all systems are operating. He also operates the twin .50 caliber top gun turret in combat.

# B-17 Flying Fortress

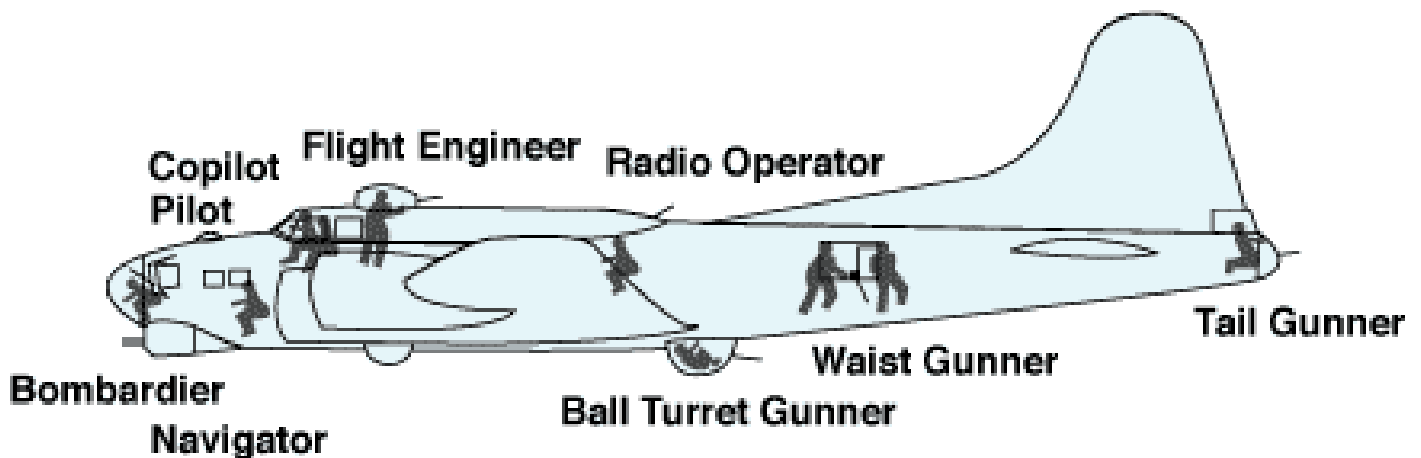
---

**Radio Operator:** He sits immediately behind the bomb bay. He is an expert in the operation and maintenance of communication and navigation equipment. He transmits position reports back to headquarters every 30 minutes and maintains the log. In combat, he would man the machine gun (if equipped) above his station.

**Ball Turret Gunner:** Ever wonder what a hamster feels like? This gunner sits in the Sperry Turret which is a spherical glass and plastic ball on the bottom of the B-17. His field of view was particularly critical over Germany as Luftwaffe fighter pilots frequently attack from below the bomber. Once inside the turret, the gunner was in the fetal position. This was only comfortable for airmen of small stature.

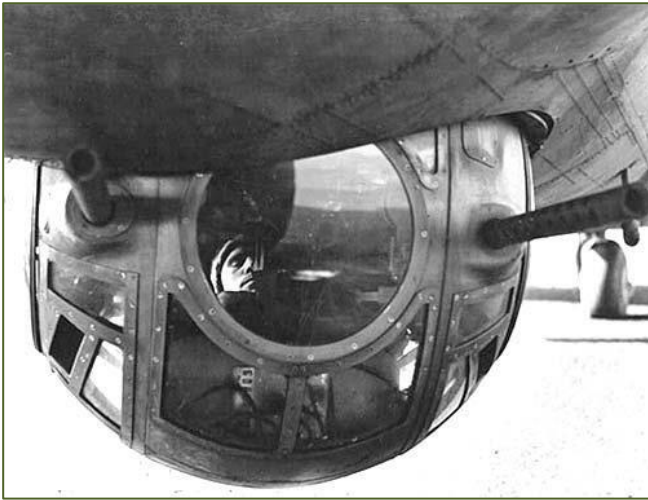
**Tail Gunner:** He is responsible for defending the bomber from rear attacks with his twin .50 caliber machine guns. As the only rearward facing crewmember, he would assess the battle damage of the dropped bombs. He would also have the inglorious job of counting chutes of bombers shot down. The B-17's fuselage tapered to the rear so the tail gunner position was narrow. Likewise, tail gunners were typically airmen of small stature.

**Waist Gunners:** Before you complain about your car heater not working, imagine driving with your windows down at 200+ mph in the middle of winter. This is the daily routine for the Waist Gunners. They each man a .50 caliber machine gun out an open window to defend against enemy fighters. Ambient temperatures drop 3 1/2 \* per 1,000 ft. so at 20,000 ft., the temperature is about 70\* cooler than on the ground.



# B-17 Flying Fortress

---



**Ball Turret Gunner**

**Waist Gunners**



FLASHBACK, October 1935: The B-17 prototype crashes on takeoff. The cause of the crash was due to a gust lock left in place preventing the pilots from moving the flight controls. It was a simple mistake. The two pilots paid for this over-looked item with their lives. In fact, Hill AFB is named after Major Ployer Hill who only flew the aircraft that one time. As a result of this crash, the B-17 lost the bomber contract to the much simpler: B-18 Bolo. The Army Air Corps recognized that aviation technology and complexity was advancing faster than pilots could keep up with. As a result, the Air Corps stipulated that all future aircraft contracts MUST have a checklist to avoid mistakes. Checklist discipline has been a staple requirement for all pilots, civil and military, ever since. General Warner Robins, who witnessed the fatal crash, worked vigorously to keep the B-17 as a contender. The Air Corps also recognized that despite its complexities, the B-17 had its merits and allowed both bombers to enter service together in the event of some future war. Less than 7 years later, the B-17 would cash in on this eventuality and would pave the way for the Allies to defeat the Axis powers through strategic bombing. Ironically, the B-18 Bolo has less than a footnote in the annals of air power. Perhaps the B-17s greatest tribute came from Luftwaffe fighter ace Major Hans Phillips: ***"Against 20 Russians trying to shoot you down or even 20 Spitfires, it can be exciting, even fun. But curve in towards 40 fortresses and all your past sins flash before your eyes."***

Michael Cashman, Museum of Aviation

Mission Quest Flight Instructor