Messerschmitt Me 262

Messerschmitt Me 262A-1a		
Description		
Role	Fighter/Bomber	
Crew	One, pilot	
First flight	July 18, 1942	
Manufacturer	Messerschmitt	
Dimensions		
Length	10.58 m	34 ft 9 in
Wingspan	12.5 m	41 ft 0 in
Height	3.83 m	12 ft 7 in
Wing area	21.7 m²	234 ft²
Weights		
Empty	3,800 kg	8,400 lb
Loaded		
Maximum takeoff	6,400 kg	14,100 lb
Powerplant		
Engines	2x Jumo 004B-1 turbojets	
Thrust	18 kN	4050 lbf
Performance		
Maximum speed	870 km/h	540 mph
Range	1050 km	650 miles
Service ceiling	11,450 m	37,600 ft
Rate of climb	1,200 m/min	3,900 ft/min
Armament		

The **Messerschmitt Me 262** *Schwalbe* or "swallow" was the first operational jet powered fighter. It was mass-produced in World War II and saw action from late 1944 in bomber/reconnaissance and fighter/interceptor roles. German pilots nicknamed it the Turbo, while to the Allies it was the Stormbird. Although the Me 262 had a negligible impact on the course of the war—shooting down an estimated 150 Allied aircraft for the loss of 100 Me 262s, the majority of aircraft grounded for lack of fuel—the jet was both well-known and highly influential on post-war aircraft development.

Development

Although often viewed as a last ditch super-weapon, the Me 262 was already being developed as project P.1065 before the start of WWII. Plans were first drawn up in April 1939, and the original design was very similar to the plane that would eventually enter service. The progression of the original design into service was delayed by a lack of funds, many high ranking officials thought that the war could easily be won with conventional aircraft, and therefore most of the available government funds were used for the production of other aircraft.

During development, when an increase of the weight of the still unfinished jet engines was anticipated in March 1940, Messerschmitt used this as an opportunity to turn the Me 262 into a swept-wing fighter by sweeping back the outer wings. In 1942, the leading edges of the inner wings were extended, too, to turn the Me 262 into a true swept-wing aircraft. Swept wings had been proposed as early as 1935 by Adolph Busemann, and Willy Messerschmitt had researched the topic from 1940. In April 1941, he actually proposed to fit a 35° swept wing (*Pfeilflügel II*) to the Me 262. Though this suggestion wasn't implemented, he continued this line of thought with the projected HG II and HG III high-speed derivatives of the Me 262 in 1944, which were designed with a 35° and 45° wing sweep respectively. The aircraft was originally designed as a tail-dragger which it was built as in the first (Me 262 V1) through fourth (-V4) prototypes, but it was discovered on an early test run that the engines and wings "blanked" the stabilizers, giving almost no control on the ground. Changing to a tricycle landing gear arrangement, firstly as a fixed undercarriage on the fifth prototype aircraft, than a fully retractable one on the sixth and succeeding prototypes, corrected all of these problems immediately.

The first test flights began in April 1941, but since the BMW 003 turbojets were not ready for fitting, a conventional Junkers Jumo 210 engine was mounted in the nose, driving a propeller, to test the Me 262 V1 airframe. When the BMW 003 engines were finally installed the Jumo was retained for safety which proved wise as both 003s failed during the first flight and the pilot had to land using the nose mounted engine alone.

The V3 third prototype airframe became a true jet plane when it flew on July 18, 1942 in Leipheim near Günzburg, Germany, piloted by Fritz Wendel. The 003 engines which were proving unreliable were replaced by the newly available Junkers Jumo 004. The Jumo 004 was more reliable, but it also caused problems since they had to compete with the Arado Ar 234 over the engines. The Junkers Jumo 004 was, however, considerably less reliable than its British contemporary the Rolls-Royce Welland fitted to the Gloster Meteor.

Test flights continued over the next year but the engines continued to be unreliable. The production of the aircraft was slowed not only by the engine troubles, but also by a personal demand from Hitler that the new Me 262 must also be part bomber. Although airframe modifications were completed by 1942, production never began until 1944 when the production engines — which due to the shortage of strategic materials like tungsten and chrome had to be completely redesigned to employ alloys of inferior temperature resistance — finally started to work.

Jet engines have less thrust at low speed than piston or turboprop engines. Acceleration is relatively poor and for the Me 262 it was worse because all early jet engines responded only slowly to throttle changes. Conversely, the higher power of jet engines at higher speeds meant the Me 262 enjoyed a much higher climb speed. Used tactically, this gave the jet fighter an even greater speed advantage than level flight at top speed.

Operationally, the Me 262 had an endurance of 60 to 90 minutes.

Combat overview

Despite its deficiencies, the plane was clearly signaling the beginning of the end of the propeller aircraft as an efficient fighting machine. Once airborne it quickly accelerated to speeds well over 800 km/h, over 150 km/h faster than anything else in the air.

Many accounts from Allied bomber crews cited that they were horrified by the speed of the Me 262. Allied accounts also state some level of amazement and awe: the idea of an extremely fast propeller-less aircraft was difficult to imagine at the time, let alone experience. While Allied intelligence was aware of the German jet development, not all combat units were informed about the existence of the Me 262, contributing to the Allied amazement.

Anti-bomber tactics

The standard approach against bomber formations, which were travelling along at cruise speed, called for the Me 262 to approach the bombers from the rear at a higher altitude, diving in below the bombers to get additional speed before zooming up again to their level and opening fire with its four 30 mm cannon at 600 m range.

Reportedly, Allied bomber gunners were finding that their electric gun turrets had problems tracking the jets. However, due to the jets' straight line approach, traverse rates were actually not as important as target acquisition itself, which was difficult because the jets closed into firing range very quickly and had to remain in firing position only very briefly using their standard attack profile.

On September 1, 1944, General Spaatz expressed the fear that if greater numbers of German jets were fielded, they could inflict losses to the USAAF bombers heavy enough to cause cancellation of the Allied daylight bombing offensive.

Counter-jet tactics

Tactics against the Me 262 developed quickly to find ways of defeating it despite its insurmountable speed. Allied bomber escort fighters (specifically P-51s) would fly high above the bombers to gain extra speed in a dive down to protect the bombers, thus reduce the speed advantage of the Me262. The Me262 was less maneuverable than the P-51 and trained allied pilots could catch up to a turning Me262; but the only reliable way of dealing with the jets was to attack them in the take-off and landing phase of their flight, and on the ground. Accordingly, Luftwaffe air fields that were recognized as jet bases were frequently bombed by medium bombers, and Allied fighters patrolled over the fields to attack jets that were trying to land on their bases. The Luftwaffe countered these moves by installing Flak alleys along the approach lines in order to protect the Me 262s from the ground, and providing top cover with conventional fighters during the take-off and landing phase.

The US Army demanded production far ahead of schedule for the P-80 to provide an allied jet fighter that could match the Me262, but had to ground the P-80 after one of the four US jets deployed to Europe was wrecked in a fatal accident. Other Allied fighters who encountered the Me 262 included the British Hawker Tempest Mk.V and the Soviet Lavochkin La-7. The Tempest was the first Allied plane to shoot down a Me262, and won a number of victories over these jet fighters, while the Lavochkin was the only Soviet fighter to encounter a German jet, with La-7 ace Ivan Nikitovich Kozhedub fighting and downing one Me262 jet on February 15, 1945 over eastern Germany. Kozhedub apparently later said that his success was mainly due to the Me262 pilot attempting to out-turn his more maneuverable plane.

High speed research


Me 262 interior

Willy Messerschmitt regarded the Me 262 as it went into production only as an interim type. His interest in high-speed flight that had led him to initiate work on swept wings starting in 1940 is evident from the advanced developments he had on his drawing board in 1944. While the Me 262 HG I (Hochgeschwindigkeit, *high speed*) that was actually flight-tested in 1944 had only small changes compared to combat aircraft, most notably a low-profiled canopy to reduce drag, the HG II and HG III designs were far more radical. The projected HG II variant combined the low-drag canopy with a 35° wing sweep and a butterfly tail. The HG III aircraft had a conventional tail, but a 45° wing sweep and the jet turbines embedded in the wing root.

Messerschmitt also conducted a series of carefully controlled flight tests with the series production Me 262. In these dive tests, it was established that the Me 262 was out of control in a dive at Mach 0.86, and that higher Mach numbers would lead to a nose-down trim that could not be countered by the pilot. The resulting steepening of the dive would lead to even higher speeds and disintegration of the airframe due to excessive negative *g* loads.

The HG series of Me 262 derivatives was estimated to be capable of reaching transonic Mach numbers in level flight, with the top speed of the HG III being projected as Mach 0.96 at 6 km altitude.

Despite the necessity to gain experience in high-speed flight for the HG II and III designs, Messerschmitt undertook no attempts to exceed the Mach 0.86 limit for the Me 262.

After the war, the Royal Aircraft Establishment — at that time one of the leading institutions in high-speed research — re-tested the Me 262 to help with the British attempts at breaking the sound barrier. The RAE achieved speeds of up to Mach 0.84 and confirmed the results from the Messerschmitt dive tests as accurate. No attempts were made to exceed the Mach limit established by Messerschmitt.

After Willy Messerschmitt's death, the former Me 262 pilot Hans Guido Mutke claimed to be the first person to break the sound barrier on April 9, 1945 in a Me 262, in a "straight-down" 90º dive. This claim is disputed because it is only based on Mutke's memory of the incident, which recalls effects that other Me 262 pilots have observed below the speed of sound and a high airspeed indicator reading, but no altitude reading, which would be required to determine the actual speed.

Operations


Me 262A-1a camouflaged on a German airfield

Initially only bomber units were equipped with the Me 262 (at Hitler's insistence) despite the aircraft being designed as a fighter and the already existing Arado Ar 234. Due to the characteristics of jet engines, dog fighting at low speeds had to be avoided. While it had originally been planned to use the Me 262 against the USAAF fighter escorts to make it possible for the slower propeller fighters to attack the bombers, the overwhelming numerical superiority of the USAAF fighters lead to the use of the Me 262 in the anti-bomber role.

On March 18, 1945, 37 Me 262s intercepted a force of 1,221 bombers and 632 escorting fighters. They managed to shoot down 12 bombers and one fighter for the loss of three Me 262s. Although a four to one ratio was exactly what the Luftwaffe would have needed to make an impact on the war, the absolute scale of their success was minor as it represented only one per cent of the attacking force. In 1943 and early 1944, the USAAF had been able to keep up offensive operations though enduring loss ratios of 5% and more, and the few available Me 262s could not inflict this magnitude of losses.

Two-seater "B" variants of the Me 262 had been produced as night-fighters, complete with on-board radar and "deerhorn" antennae. Whether these ever saw combat is debated. In either case, few veteran night-fighter pilots expressed much enthusiasm for the idea of adding a second crewmember. As the two seat trainer was largely unavailable many pilots had to do their first flight in a jet in a single seater without an instructor.

Although the British Gloster Meteor jet had entered service in August 1944, the two aircraft never engaged in combat; the Meteor was initially restricted to the skies over Britain (where it engaged incoming V-1 flying bombs), whilst its later use over mainland Europe did not result in any combat. The first jet-jet dogfights would thus not take place until the Korean War. According to pilots who had the chance to fly both aircraft the Me 262 was superior apart from the engine, reliability and manouverability. According to test pilot Roland Beamont the 262 had "a significantly higher critical Mach number than the British Gloster Meteor" in early versions although by the Meteor IV could reach "Mach Crit. 0.84" compared with the critical compressiblity threshold of the 262 at Mach 0.83 allowing the Meteor to take the world speed record.

Production

As Germany was bombed incessantly, production of the Me 262 was dispersed into low-profile production facilities, sometimes not more than clearings in the woods. Large, heavily protected underground factories were constructed to take up production of the Me 262 safe from bomb attacks, but the war ended before they could be completed.

Post-War

After the end of the war the Me 262 as well as other advanced German technology was quickly swept up by both the Soviets and the Americans. Many Me 262s were found in working condition by both sides and were confiscated. These aircraft were extensively studied, aiding development of early US and Soviet jet fighters. The F-86 Sabre and the Sukhoi Su-9 (1946) were directly influenced by the Me 262.

The Czechoslovakian aircraft industry continued to produce single-seater and two-seater variants of the Me 262 after WWII. These were kept flying as late as 1957. Both versions are on display at the Prague Aero museum in Kbely.

In January, 2003, the American Me 262 Project (formerly known as Classic Fighter Industries, Inc.) successfully flight tested a near-exact reproduction of the Me 262 B-1c two-place variant, powered by GE J-85 engines. Flight testing of the first newly-manufactured Me 262 A-1c (single seat) variant was completed in August, 2005. The first of these machines was destined for private ownership in the southwestern United States, while the second is currently enroute (as of November 2005) to the Messerschmitt Foundation in Germany. Work continues on three remaining aircraft, which are in now various stages of completion.

Variants

Me 262A-1a circa 1944

- A-1a *Schwalbe* - production version *Jäger* (fighter) and *Jabo* (fighter bomber).
  - A-1a/U1 - single prototype with two additional guns in nose, for total of six.
  - A-1a/U2 - single prototype with additional avionics for all-weather operation.
  - A-1a/U3 - reconnaissance version modified in small numbers.
  - A-1a/U4 - two prototypes with a 50 mm tank cannon in nose.
- A-1b - as A-1a but powered with BMW 003 engines. Few if any built, two are known to have existed at experimental establishments-maximum speed of 497 mph {800 km/h).
- A-2a *Sturmvogel* - definitive blitzbomber version with only two guns.
  - A-2a/U1 - single prototype with advanced bombsight.
  - A-2a/U2 - two prototypes with glazed nose for accommodating a bombardier.
- A-3a - proposed ground attack version.
- A-4a - reconnaissance version.
- A-5a - definitive reconnaissance version used in small numbers at end of the war.
- B-1a - two-seat trainer.


Me 262A-1a

  - B-1a/U1 - small number of prototype night fighters adapted from trainers.
- B-2 - proposed night fighter version with stretched fuselage.
- C-1a - single prototype of rocket-boosted interceptor with Walter rocket in tail.
- C-2b - single prototype of rocket-boosted interceptor with BMW rockets mounted in engine nacelles.
- C-3a - single prototype of rocket-boosted interceptor with Walter rockets in belly pack.
- D-1 - proposed variant to carry Jagdfaust mortars.
- E-1 - proposed cannon-armed variant based on A-1a/U4.
- E-2 - proposed rocket-armed variant carrying 48 R4M rockets.

Japanese design patterned after the Me 262:

- Nakajima Kikka

Post-war variants:

- Avia S-92 - Czech built A-1a
- Avia CS-92 - Czech built B-1a

- A-1c - American privately built replica based on A-1a configuration

- B-1c - American privately built replica based on B-1a configuration
- A/B-1c - American privately built replica convertible between A-1a and B-1a configuration

See also

- List of World War II jet aircraft

Trivia

- The American hard rock band Blue Öyster Cult portrayed an Me 262 on the cover of their 1974 album *Secret Treaties*. The album also contains a song, *Me 262*, inspired by the real-life jet. The lyrics are written from the point of view of a Luftwaffe pilot on a bomber interception mission in April, 1945. The song is generally technically accurate, correctly identifying the aircraft's Junkers Jumo 004 engines, and describing how the pilot's Me 262 is armed with R4M air-to-air rockets, which were operational at that late stage in the war.