MESSERSCHMITT
Me 262

Development • Testing • Production

Willy Radinger & Walter Schick

$24.95

MESSERSCHMITT Me 262

Development Testing Production

Willy Radinger &
Walter Schick

This new book is certain to become a standard reference on this legendary aircraft. Emphasizing the technical development of the Me 262, one-time Willy Messerschmitt protégé Willy Radinger presents in detail the trials of the world's first operational jet fighter. Detailed text and illustrations show the development of the fighter, fighter/bomber, reconnaissance and night fighter versions from an insider's point-of-view.

Willy Radinger/Walther Schick

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Dust jacket artwork by Steve Ferguson, Colorado Springs, CO

PROFESSOR PRITZL

After the death of *Major* Walter Nowotny on November 8, 1944, and subsequent disbanding of *Kommando Nowotny, General der Jagdflieger* Adolf Galland desperately reorganized his war ravaged *Jagdgeschwadern* to insure that the entire jet fighter program would not be canceled in favor of Hitler's demand for the *Sturmvogel* bomber version of the Messerschmitt Me 262. The defunct *Kommando Nowotny* was quickly regrouped into the new JG 7, and Galland simultaneously directed Knight's Cross recipient *Major* Heinz "Pritzl" Bär to take command of III/EJG 2, the operational fighter training unit at Lechfeld airdrome just southwest of Munich. Bär's small *Gruppe*, rarely exceeding a dozen serviceable aircraft, would assume a greater combat role in the south as the larger JG 7 assumed a broader scope of missions in the north by month's end.

Experten Bär was a proven *Gruppen Kommandeur* on three different war fronts, and as one of the Air Ministry's principal test pilots, he quickly confirmed his skill as a jet pilot instructor. Leading by example in his "White 17", W.Nr.110956, "Professor Pritzl" took his wingmen on numerous sorties against the massive Allied bomber formations, and their swarming escorts which paraded across Bavaria. Throughout the brutal winter campaign of 1944-45, Bär beat the incredible odds to account for fourteen jet victories beyond his previous score of 204 kills in Bf 109 and Fw 190 aircraft.

By the end of March 1945, Bär had lost eight pilots to enemy action as well as his source of supplies and fuel. The *Gruppe* stood down and the survivors joined *General* Galland's newly arrived band of "outcasts" in the famous JV 44. They dispersed to the autobahn runways in the Bavarian forest and despite primitive operational conditions, Bär scored his last two aerial victories. Perhaps the foremost jet pilot in the Luftwaffe, Bär survived the war as the eighth highest scoring *Experten* with 220 victories, including 21 heavy bombers over the Western Front. Bär died in a civilian plane crash in 1957.

Translated from the German by David Johnston.

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Development • Testing • Production

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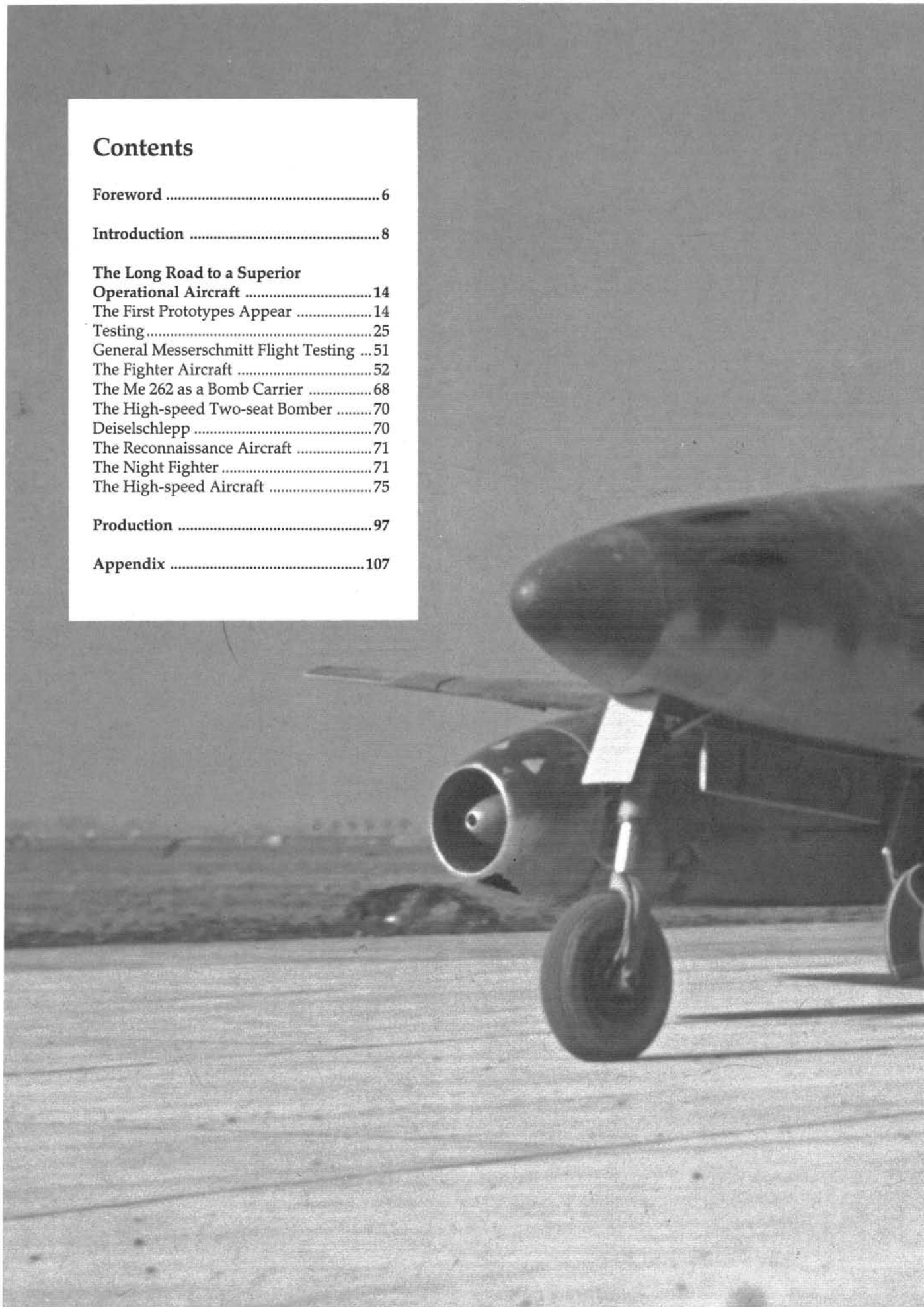


Foreword

Much has been written about the Me 262 at home and abroad in the portrayal of aviation history in general and in Germany in particular–sensible, less sensible and downright nonsensical.

It is often difficult, even for the experts, to distinguish between the true historical and technical facts and inaccurate assessments, tendentious wishful thinking or even pure fantasy.

While not making any claim to completeness, this documentation should help set several things straight and add some new facts.

It is not the intention of the authors to make a contribution to the so-called "jet fighter tragedy."

While assessing the available original documents the authors adopted as their own a point of view formulated by the Director of the DVL (German Aviation Research Institute), Professor Dr. Ing. Günther Bock, in March 1945:

"Testing of the aircraft extended through 1942/43; it was made all the more difficult by the fact that this was also the first broad-based flight testing of the jet engine, and therefore caused many of the teething problems of the jet engine to become apparent. Almost six years passed from the beginning of project work to the appearance of the aircraft at the front, due mainly to the fact that development of this novel power plant could not keep pace with development of the aircraft."

That just about says it all, for no decision by Germany's leaders could have had as paralyzing an effect on the construction, testing and delivery to the units of the jet fighter, as this fact.

In addition to a selection of extremely interesting, largely unpublished photographs and drawings, the photo section contains, for the first time, a series of color photographs depicting the testing of the Me 262. The text section makes it

clear that not only did this aircraft provide jet propulsion with its first broad usage, but it broke new ground in several other areas as well.

When the victors inherited the Me 262 program, a prize fell into their hands whose value cannot as yet be assessed.

The authors wish to express their thanks to the former members of the Messerschmitt flight test team, the acceptance and test pilots and their families, without whose friendly cooperation this photo album would not have been possible.

Our special thanks go out to Herr Wolfgang Degel, Herr Fritz Kaiser, Herr Peter Petrick, Herr Günther Sengfelder, Herr Hans Tilch, Frau Trude Wendel, Herr Manfred Jurleit, Herr Karl Lüttgau, Frau Vera Salzmann (formerly Lindner), and not least to Herr Theodor Mohr of Neuburg for his painstaking examination of the manuscript and for his valuable assistance in the illustration of this volume.

Introduction

On April 26, 1939, the Messerschmitt 209 V1 (D-INJR, WNr. 1185), piloted by Fritz Wendel, raced over the Augsburg-Buchloe line between Bobingen and Kleinaitingen, establishing a new world speed record with an average speed of 755.138 kph. It was clear to all involved that the limit of performance of the piston engine/propeller propulsion system was in sight.

At that point in time the same Messerschmitt firm had under development an aircraft whose propulsion system was based on a different principle and which promised a significant increase over the speed achieved on April 26. The aircraft, which bore the internal company designation P65 or P1065, would later become known the world over as the Me 262.

Today this aircraft holds a prominent place in the annals of aviation, which are certainly not short on celebrities, as the worlds first operational jet fighter aircraft. How did the Me 262 achieve this fame and what was behind it?

The idea of an air vehicle powered by a stream of heated gas is generally accepted as being older than the "heavier than air" aircraft. As early as 1863 Frenchman Jean Delouvrier (also Charles de Louvrié) of the Academy of Science in Paris proposed a jet propulsion system for aircraft which he dubbed the "Aeronave."

Following the introduction of the steam turbine in the 1880's by Patrick de Laval of Sweden, at the turn of the century the brothers Armengaud of France succeeded in building and running a gas turbine based on the Laval principle.

The German Hans Holzwarth, on the other hand, designed and built his gas turbine with valve-controlled combustion chambers based on the deflagration principle.

Both gas turbines, which were driven by liquid fuel, were designed for stationary operation only. There was still no question of using them to power an air vehicle. Meanwhile the piston engine was the method of propulsion of choice in aircraft construction. The main reason for this is the understandable preference of the pioneers for the proven and the higher degree of efficiency of the piston engine compared to other propulsion systems. This was to remain so until about 1935.

However the attempts to create a simple and light propulsion system were not abandoned after the first successful flights by the pioneers of aviation. And even in aviation's new "theoretical phase" one characteristic of the aircraft stood out among the others, one which would later play a decisive role in the development of the jet engine: speed.

As early as 1908 Caravodine of France was running a test device for a jet propulsion unit employing pulsed combustion (pulse jet). A year later fellow Frenchman Marconnet received a patent for a jet engine with an externally-driven compressor. Soon afterward he patented a unit with a valve in place of the compressor with subsequent combustion. In any case the work of these two Frenchmen was soon forgotten.

In 1910 Henri Coanda, a Romanian living in France, took a somewhat different path. He built an unbraced, plywood-covered aircraft with a shrouded propeller propulsion unit, which he called a "Turbo-Propulseur." This aircraft was shown in October 1910 at the Paris air show. An involuntary test flight with this machine on December 10, 1910 ended with an injured Coanda and a completely destroyed aircraft.

Coanda turned to other things, but his idea was later taken up by a fellow student, Gianni Caproni, and his partner Secondo Campini, who continued to develop the concept.

The result was the first Italian jet aircraft, the Caproni-Campini N1, which made its first flight on August 28, 1940. This rather clumsy aircraft was propelled by a three-stage compressor powered by a 900 H.P. piston engine. Fuel was mixed with the compressed air and ignited, afterburner-style, in a steel tube fitted with an adjustable nozzle. The Caproni-Campini propulsion system can only be characterized as an interim solution on the road to the pure turbojet, the basic principle of which Marconnet had formulated in his patent of 1909.

In 1944 the German jet pioneer Professor Eugen Sänger proposed a supplementary power plant of a similar design, in order to achieve a short-term increase in the performance of the Me 262.

Another Frenchman, August C.E. Rateau, took another step in the direction of the aircraft gas turbine: in 1916 he constructed a high-altitude supercharger for an aero-engine which consisted of a compressor powered by an exhaust gas turbine.

In this connection it is worth mentioning that the compressor of the Junkers Jumo 004 was based on studies and work on a turbo-supercharger for a piston engine.

Towards the end of the First World War Dr. Stanley Moss brought Rateau's development to production maturity in the United States. On June 19, 1918, atop Pike's Peak, a Liberty engine ran with an output of 366 H.P. instead of the normal 230 H.P. for that engine at that altitude. The reason: Dr. Moss' "Turbo-Supercharger."

This now widely-used system represented a further step and interim solution on the path to pure jet propulsion. The final breakthrough came in 1921. In France Maxime Guillaume applied for a patent for an engine which possessed all the features of a modern jet engine: a combustion chamber arranged between a multi-stage compressor and a multi-stage turbine. Compressed and heated air emerging from the combustion chamber drove the turbine. The patent makes no reference to a thrust nozzle, perhaps what Guillaume had in mind was a power plant which today would be known as a turboprop.

By that point in time all the alternatives to the piston engine, which have not been significantly expanded upon to this day, existed in France in theoretical form as patents:

- the turbo engine drawing oxygen from the air
- the ram-jet, and
- the intermittent propulsive duct with pulsed combustion

Since the potential of the piston engine was still a long way from being exhausted at that point in time, all of these clever ideas more or less dropped from sight at first.

In Germany, meanwhile, scientists were working on a fundamentally different type of jet propulsion: rocket propulsion. Based on the work of Max Valier, on June 11, 1928, Fritz Stamer successfully carried out the first flight by a manned rocket. The aircraft used, the "Ente" research machine designed by Alexander Lippisch, was powered by solid-fuel rockets built by pyrotechnist Sander.

Further tests with rocket-powered gliders followed, but in the end this mode of propulsion offered no real alternative to the piston engine and to this day remains limited to specialized applications.

At the beginning of the 1930's, as in the years before, development of the new propulsion system still lay in the hands of the often ridiculed individualists. The engine industry was busy with the production and development of the piston engine and obviously had no desire to invest time or money in things whose initial costs were high and whose success appeared more than questionable. Beyond that, to the engine builders this "thing" was technically unfathomable and thus little more than a "pipe dream."

The mid-1920s found A. A. Griffith of Britain's Royal Aircraft Establishment (RAE) working on the idea of jet propulsion. However it was a British flying officer who applied for a patent on such a propulsion system in 1930. Patent No. 347206 gave Frank Whittle the rights to a system with an axial compressor, a subsequent radial stage, combustion chamber, axial turbine and a circular arrangement of thrust nozzles.

Meanwhile, in Europe, numerous patents had been issued concerning the "generation of propulsion in an air vehicle."

At first the Whittle patent, too, had little effect. The British and later the German patent offices were obviously unaware of the earlier French patents.

Finally, in the mid-1930's, when the limit of the propeller's potential became more apparent, there was movement in the firmly mired situation. In Rome the Alessandro Volta Foundation held a congress titled "Le alte velocita in aviatione," which lasted from September 30 to October 6, 1935. This so-called "Volta Congress" was the first international conference of technical experts to explore the possibility of a supersonic aircraft. Professor Adolph Busemann presented his swept wing as a means of reducing drag at high speeds. It was clear to every scientist at the convention that the goal of supersonic flight could not be reached with the piston engine.

Almost immediately afterward, on November 10, 1935, a young doctor at Göttingen University, Hans Joachim Pabst von Ohain, received the German secret patent 317/38 for a jet engine which he had developed while a student. The year 1936 saw promising developments in various locales:

– In April 1936 aircraft manufacturer Ernst Heinkel hired Hans von Ohain and provided him with everything necessary to carry on his work.

– In Great Britain the company Power Jets Ltd. was founded; the sole purpose of the undertaking was the construction of an aircraft gas turbine based on the ideas of Frank Whittle.

– At the Magdeburg branch office (MZM) of the Junkers Motorenwerke AG Dessau, Professor Herbert Wagner outlined his ideas for a jet engine to a small, select group. Due to internal conflicts and the complicated design of the axial power plant, this program fell somewhat behind the previous two.

– The BMW GmbH in Munich and its Spandau development works also became involved in the designing of jet engines; however, success was slow in coming and no positive results were achieved until near the end of the war.

1937 was the year of the breakthrough. In mid-March von Ohain and his co-workers successfully test-ran his model He S2, which was still powered by hydrogen. Heinkel pressed for progress. His declared objective was a research aircraft designed expressly for jet propulsion.

Frank Whittle carried out the first test run of his design on April 12, 1937. The third pioneering group were citizens of the nation where much of the theoretical groundwork had been laid: Sensaud de Lavaud and Brunet achieved a thrust of 100 kg from their small unit. France was prevented from successfully exploiting this initial success by the outbreak of war.

Little went on in the other nations with aviation industries in 1937. An exception was the Soviet Union, where A. M. Lyulka was working on the design of an axial power plant. The work was broken off in 1941 and the first Soviet-built jet engine did not reach the test stand until August 1945.

By early 1939, when Fritz Wendel carried out his record-breaking flight in the Me 209 V1, Ernst Heinkel had completed construction of his research aircraft, which had meanwhile been designated the He 178 by the RLM, and the jet engine which had been designed to power it, the He S 3B.

In Great Britain, meanwhile, Frank Whittle was struggling with combustion problems, and in France the Société Rateau and René Auxionnaz were planning a high-speed aircraft powered by a jet engine.

August 27, 1939 was a day destined to go down in aviation history: at about five o'clock on this Sunday morning the world's first jet aircraft, the Heinkel He 178, took off on its maiden flight from the factory airfield at Rostock-Marienehe with Erich Warsitz at the controls.

This success was important and necessary, but the switch for the development of a jet-powered fighter aircraft had been thrown by the *Reichsluftfahrtministerium* months before. On January 4, 1939, Dept. GL/C-E2 of the *Technische Amt* published its "Provisional Guidelines for Jet Aircraft," which demanded a speed of 900 kph and comprehensive armament and equipment for the fighter and interceptor roles.

In the meantime Ernst Heinkel's great rival Willy Messerschmitt had received a development contract for a jet-powered pursuit fighter. Messerschmitt was to have frustration enough with the new-style power plants, but he wasn't handicapped by having to develop a new airframe and a propulsion system simultaneously. He concentrated his work almost exclusively on an operational aircraft, taking into consideration all military and production technical aspects, and in the end he won the race against Ernst Heinkel's He 280 in spite of the latter's head start.

Messerschmitt's Me 262 was superior to the He 280 in the areas of speed, ceiling, range, and armament. Moreover the double tail unit of the He 280 was susceptible to dangerous oscillations at speeds in the 800 kph range. The elimination of this extremely troublesome characteristic would have required a considerable expenditure in time and money, namely the designing of a new, central fin and rudder assembly.

Thus it was the Me 262 which became the first jet fighter to go into quantity production and enter operational service. Thanks to its outstanding design concept, the Me 262 was able to demonstrate the superior performance potential of the new propulsion technology and thus help achieve a breakthrough for jet aviation, which was still in its infancy. A decisive factor in its success, in addition to the aircraft's great speed range and its powerful and flexible armament, was its ability to serve as a test-bed for a multiplicity of operational roles. Illustrating the versatility of the Me 262 is one of the objects of this photo album.

The Me 262 was put through an extensive technical and flight test program at a time of great dislocation, which is surely without parallel in aviation history. Finally, following a period of front-line testing, which introduced some novel tactical and strategic concepts, the aircraft was committed to a variety of combat roles against a numerically far superior enemy. Beyond that, the first jet pilots in aviation history trained on the Me 262, and in the Me 262 B-1a Messerschmitt created the world's first jet trainer.

The Me 262 exhibited a series of advanced and noteworthy features in addition to its propulsion system, most of which became standard features of every post-war jet fighter:

- A pressurized cockpit
- It was planned to equip the prototypes with a Messerschmitt-designed ejector seat, however this was installed only in the V1. It was planned to carry out extensive testing of the seat using the Me 309.
- Brakeable nosewheel to cope with high landing speeds.
- Extensive use of steel in construction, for example wing spar flanges of wedge-shaped, rolled steel plates. (For comparison Bf 109: 0.96 tons light metal per 1 ton of aircraft weight, Me 262: 0.55 tons light metal per 1 ton of aircraft weight.)
- Versatile and powerful armament, for example large-caliber automatic cannon, long-range air-to-air rockets, some with automatic homing guidance, and air-dropped weapons, some of which were released by an on-board computer.
- Extensive electronic equipment such as search radar for the night fighter version, navigational equipment, and so on.
- Outstanding aerodynamics with a nearly optimal fuselage shape, a leading-edge slat over virtually the entire wingspan, a symmetrical, relatively thin wing profile, and not least a wing sweep-back of 18.5 degrees.
- Overall concept capable of further development.

While hostilities continued the Me 262 was a prized piece of war booty among the Allied forces.

On March 18, 1945, Soviet armored forces found an almost undamaged Me 262 A-1a at Kolberg-Bodenhagen airfield.

This was the first example of the secrecy-shrouded "Turbo" to fall into the hands of the Allies.

Not two weeks later, on March 30, 1945, a Messerschmitt test pilot "ferried" *Werknummer* 111711 from Schwäbisch Hall to Frankfurt's Rhein-Main airfield, which had already been occupied by the Allies.

It was not long before France and Great Britain also obtained examples of this the most modern operational aircraft of the Second World War.

The victorious powers tested the German jet fighter, extensively in some cases, and analyzed the aircraft in detail, so as to draw the proper conclusions for their own programs. The Me 262's main influence was of a military-tactical nature. The appearance of the superior German fighter was reflected primarily in the specifications which the air force commands of the respective nations directed to their aviation industries.

Only Czechoslovakia continued to build the Me 262 after the war; Avia constructed twelve aircraft in the years 1946 to 1949. These aircraft were flown briefly by the Czechoslovak Air Force as the single-seat S-92 *Turbina* and the two-seat CS-92, before being replaced by Soviet designs.

Direct reference to the German concept in the development of a foreign jet fighter is recognizable only in Japan's Nakajima J8N1 "Kikka" (first flight 1945), and in two Soviet designs, the Sukhoi Su-9 and Su-11 (first flight 1947).

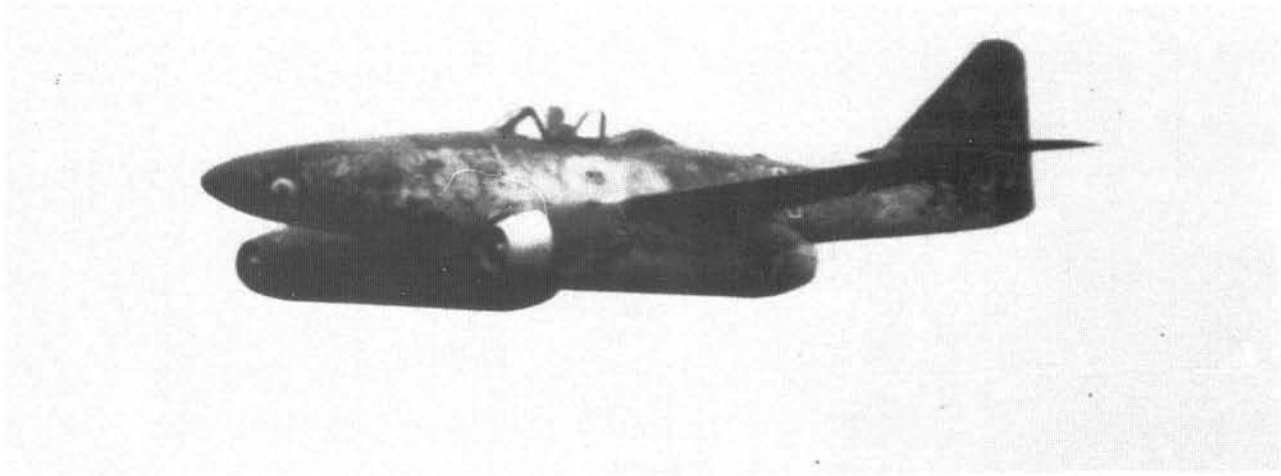
The fact that there was no large-scale copying of the Me 262 is due to two fundamental reasons:

- By 1945 the basic concept of the Me 262 had been overtaken for the design of high-speed fighter aircraft. The blame for this lay with the Germans themselves, especially the Messerschmitt project engineers: in July 1944 the RLM drafted a competition for a single-engined jet fighter to replace the Me 262 in 1945/46.

One conspicuous feature of all the projected designs was the use of aerodynamics based on the latest scientific findings, expressed primarily in the use of swept-back or delta wings.

- After the end of the war American and British jet engines reached such a level of reliability and performance that a twin-engined layout was necessary only for multi-seat light bombers, night fighters, and so on.

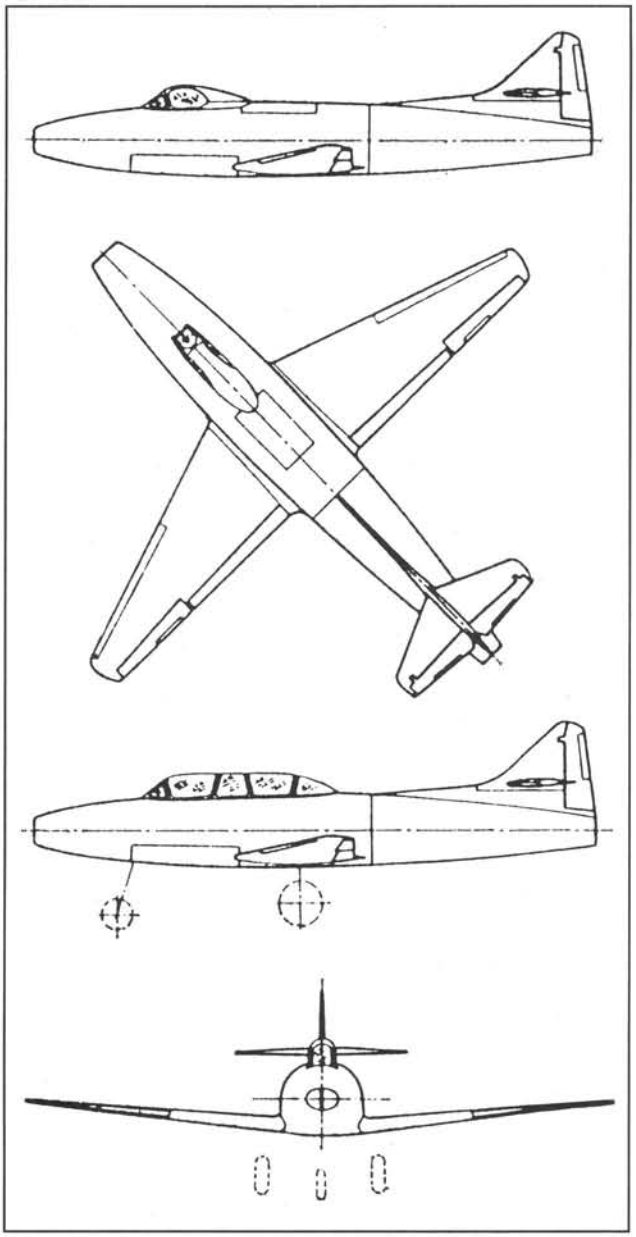
Professor Messerschmitt allowed for this development in the P 1099 and P 1100 proposals which sprung from the Me 262 and likewise recommended this path to the RLM with these projects.



A much sought after prize among the Allied nations:
– large numbers were captured by the Americans
– several examples fell into British hands
– evaluated by the French
– and finally also by the Soviets

After the war the Me 262 A-1a was produced in Czechoslovakia as the Avia S-92.

Influenced by the concept of the Me 262: the Soviet Sukhoi Su-9 frontal fighter. Powered by two RD 10 engines (Soviet copies of the Jumo 004 B), first flight July 1946.



The L-52 single-engined fighter developed from the S-92; conceived in 1947 it progressed no further than the drawing board.

Power plant: one Rolls Royce Nene producing 2,270 kg of thrust, maximum speed: 920 kph, takeoff weight: 5,670 kg.

The Long Road to a Superior Operational Aircraft

The First Prototypes Appear

1937
Messerschmitt receives the first information about the new "turbine air-jet" (TL) propulsion system.

Early autumn 1938
The RLM convenes a secret meeting with representatives of the aero-engine and airframe industries to provide them with a thorough briefing on the state of development of the new propulsion system. It is declared that the Messerschmitt and BMW firms are to form a "South-German Development Focal Point."

October 1938
Messerschmitt instructs his Project Bureau (headed by Dipl. Ing. Robert Lusser) to determine whether to give preference to single- or twin-jet designs. This results in the first studies for a single-engined aircraft. Power plant arrangement is similar to that later found in the Saab J-29 and the de Havilland "Vampire."

Late 1938
Messerschmitt AG receives a formal development contract from the RLM's Department GL/C-E 2/I (*Fliegerstabs-Ing.* Hans Antz) for a pursuit fighter with jet propulsion. At this time Ernst Heinkel Flugzeugbau is testing the He S 3a engine in an He 118. Work is already under way in Heinkel's workshops on the aircraft which this engine is to power, the He 178.

1938/39
Dr. Kurt Löhner and Dr. Müller Berner of the BMW GmbH in Munich work on the development of the F 9225 TL engine.

In September 1939, following the takeover of the Brandenburgischen Motorenwerke GmbH (Bramo) in Berlin-Spandau by BMW, all jet engine development is concentrated there. Directing the effort is Dr. Hermann Oestrich, who has been involved with jet propulsion since 1928.

In early 1939 Bramo had received a development contract for a jet engine with 600 kg of thrust and a maximum diameter of 600 mm.

January 4, 1939
The RLM issues a specification to the aviation industry titled: "Provisional Technical Guidelines for High-speed Fighter Aircraft with Jet Engines."

The specification contains a demand for a maximum speed of 900 kph for a high-speed fighter.

Early 1939
BMW begins development of the P 3302 jet engine at its Berlin-Spandau facility.

April 1, 1939
In Augsburg Haunstetten the leading figures of Messerschmitt's Project Bureau begin work on Design P65, from which will later emerge the Me 262.

Participating in the design work are: Willy Messerschmitt, Woldemar Voigt (who on this date officially takes over direction of the Project Bureau following Lusser's departure to join Heinkel), Wolfgang Degel, Karl Althoff, and the aerodynamicists Walter Eisenmann and Riclef Schomerus.

June 7, 1939
Messerschmitt AG presents the first P 1065 project proposal to the RLM.

Description:

Pursuit Fighter
Power plants: 2 X BMW TL devices with 2 X 600 kp rated thrust
Wingspan: 9.40 m
Height: 2.80 m
Length: 8.30 m
Wing area: 18.00 m2

Performance:
Landing speed at landing weight: 130 kph
Landing speed at max. weight: 164 kph
Takeoff run to 20 m with 100% thrust: 800 m
Max. speed at 3,000 m with 100% thrust: 840 kph
Max. speed at 3,000 m with 130% thrust: 950 kph
Landing weight with ammunition and fuel: 3,196 kg

Maximum flying weight: 4,321 kg
Fuel capacity equivalent to 1 hr. flight time
Takeoff with: 130% thrust
Climb: 100% thrust
5 min. combat: 130% thrust
55 min. flight time: 85% thrust

Armament 1 MG 151/20 200 rounds
1 MG 151/15 400 rounds

Equipment
FuG 18 with homing device
Night lighting – pressurized cockpit

Although the advantages of the tricycle undercarriage were known, primarily as a result of work by Professor W. Kamm of the Research Institute for Motor Transport and Aero Engines at TH Stuttgart, the project team selected a conventional wide-track undercarriage arrangement. The reason for this lay not in the rejection of what was seen an "American invention," rather in the space demands and greater weight of the nosewheel.

The decisive drawback of a tailwheel for a jet-powered aircraft was demonstrated on the Me 262's very first takeoff. Therefore, from the fifth prototype on, all Me 262's were equipped with a tricycle undercarriage.

Messerschmitt and his team were able to take their time developing this first proposal; the power plants were far from being mature enough to permit their installation in the aircraft; even worse, over the course of time they became heavier although their rated thrust dropped.

September 1939
Design work begins on the P1065; a month later the first design drawings are delivered.

Headquarters of the Messerschmitt AG in Augsburg-Haunstetten on the southern edge of the city on the road to Landsberg/Lech.

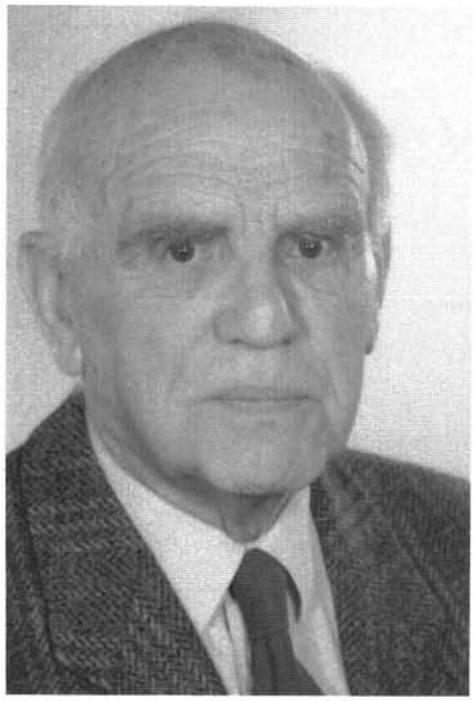
View to the west from the headquarters building; on the right side of the photo is the building wing which housed the project, design and production bureaus. Visible at the top of the photo behind the long barracks is the hangar in which the mock-ups were constructed.

The building behind the hangar housed the company's own wind tunnel. Right next to the large, light-colored building is the office building for experimental flight testing; the attached aircraft hangar, which until April 1943 housed Department "L" (Lippisch) can scarcely be seen.

The room in which many decisions were made: the conference room belonging to Professor Messerschmitt's bureau.

The namesake, general director, principal stockholder and technical director of operations: Professor and Honorary Doctor Willy Messerschmitt, seen here with a co-worker (Engineer Wedekind) in front of the experimental flight test hangar. Just visible behind Messerschmitt is the Bf 163 D-IUCY, a competitor of the Fi 156 "Storch."

Prof. Messerschmitt studied each new aircraft project in detail. Here he is seen in a "drawing board discussion" with the director of the design bureau, Walter Rethel, who came to Messerschmitt from Arado.



Dipl. Ing. Woldemar Voigt, director of the project bureau from April 1939, when design work on the P 1065 officially began.

Dipl. Ing. Wolfgang Degel played an influential role in the design of the Me 262. As well he was in charge of Me 262 development until the end of the war and was deputy to the project director. Degel is still active in aviation today.

Multi-talented Dipl. Ing. Riclef Schomerus played a leading role in the development of the aerodynamic concept of the Me 262 and was director of the Aerodynamics and Flight Mechanics Department. Messerschmitt employees Schomerus and von Chlingensperg lost their lives on February 9, 1945 while on their way to Japan, when the transport submarine U864 was torpedoed by the British submarine "Venturer" off Bergen. In addition to the German specialists, the Type IX D2 U-Boat was supposed to transport drawings and hard to obtain or difficult to manufacture components of the Me 163 and Me 262 to Germany's ally in the Far East.

Autumn 1939
Design work begins on the Jumo 004 jet engine, under the direction of Dr. Anselm Franz.

November 9, 1939
The RLM receives the improved P 1065 project proposal II from Messerschmitt AG.

November 16, 1939
Flight testing of the BMW P 3302 is supposed to begin using a Bf 110 test-bed; however, difficulties arise and the tests do not commence until summer 1941.

December 1, 1939
Conference in the Air Ministry with representatives of the Messerschmitt and BMW companies and the *E-Stelle* (Luftwaffe Test Station Rechlin) concerning the installation of the BMW engines in the P 1065. Also under discussion is another jet engine which BMW intends to develop with inventor Ing. Hellmut Weinrich under the project number 3304.

This project will be dropped in 1942 however, on account of work overload at BMW and excessive production difficulties (counter-rotating axial compressor).

Other topics of discussion are the mounting of the engines, the fuel system and control systems.

December 19, 1939
First inspection of the P 1065 visual and cockpit mock-ups by representatives of the RLM. No fundamental objections or concerns are expressed.

January 18, 1940
Discussions with *E-Stelle Rechlin* and the Aeronautical Institute at TH Stuttgart concerning the installation of a braking parachute, which is considered necessary to shorten the jet fighter's landing roll.

Two FIST stream-type parachutes are ordered.

January 19, 1940
Mock-up construction makes progress: Messerschmitt presents the cockpit mock-up, followed toward the end of the month by the full-scale mock-up. In the course of the inspection representatives of the RLM's Technical Office and the *E-Stelle Rechlin* suggest increased armor protection.

January 31, 1940
Preliminary Decision LC 2 No. 467/40 (IIIc) Secret; the RLM issues a contract for 20 P 1065 trials aircraft.

February 1, 1940
Discussions with *E-Stelle Rechlin* over tankage and radio systems; the first 20 trials aircraft are to receive the FuG 17 and FuG 20.

March 1, 1940
The RLM decides to equip the first 20 trials aircraft with the BMW P 3302 jet engine.

At the same time the P 1065's equipment fit is established: pressurized cockpit without pressure-tight canopy, ejection seat, air brakes (dive brakes), braking chute, protected fuel tanks.

March 21, 1940
Changes are made to the P 1065 design: a report by Woldemar Voight shows the aircraft with an almost triangular fuselage cross-section, a hinged fuselage nose as weapons compartment for 3 MK 108 cannon, and swept-back outer wings to compensate for the shift in the center of gravity produced by the heavy jet engines. (Moving the wing would have resulted in time-consuming, expensive design changes). The arrangement of the engines in the wings is unchanged.

Overall measurements now: Wingspan 12.35 m
Length 10.46 m

These measurements approximate the wingspan and length of the first prototypes (design specification No. 3 P 1065).

March 29, 1940
Further discussions with *E-Stelle Rechlin* concerning changes in equipment.

April 12, 1940
Together with BMW, Messerschmitt establishes the power plant instrumentation for the Bf 110 test-bed and the P 1065 V1.

Early 1940
Junkers concludes design work on the Jumo 004 A.

May 15, 1940
Messerschmitt presents Project Proposal II to the RLM. The aircraft it describes is identical to the design presented in Woldemar Voigt's report of March 21, 1940.

May 30, 1940
E-Stelle Rechlin and Messerschmitt agree upon the layout of the armament electrics.

June/July 1940
Wind tunnel measurements of various engine arrangements above and beneath the wings.

In spite of this uncertainty concerning the engine layout, work has been under way in Messerschmitt's experimental shops since January 1940 on construction of assembly jigs and individual components for the P 1065 V1 and V2. (Source: interrogation F.W. Seiler, June 17, 1945).

August 1940
Construction of individual components for P 1065 V3 to V5 begins.

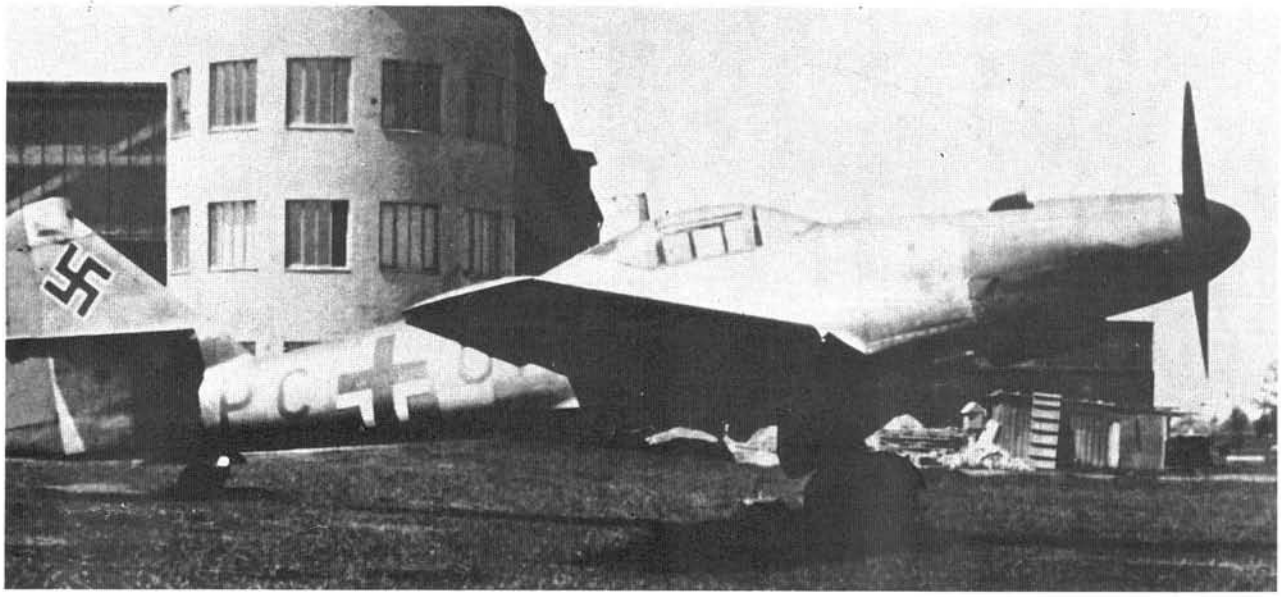
October 11, 1940
First test bench run of a Jumo 004 (so-called "T1" jet engine) in Dessau.

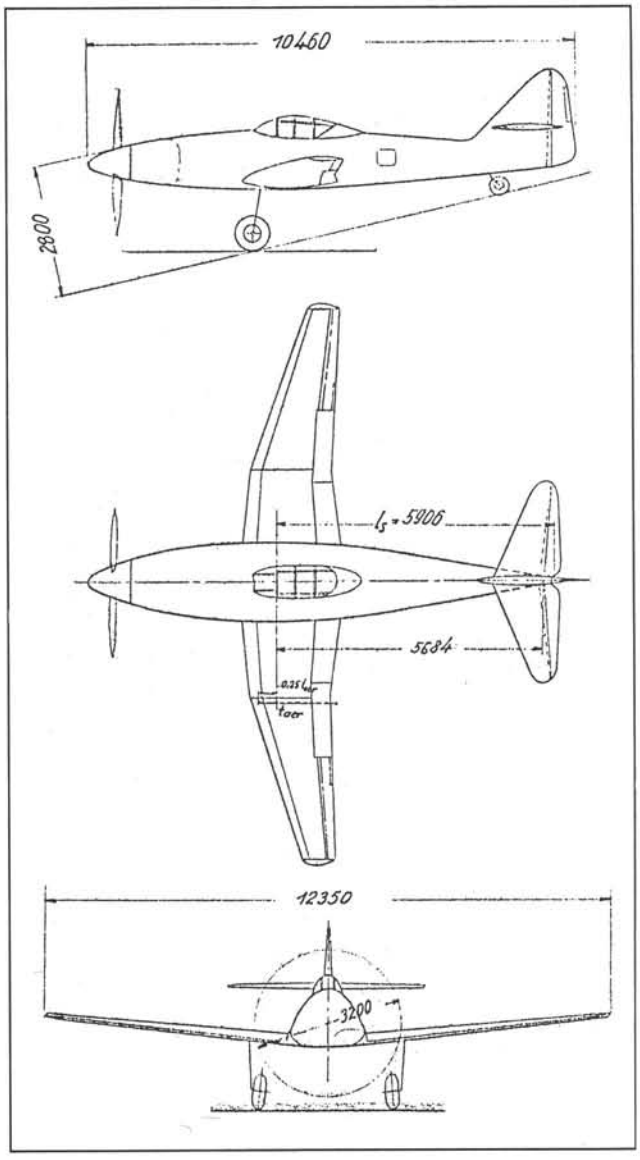
November 1, 1940
Project Proposal III; forms the basis for the construction of the first trials aircraft.

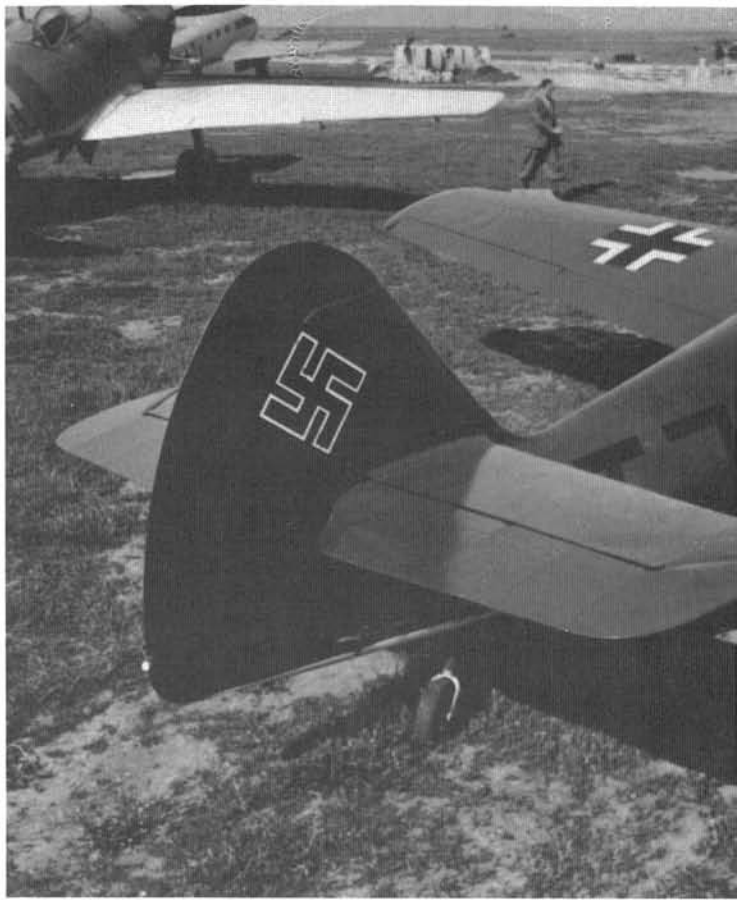
The power plants are now located beneath the wing, simplifying the design of the main spar and ensuring ease of maintenance, which is desirable during testing and for later operational use as well.

All of these deviations from his original drag-minimizing concept are not received with outright joy by Professor Messerschmitt; in the end he reluctantly agrees.

December 19, 1940
Messerschmitt receives Delivery Plan No. 18, Issue 3, dated November 1, 1940. In addition to the 20 Me 262 trials aircraft







The Me 262 V1 (PC+UA) with Jumo 210 G in front of the experimental flight test building.

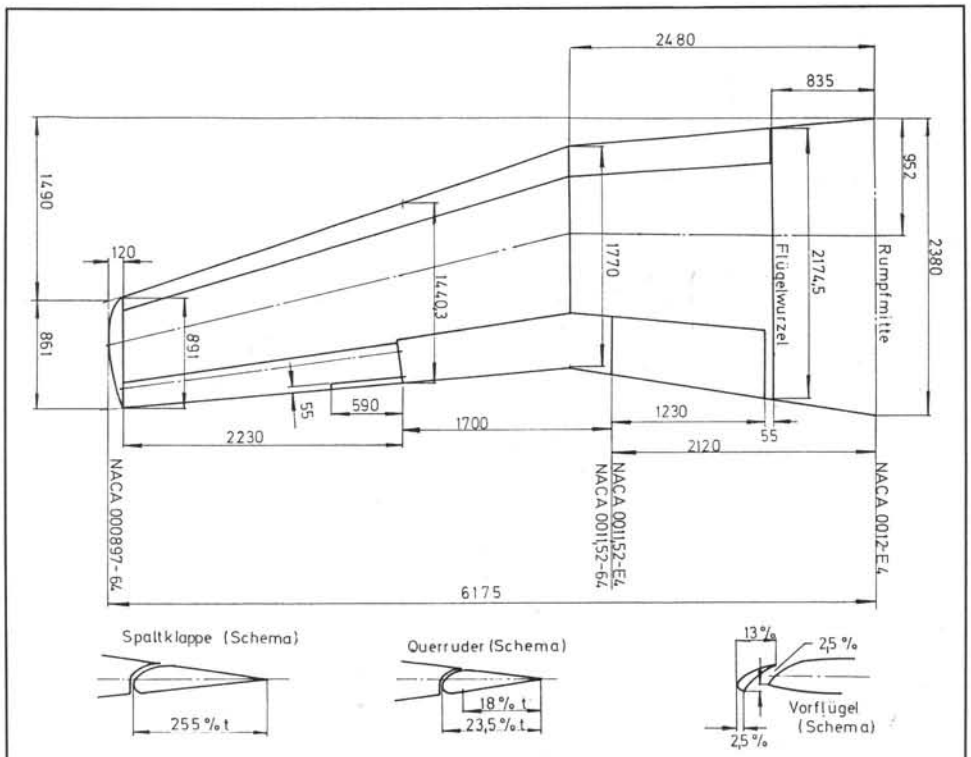
The Me 262 V1 on the Messerschmitt factory airfield. In the background is the company's Caudron C.445.

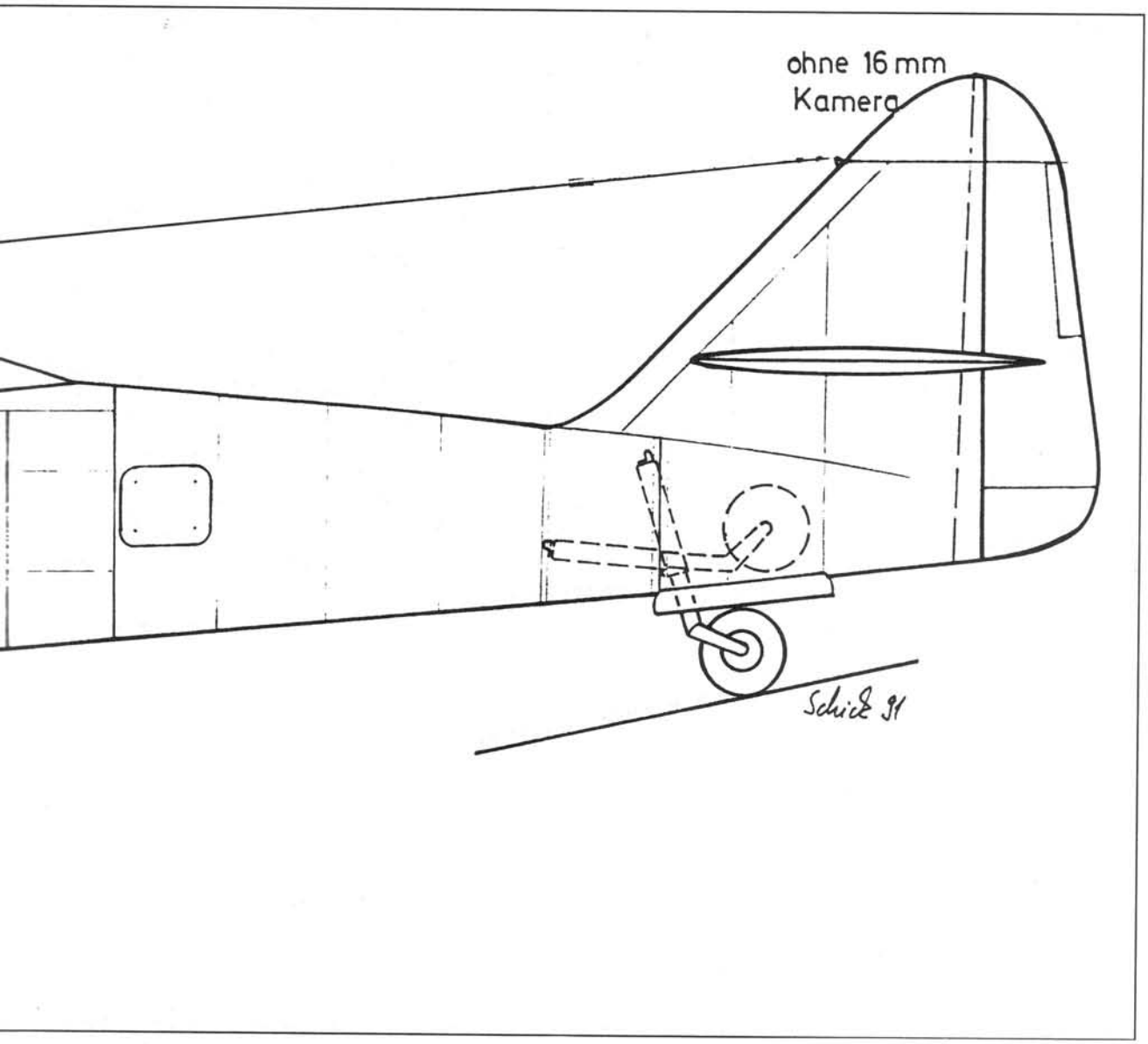
This three-view drawing of the Me 262 V1 with Jumo 210 G from April 10, 1941 provides a rather crude impression of the aircraft.

Reconstructed side-view drawing of the Me 262 V1 (PC+UA, WNr. 262 00 001) with Jumo 210 G, WNr. 42012, and two-bladed VDM Type 9-110 propeller. Take-off weight 3,100 - 3,170 kg.

Scale drawing of the wing of the first prototypes (V1-V4). It still differs significantly from the later production wing. (From drawing of V1 wing, 19. 7. 1941.)

General arrangement drawings of the main undercarriage and tailwheel arrangement of the first four prototypes (V1-V4).

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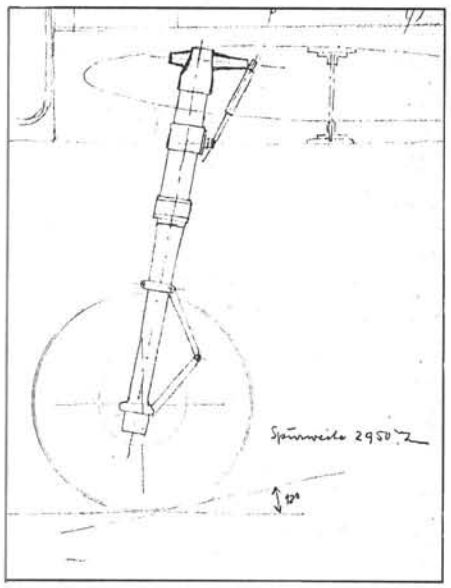
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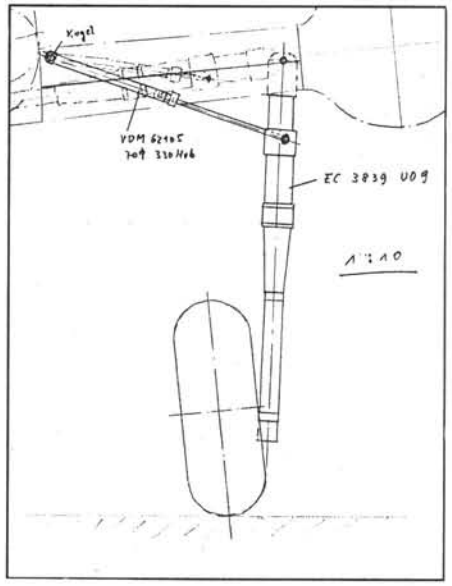
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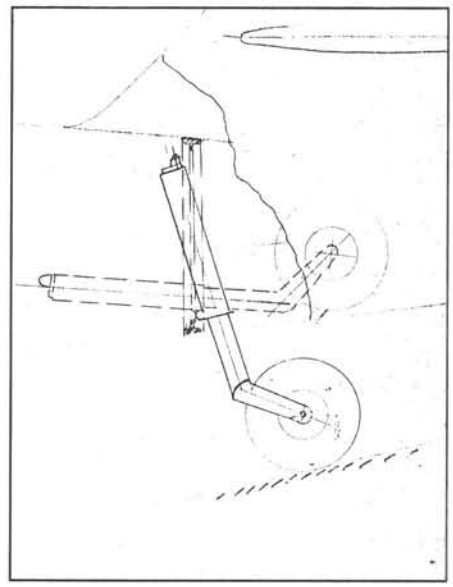
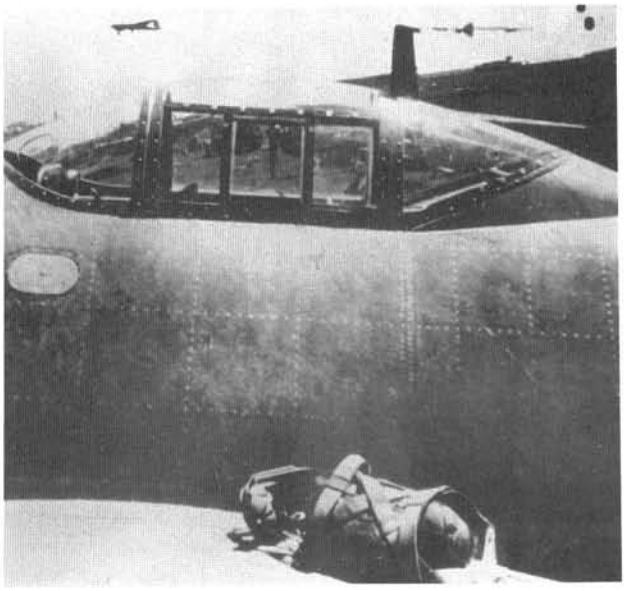
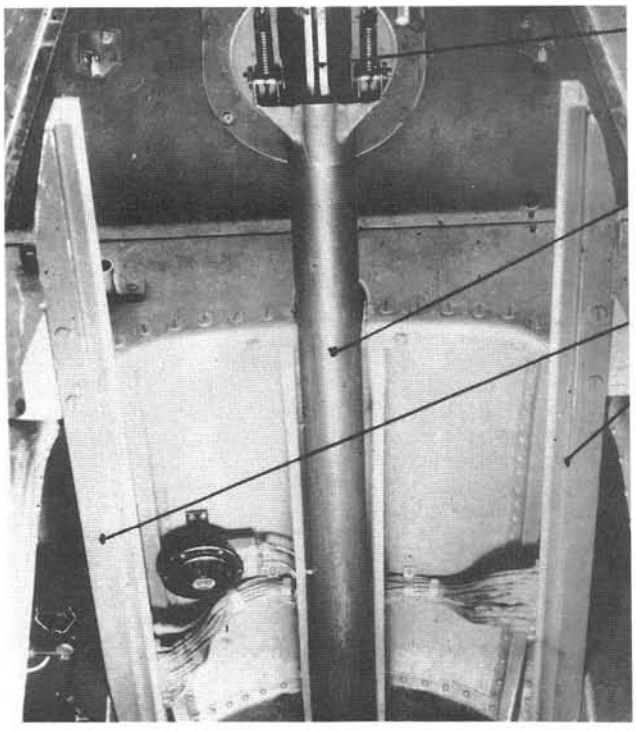
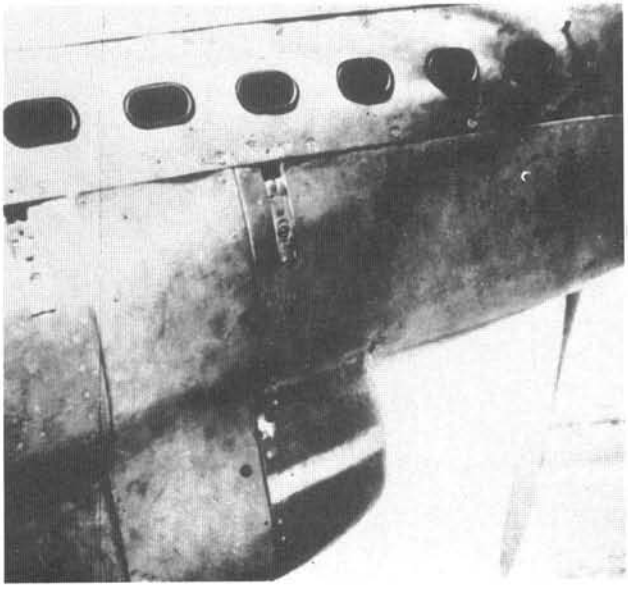
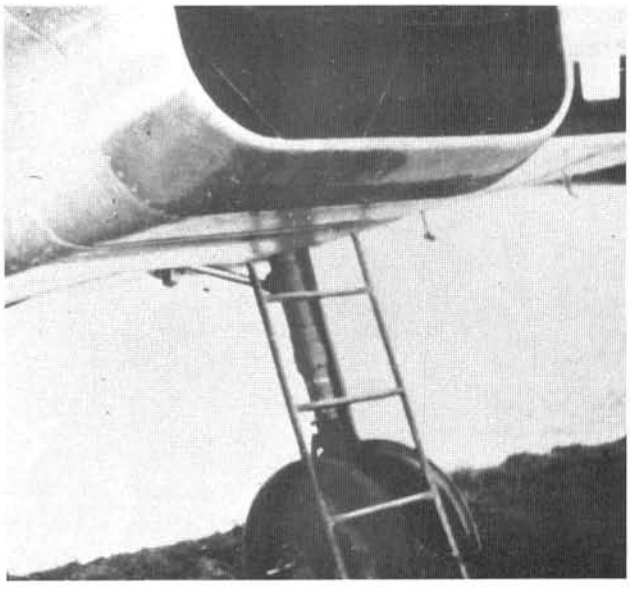
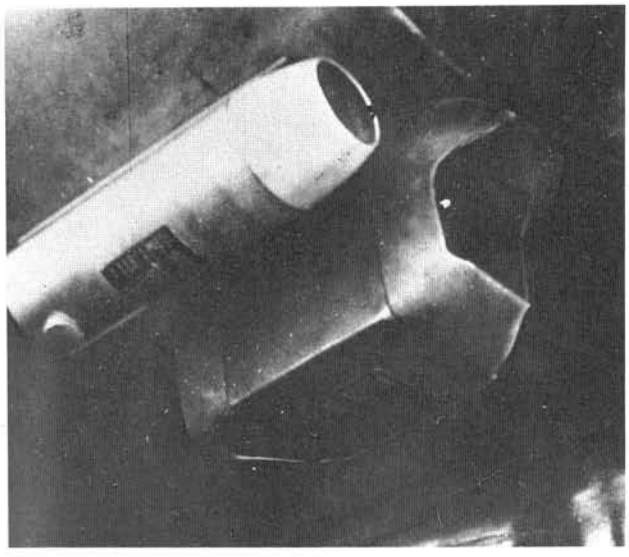












The Me 262 V1 with Jumo 210 G in detail:

Top Left

Cockpit canopy; this was designed to allow for pressurization at a later date.

Top Right

Ejection seat installation. In the center is the compressed air cylinder with piston rod, which ejected the seat; left and right are light metal guide rails. Note that the seat has been removed.

Compressed air with a pressure of 120 atm was necessary to operate the ejection seat. This was contained in three bottles. As well as the Me 262 V1, the Me 210 V14 was used to test the functioning of the seat.

Center Left

Ejector exhausts of the Jumo 210 G, beneath them the radiator bath.

Center Right

Radiator and main undercarriage leg.

Bottom

The Jumo 210 G's oil cooler.

it calls for a pre-production series of 15 machines.

February 1941
Messerschmitt Project P 1065 receives the type designation Me 262 from the RLM.

March 30, 1941
First flight of the twin-jet He 280 V2 with Dipl.Ing. Schäfer at the controls. Power plants two He S 8a engines each producing 720 kg of thrust.

April 8, 1941
It is decided that the Me 262 V1 will begin high-speed testing with Walter rocket engines (2 X 750 kg thrust). The idea comes to nothing as the Walter engines are not yet available either.

April 18, 1941
Since the jet power plants will not be available until July, the Me 262 V1 makes its first flight powered by a Jumo 210 G piston engine which has been installed temporarily in the nose of the aircraft. The flight takes place after sundown at Augsburg. At the controls is Fritz Wendel, who subsequently does a large part of the testing of the propeller-driven Me 262. The 730 H.P. Jumo 210 G limits the aircraft's flight performance enormously, and as a result test pilots Fritz Wendel, Karl Baur and Lukas Schmid are limited to exploring the Me 262's handling characteristics in the lower speed range. No performance measurement is carried out.

May 15, 1941
In Great Britain the Gloster E.28/39 takes off on its maiden flight in the hands of test pilot G. Sayer. The first Allied jet aircraft is powered by a Whittle W.1 centrifugal-flow jet engine (similar to the Heinkel engine).

July 1, 1941
The Me 262 V2 is 70% complete; the fuselage of the Me 262 V3 has been built, the wings are still being assembled.

July 11, 1941
Udet inquires about the state of development of the He 280. He wishes to have the aircraft soon as an interceptor. Heinkel is unable to give a definitive answer to the question of when the He S 8A engines will be ready for front-line use.

Summer 1941
Junkers begins redesigning the Jumo 004 A into the largely "rationed materials free" model 004 B. The design and dimensions of the new engine remain the same, however other, readily available materials are used in its construction.

July 25, 1941
The RLM directs Messerschmitt to now build five prototypes and 20 pre-production aircraft.

August 4, 1941
Rechlin test pilots Beauvais and Bader fly the piston-engined Me 262 V1. Their findings: improvement is required in the aircraft's low-speed flight characteristics.

August 6, 1941
The Junkers engine reaches the required 600 kg of thrust on the test bench.

September 26, 1941
The RLM calls for a high-speed reconnaissance aircraft, namely the Me 262 with photo equipment and increased range but without armament. Power plants: 2 Junkers TL engines.

Autumn 1941
Because of the continuing difficulties with the jet power plants Messerschmitt once again considers equipping the "Ten sixty-five" with Walter rocket engines or Schmidt-Argus pulse jets. The RLM rejects the idea.

October 21, 1941
Messerschmitt hands over the description for the Me 262 reconnaissance aircraft to the RLM.

November 25, 1941
Contract issued for the construction of a cockpit mock-up of the reconnaissance version.

December 24, 1941
The Jumo 004 completes a ten-hour run. In early 1942 the engine achieves a short-term thrust of 1,000 kg.

February 1, 1942
Modification work for installation of the special power plants in the Me 262 V1 is under way. Construction of the Me 262 V2 and V3 airframes is complete, however delivery of the special power plants is uncertain. The fuselages of prototypes V4 and V5 are in the final assembly stage.

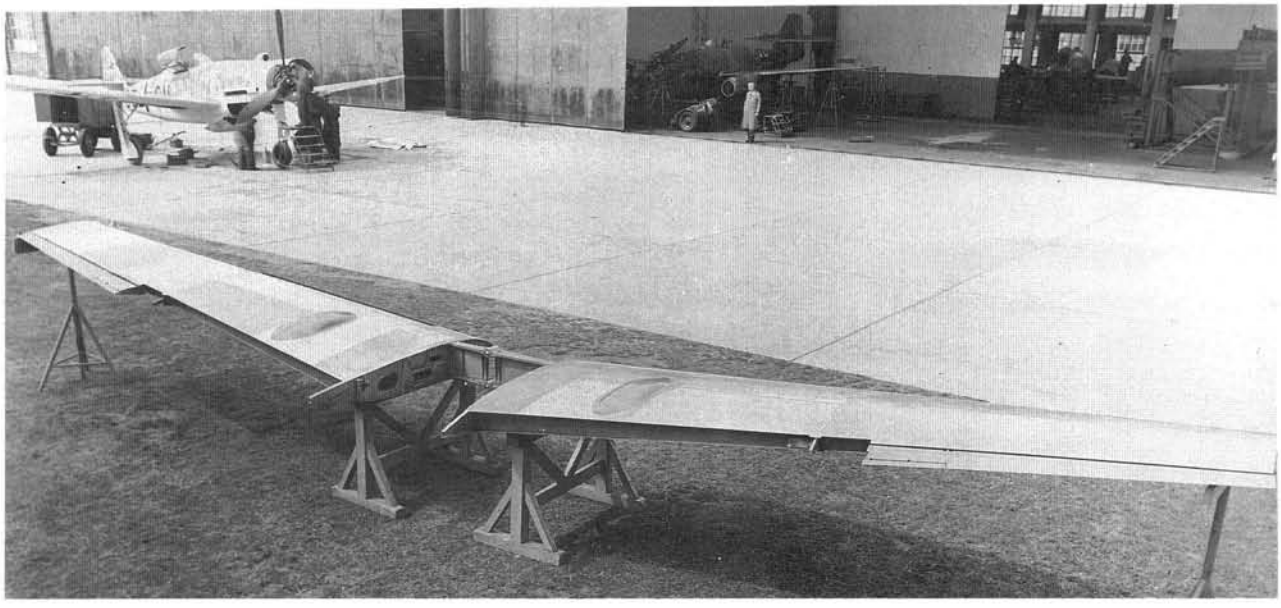
February 5 and March 6, 1942
Inspection of the Me 262 reconnaissance version mock-up. One aircraft from the pre-production series is to be modified to reconnaissance aircraft standard.

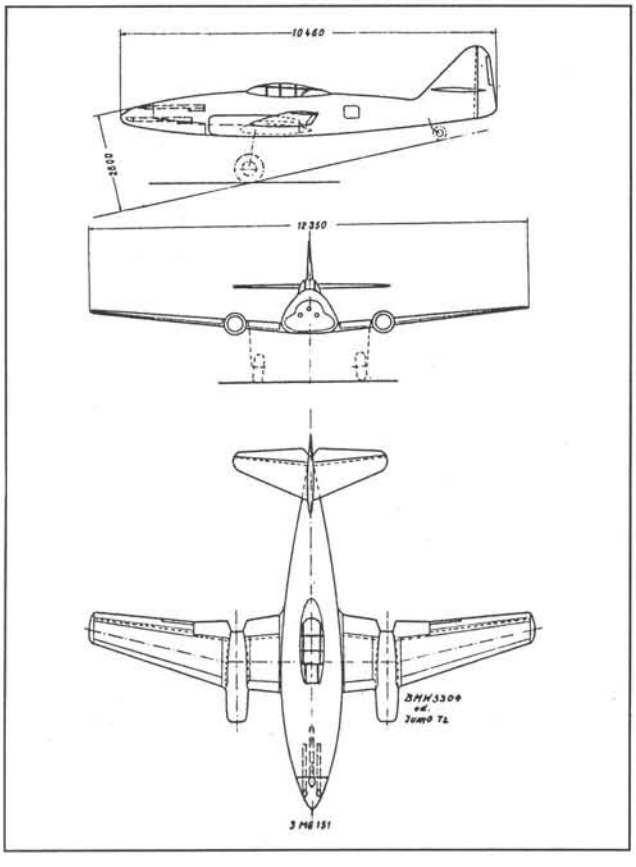
Early March 1942
BMW delivers the P 3302 jet engine.

March 25, 1942
Fritz Wendel takes off on the first flight of the Me 262 V1 with two BMW P 3302 jet engines. The Jumo 210 G piston engine has been retained as a precaution. According to Fritz Wendel's log book the time of the takeoff is 19 hours 29 minutes, or long past nightfall. Both jet engines fail immediately after takeoff. Thanks to the piston engine Wendel is able to land the heavy machine safely. The undercarriage sustains minor damage while landing.

March 26, 1942
A further inspection of the reconnaissance version mock-up. Requests for various changes make necessary the rebuilding of the mock-up. A decision on construction of the reconnaissance version is to be made following successful engine testing.

May 29, 1942
The failure of March 25, 1942 causes the RLM to initially limit the Me 262 program to the construction of prototypes V1-V5. The decision on construction of the rest of the aircraft covered by the contract is not to be made until after successful engine tests.





An interesting scene, only parts of which are usually published, from the summer of 1942 in front of the experimental shops at Augsburg-Haunstetten:

The Messerschmitt V1, with two BMW P3302 jet engines and one Jumo 210 G piston engine, sits behind the hangar door on jacks with minor undercarriage damage (as a result of an accident suffered on its maiden flight on April 18, 1941).

Inside the hangar, barely discernable, is an Me 209 prototype (?) on the assembly line. On the left of the photograph is the Me 309 V1 (first flight July 18, 1942).

In the foreground, sitting on supports, is the wing of the Me 309 V4. The photographer, who was concentrating on the wing of the Me 309 V4, changed locations and "caught" the second Me 262 prototype (PC+UB, WNr. 262 00 002), which was structurally complete and just waiting for the arrival of the jet engines.

RLM aircraft type sheet from January 1, 1942; this sketch anticipates the use of either BMW 3304 or Jumo TL-power plants.

Early July 1942
Junkers delivers Jumo 004A prototype engines V9 and V10 to Messerschmitt.

July 18, 1942
The first flight of an Me 262 on pure jet power takes place at Leipheim airfield, located beside the Augsburg-Ulm autobahn. Fritz Wendel lifts the Me 262 V3 (PC+UC) off the runway at 0840. Twelve minutes after the rather problematic takeoff from Leipheim's concrete runway, which is somewhat longer than Augsburg's, Wendel lands after a completely trouble-free flight.

Soon after the flight pilot Wendel stated: "My jet engines ran like clockwork. It was a pure pleasure to fly this new machine. In fact rarely have I been so enthusiastic about a first flight with a new aircraft as I was with the Me 262."

This was the type of success Messerschmitt needed at that point. His reputation with the RLM had already suffered as a result of the events surrounding the Me 210, and it was obvious that this maiden flight did not receive the attention it deserved from the official side on account of this.

Now that the basic design had flown successfully, Messerschmitt and his team could tackle another piece of hard work: they had to take the Me 262 from being a handmade prototype, flown by selected pilots, to a series-produced fighter, fully capable of being flown by average pilots in day to day, front-line operational use.

Testing

From the new design's first flights to its initial service introduction.

The first stage in the testing of a new aircraft design, especially one with a new mode of propulsion, is carried out by the builder, and is primarily concerned with:

- the general impression of the aircraft's flying qualities
- good handling (harmonization of flight controls)
- exploration of the aircraft's stability characteristics
- testing of individual, new components
- creation of the first written documents for the operation of the aircraft

Subsequent testing, which usually involves additional prototypes, is primarily concerned with:

- the elimination of weak points (involves the working-in of ongoing changes and improvements)
- the establishment of performance limits
- the effect of attachments and modifications (external loads, two-seat version, etc.)
- the creation of handbooks and other technical documents
- eventual, practical realization of an expanded range of roles, and preliminary testing for future development. (Armament!)

Finally, during unit and operational testing, trials are concerned with:

- thorough evaluation of the aircraft in its designed role
- demonstration of possible new operational uses
- establishment of production aircraft equipment standard for the future operational aircraft.

At the same time operational, strategic, and tactical concepts are worked out which, together with the experience already gained and the technical state achieved by the aircraft, should enable an average air force pilot to successfully operate the new type.

It is obvious that the individual areas of testing just described must overlap and interact, and that such an undertaking requires careful planning and coordination.

Although there is much in the development history of the Me 262 which appears absurd, wasteful or obstructive, one cannot measure the process using a normal scale. The facts cannot be overlooked that those responsible for the project were, for the most part, treading new ground militarily and technically, and, what was even more aggravating, that the military and economic situation of the German Reich was becoming ever more desperate in 1944/45. As well they had to deal with a supreme command which was exhibiting clear signs of a serious loss of reality.

The first prototypes (V1-V10) used in the company's test program came from the Messerschmitt AG's experimental shops at Augsburg-Haunstetten.

Some aircraft from the pre-production series (S1-S22) also played a role in factory testing, while the others went to the Luftwaffe *E-Stelle* at Rechlin and to Lager-Lechfeld for operational testing (*Erprobungs-kommando* 262).

Following the loss of several aircraft, in the autumn of 1944 a decision was made to modify a number of production machines for trials and testing duties at Lechfeld and at the Luftwaffe's *E-Stellen*.

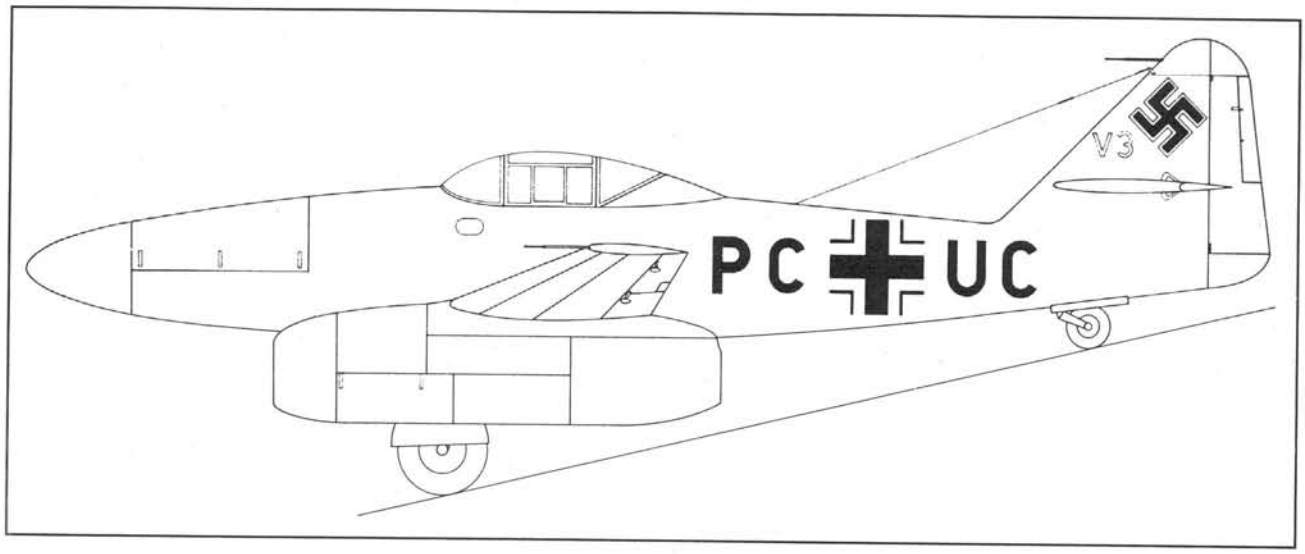
At first the aircraft made available to Messerschmitt for factory testing retained the *Werknummern* of the machines which had been lost, WNr. 130 015 - V1, 170 056 - V2, and 170 303 - V7, for example. Later some very high prototype (V) numbers appeared on these trials machines, which were derived from the last three digits of the aircraft's *Werknummer*. Thus 170 056 became V 056, or 170 303 became V 303. Among the trials aircraft in this series were V 074, V 083, V 167, V 186 and V 555 and so on.

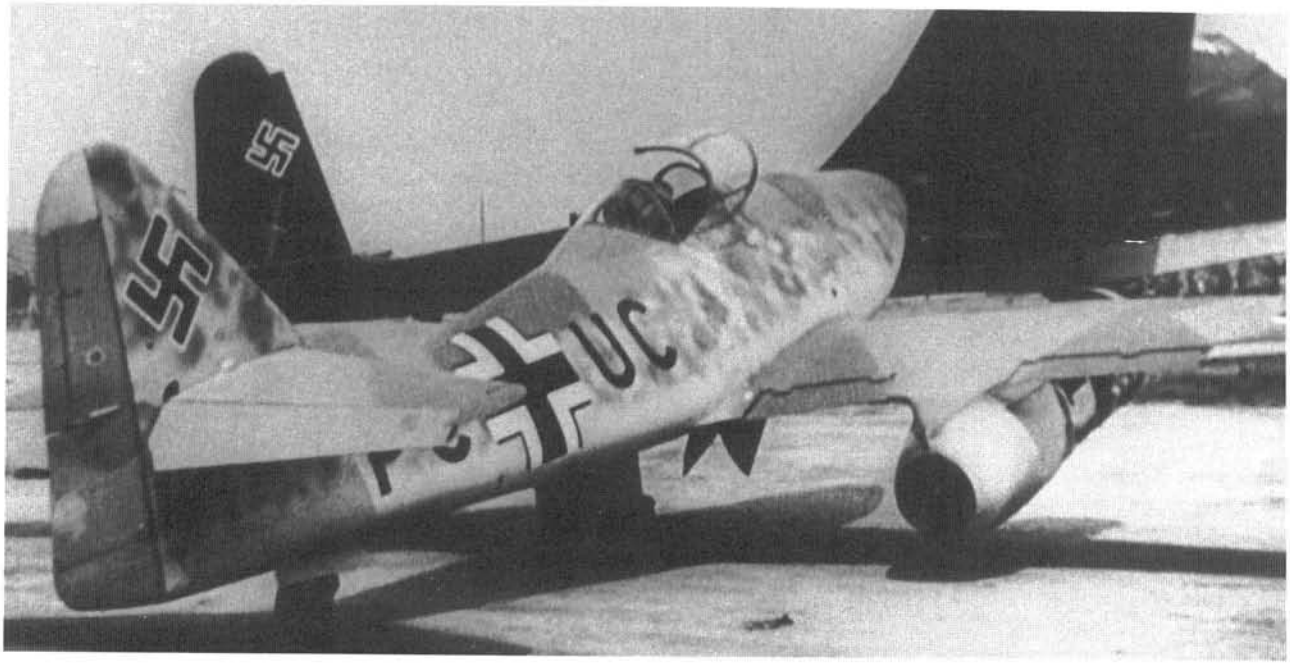
Aircraft assigned to Luftwaffe test detachments (*Erprobungs-Kommandos*) received no special *Werknummern*, instead they were marked with the usual *Stammkennzeichen* with alphanumeric coding.

Factory testing of the Me 262 began with the flights of the piston-engined V1 at Augsburg-Haunstetten. Testing continued at Leipheim, and during the course of 1943 it was transferred almost exclusively to Lager Lechfeld, located about 20 kilometers south of Augsburg.

Lager Lechfeld and Leipheim were both so-called "Silver Bases." This designation referred to airfields which were set up to handle Me 262 flight operations. (The official codename for the Me 262 was "Silber" or "Sturmvogel"). The "Silver bases" had concrete runways, stocks of special airframe and engine replacement parts, trained ground personnel, and refuelling facilities with J2 fuel.

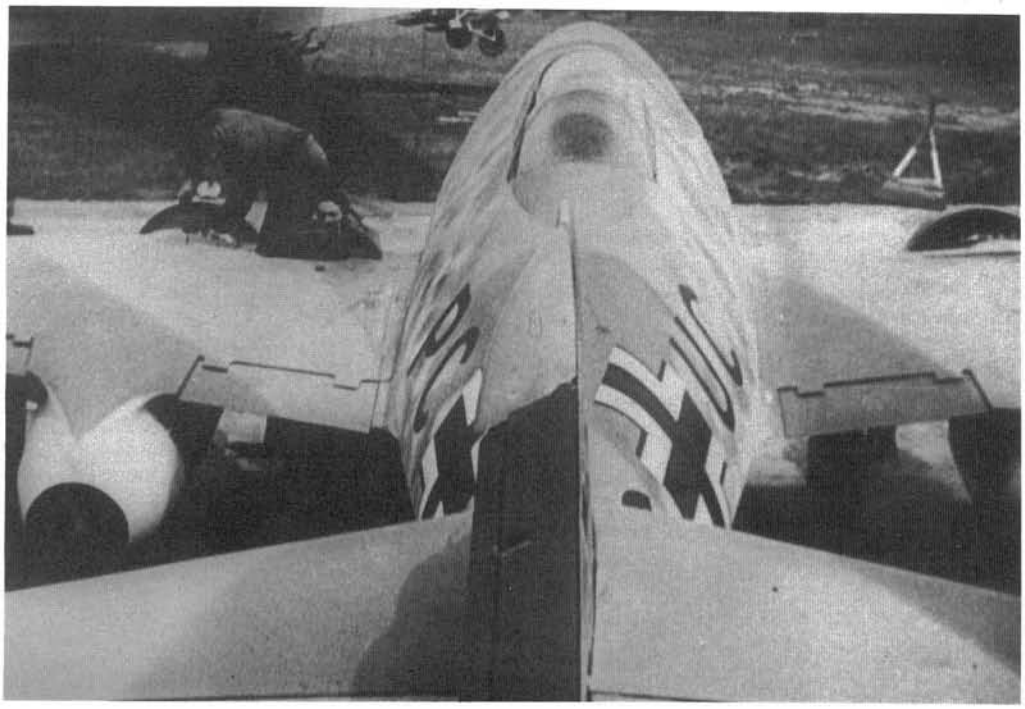
In addition to testing in operational units, most of which also began at Lager Lechfeld and in part remained there, another early jet test center was the Luftwaffe test station (*E-Stelle*) at Rechlin-Lärz.



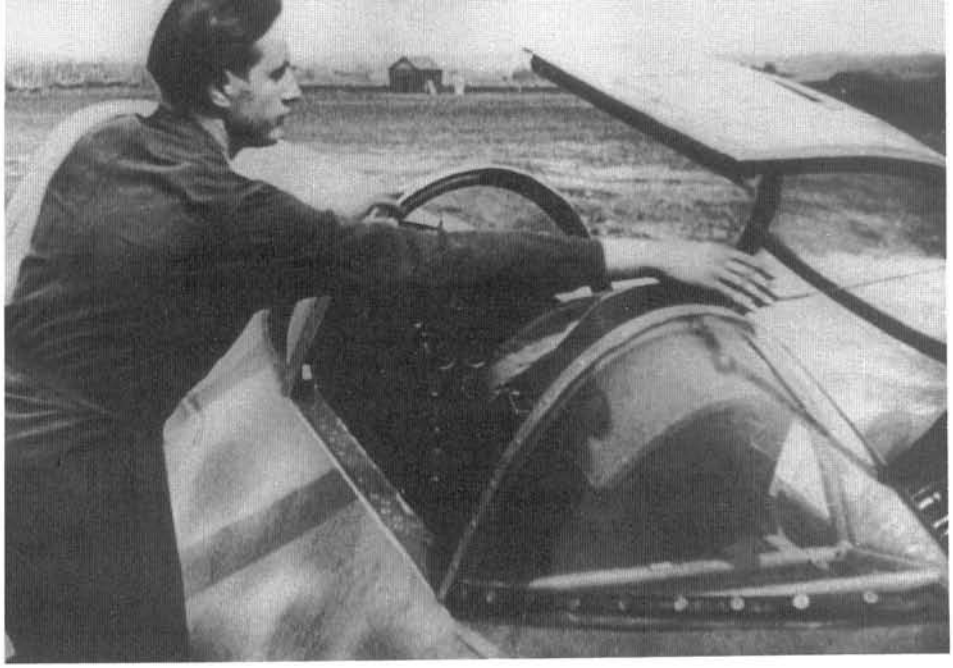


Side-view drawing of the Me 262 V3 (PC+UC, WNr. 262 00 003). This aircraft was powered by two Junkers 109-004 A (Tl) engines. Drawing by Th. Mohr.

The Me 262 V3 at Leipheim air base, which was situated near Ulm, right beside the Stuttgart-Munich autobahn. In the background is an Me 321 "Gigant."



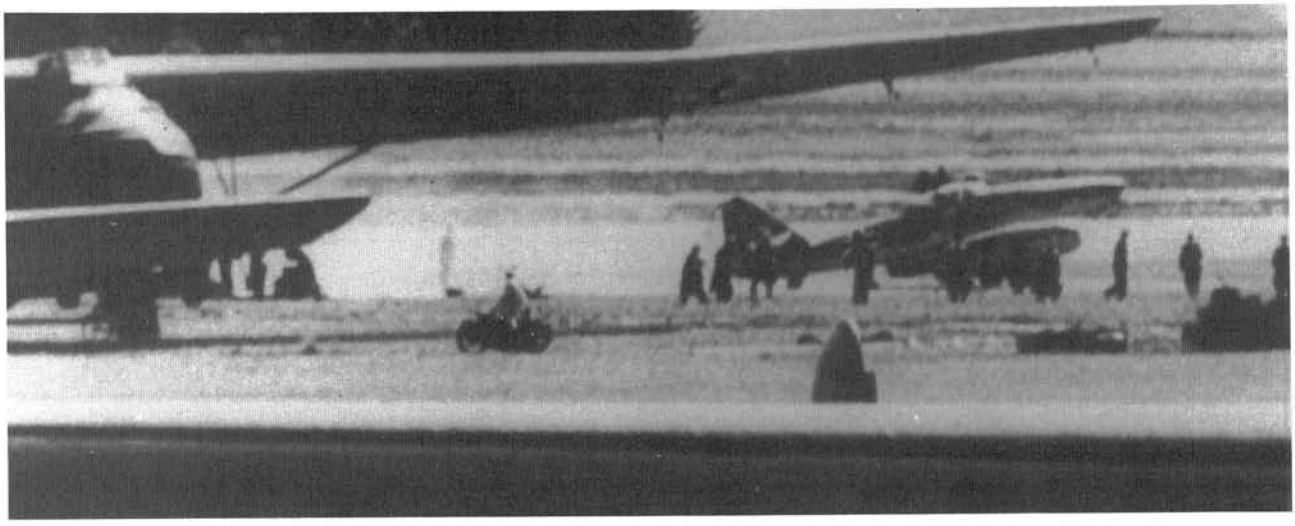
Mechanics check the radical new engines just before takeoff. The bend in the wing leading edge in the area of the engines, which was present on the early prototypes, is clearly visible.



The sideways-folding cockpit canopy, typical for a Messerschmitt-designed aircraft. This canopy differed significantly from the later production version.

Last eye contact with Fritz Wendel before the first flight; the wheel chocks have already been pulled away and the pilot is increasing the revolutions of the engines.

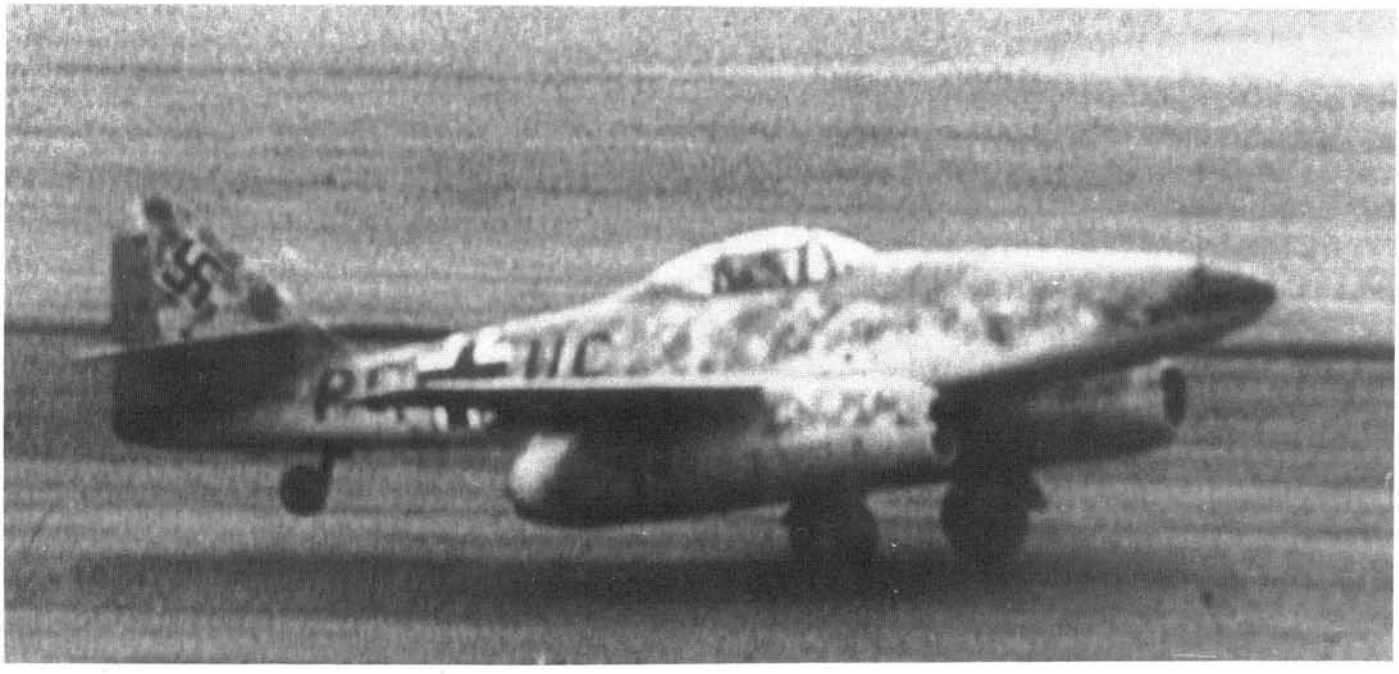
The engines have reached the desired speed of nearly 9,000 rpm. Fritz Wendel cautiously releases the brakes and sets the landing flaps at 20 degrees . . .



. . . and the V3 accelerates down Leipheim's concrete runway.

Immediately after the decisive moment: at about 180 kph Fritz Wendel has lifted the aircraft's tail by braking lightly and thus placed the tail surfaces in the area of the laminar air flow.

The Me 262 V3 lifts off into "its" element on pure jet power for the first time and climbs away.



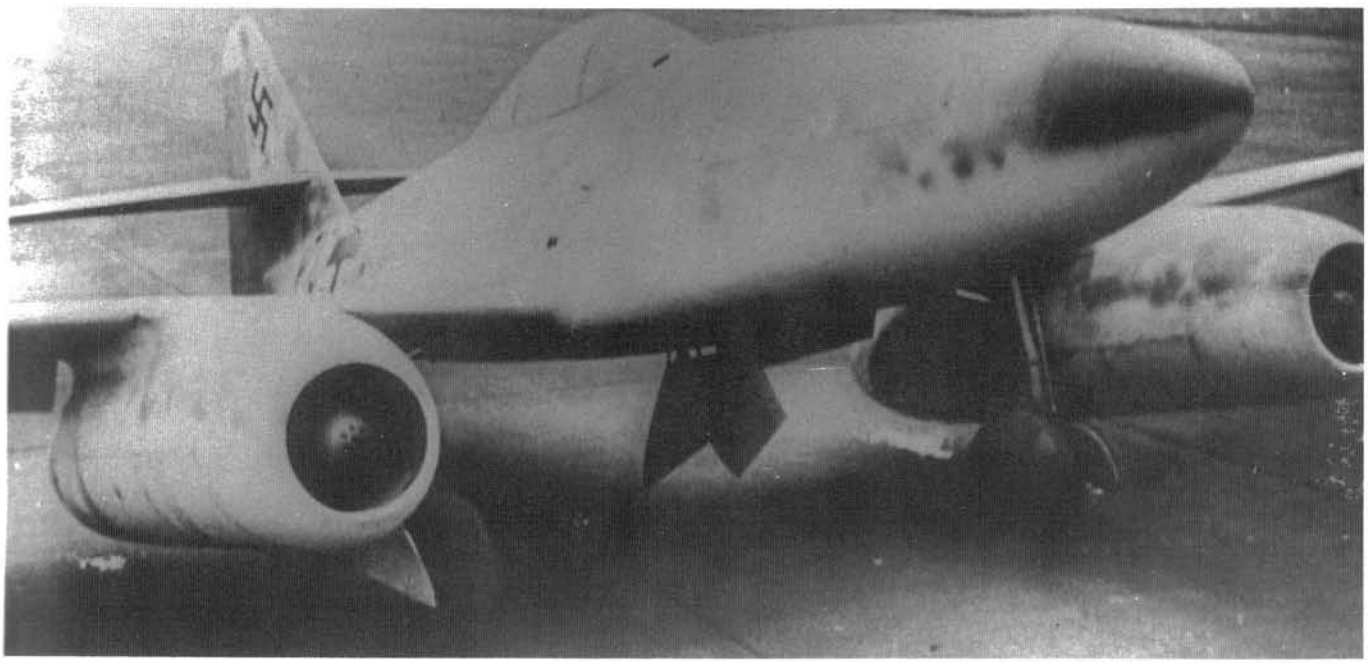
Lfd. Nr. des Flugens	Zulassungs-Nr. des Flugzeugs	Führer	Fluggast	Zweck des Fluges	Abflug Ort	Abflug Tag	Abflug Uhrzeit	Landung Ort	Landung Tag	Landung Uhrzeit	geflog. Zeit h	geflog. Zeit min	Auftrag Auftrag-gabe	Auftrag Auftrag-Nr.	Bemerkungen
a	b	c	d	e	f	g	h	i	k	l	m	n	Gruben	Nr.	Bem. q
5888	CF+CY	Wendel	Kalinowski	Start Raffe	Rl	9/7	1547	Rl	9/7	1510		23	210	2345	
2	GF+CR	"	Caroli	Höhenflug	"	13/7	0957	"	13/7	1031		34	"	2321	
3	"	"	Borgs	Werkflug	"	"	1433	Leipheim	"	1441		8	"	"	16 km
4	GF+CY	"	Kalinowski	Start Raffe	"	14/7	918	"	14/7	950		34	"	2345	
5	PN+PJ	"	Borgs	Bauerflug	"	15/7	1530	"	15/7	1610	1	10	"	105	
6	PR+BE	"	-	Stoppflug	"	16/7	713	Rl	16/7	813		60	109	6637	
7	CE+BM	"	Fischer	Me P 6	"	"	1547	"	"	1614		19	"	1952	
8	PG+UC	"	-	Einflugen	Leipheim	18/7	840	Leipheim	18/7	852		12	262	43	
9	"	"	-	"	"	"	1205	"	"	1218		13	"	"	
90	GF+CY	"	Kalinowski	Start Raffe	Rl	22/7	1105	Rl	22/7	1140		35	210	2345	
1	TJ+ER	"	/	Überland	-	25/7	1522	Leipheim	25/7	1531		9	109	12611	50
2	"	"	/	"	Leipheim	"	1745	Rl	"	1757		12	"	"	50
3	"	"	/	Sparverfahren	"	"	1719	Leipheim	"	1722		3	"	"	
4	"	"	/	auf Platzrunden	"	"	1724	"	"	1729		5	"	"	

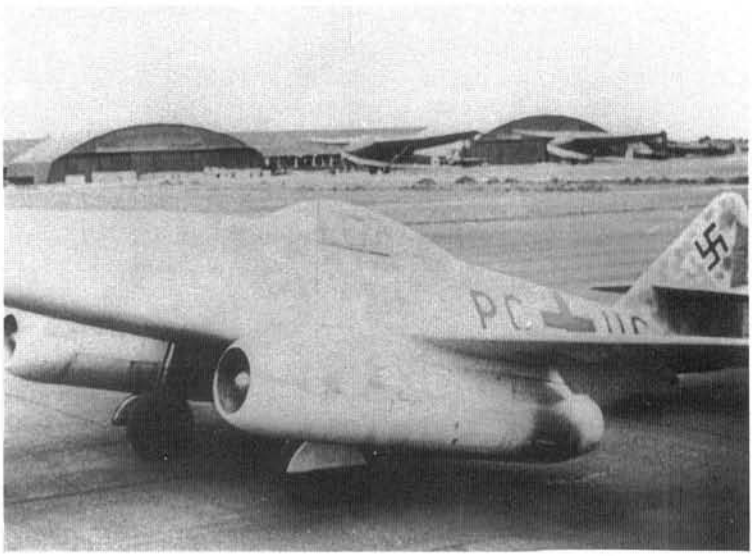
Entry of the first flight in Fritz Wendel's log book under No. 5888; beneath it is the second flight.

Aircraft construction as an art form: "A masterpiece of sculpture in metal."

The fully extended landing flaps are clearly visible.

Photo session following the successful first flight: the company photographer takes top-secret portraits of the "miracle bird."





Setbacks and advances: Summer 1942 – Summer 1944

Summer 1942
Testing of the Me 262 (still known within the Messerschmitt organization as the "Ten Sixty-five") continues at Augsburg and Leipheim using the piston-engine-powered V1 (PC+UA) and the jet-powered V3 (PC+UC).

The BMW engines are still not suitable for installation and in their P 3302 form never will be. Following redesign the power plant receives the designation BMW 109-003. In this form it proves to be a successful design and is installed in several Me 262s for test purposes.

August 11, 1942
Rechlin test pilot Dipl. Ing. Heinrich Beauvais crashes on takeoff in the Me 262 V3. It is his seventh flight in the Me 262. As a result the V3 is lost to the test program for months. Cause of the crash is probably the high air temperatures on this day, which prevent the engines from developing full thrust.

August 12, 1942
In discussions involving the RLM, *E-Stelle Rechlin* and Messerschmitt, it is decided that:

Five further trials aircraft and 10 pre-production machines (V11-V20) are to be built.

Aircraft V11-V20 are to be equipped as follows:

- Tricycle undercarriage
- Pressurized cockpit
- FuG 16Z and FuG 25A
- 1 MK 108 and 2 MG 151 in place of 3 MG 151, installation of two MG 151 in the wings to be examined
- Armor for pilot and fuel tanks
- Speed brakes (dive brakes).

October 1, 1942
At 0923 the Me 262 V2 (PC+UB) takes off from Lechfeld on its maiden flight. Once again Fritz Wendel is at the controls. The aircraft lands safely after a twenty-minute flight. The same day Beauvais of *E-Stelle Rechlin* flys the V2. He performs a roll in the jet fighter, which earns him some criticism.

The aircraft is used primarily for performance and calibration flights until its crash on April 18, 1943. At the beginning of 1943 it receives a straight wing leading edge through the addition of a filet between the engines and fuselage, which has a favorable effect on the aircraft's overall handling.

One day later, on October 2, 1942, Robert M. Stanley takes the first American jet aircraft, the Bell XP-59 A, into the air on its maiden flight. The aircraft fails to impress, as its performance is exceeded by the latest American propeller-driven machines.

October 2, 1942
In addition to the five trails aircraft ordered, the RLM demands the construction of 30 pre-production machines with the tricycle undercarriage. Messerschmitt considers the completion date specified by the RLM (end of 1943) as impossible to meet.

November 20, 1942
Messerschmitt produces a short Me 262 project specification for the RLM.

December 2, 1942
The RLM demands rapid construction of the pre-production series and a minimum monthly output of 20 aircraft for 1944. Alleged production deadline delays result in disagreements between the RLM and Messerschmitt.

December 8, 1942
The RLM demands an improvement in the Me 262's armament.

December 10, 1942
Generalfeldmarschall Milch calls for the establishment of an high-priority development and production program under the code-name "Vulcan" (Order No. 480, December 10, 1942). It is also proposed to include the Me 262 in this program under point A Aircraft, together with the Me 163, Me 328, He 280, and the Ar 234. The primary significance of "Vulcan" lies in the preferred assignment of specialists and materiel.

January 1943
Conversion of the Me 262 V2: the addition of a "fillet" between the engines and fuselage results in a straight leading edge and thus a wing of greater chord.

A specially prepared Me 262 drop fuselage is to be installed on the Me 323 S9. It is hoped that the drop trails planned with this test fuselage will yield information as to the flutter resistance of the tail surfaces.

January 22, 1943
For the first time the Me 262 receives priority level DE; the highest "Vulcan" level has already been applied for through GL/C-E 2. (See December 10, 1942, source: Messerschmitt AG "Development History of the Me 262", produced for the Allies immediately after the war.)

February 1943
Due to vibration in the area of the outer wing, the Me 262 V2 is temporarily limited to a maximum speed of 690 kph during flight testing.

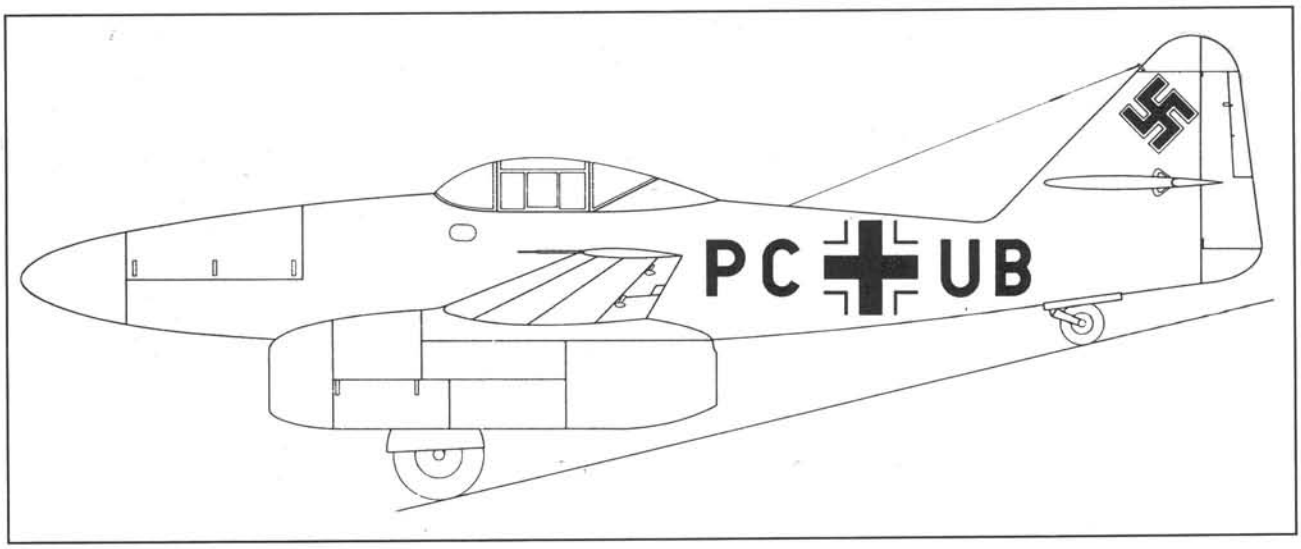
February 1943
The Me 262 V2 is limited to a maximum speed of 690 kph during flight testing for the time being, on account of vibration in the area of the outer wings. However, by April this weak point has been overcome through design changes and speeds in excess of 800 kph are now possible. Hitler orders that in future all fighters must be capable of performing in the fighter-bomber role.

February 11, 1943
Since the Müritzsee has frozen over, drop tests with the Me 262 fuselage take place from a height of 6,000 meters over the Chiemsee. The plan goes awry due to failure of the recovery system. Plans are made to repeat the test.

March 2, 1943
The Me 262 V1 is equipped with Jumo 004 A engines.

March 4, 1943
The RLM, the *E-Stelle Rechlin* and Messerschmitt finalize the future equipment state for Me 262 series production aircraft, the main points of which are:

- Standard armament of 6 MK 108 or 4 MK 108 and 2 MG 151/20
- Operation as fighter-bomber with 500 kg bombs must be possible; standard reflector gunsight on adjustable

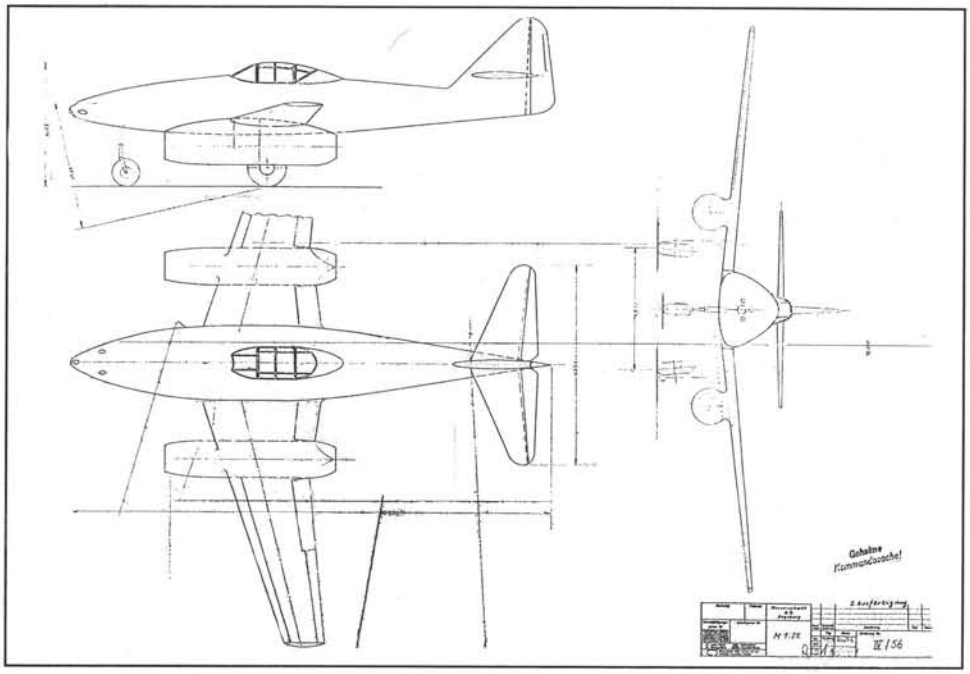


The Me 262 V2 (PC+UB, WNr. 262 00 002), powered by Junkers 004 A (Tl) engines. Drawing by Th. Mohr.

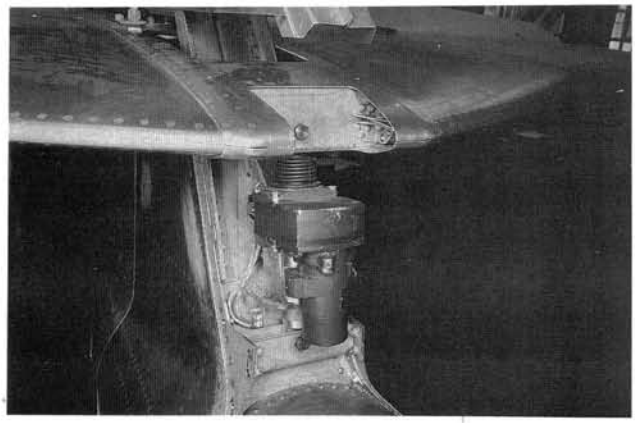
By March 1943 the Me 262 V3 (PC+UC) was ready to fly again at Lager Lechfeld. On the wing: Engineer Jung and Messerschmitt company photographer Lüttgau.

Takeoff preparations; with a landing weight of 4.7–4.8 tons, the Me 262 V3 struggles with undercarriage problems.

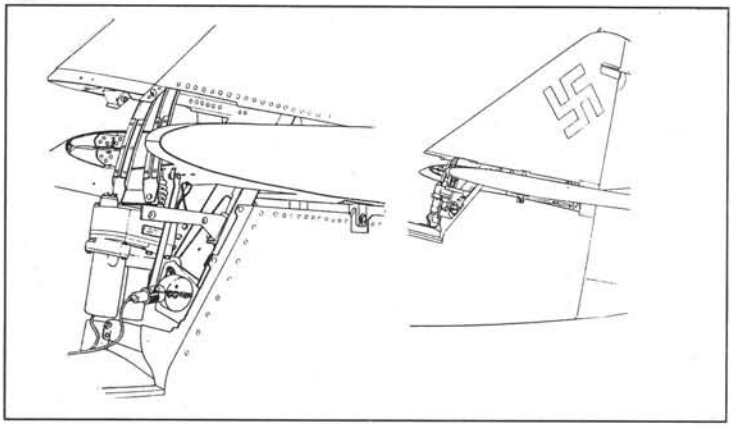
Messerschmitt test pilot Willi Ostertag in conversation with Dr. Schmidt (Junkers) and Engineer Jung (flight specifications) after a high-altitude flight.



Drawing IV/56 of November 20, 1942: "Me 262 with nosewheel."



The tailplane adjusting mechanism at the junction of the fuselage and vertical fin. This device was to cause a number of pilots to come to grief at high speeds, among them Willi Ostertag.



mount is to be used as bomb-aiming equipment
– Main undercarriage wheels 840 X 300 mm
– Installation of speed brake dispensed with initially
– Radio equipment: FuG 16ZE and FuG 25a
– Installation of ejection seat dispensed with for production version.
(Me 262 Protocol No. 9)

March 5, 1943
In Great Britain Michael Daunt makes the first flight in the Gloster Meteor, which is powered by two Halford H1 engines.

March 20, 1943
Following the completion or repairs the Me 262 V3 resumes flight testing at Lager Lechfeld. The first Me 262 to fly on pure jet power meets its end in September 1944, the victim of an Allied air raid.

March 25, 1943
Me 262 project specification; in contrast to the earlier specifications, in which the aircraft was offered solely as a pursuit fighter, the Me 262's range of roles is expanded to include use as a fighter-bomber.

Performance figures are included in this document for the first time, based on flight test results to date. Making use of the same data, Messerschmitt circulates a proposal for the step-by-step improvement of the pre-production series (Dipl. Ing. Wolfgang Degel, Dipl. Ing. Woldemar Voigt).

Various Messerschmitt documents put forward proposals for working in all the new requirements and improvements which have cropped up in the meantime (Protocol No. 9 of March 4, 1943, among others).

The authors proposed two stages:

Stage 1: State of the aircraft at beginning of pre-production series. Purpose remains limited to pursuit fighter role.

Armament: 3 X MG 151/20 in the fuselage nose each with 300 rounds
Fuel: 2 X 900 liter tanks
Undercarriage: Mainwheels 770 X 370 mm, nosewheel 660 X 160 mm
Takeoff weight: Max. 5,500 kg

Rocket-assisted takeoff, pressurized cockpit, ejection seat and speed brake are dropped.

Stage 2: Changes and improvements are to be worked in

during the course of the pre-production series, increasing the operational capabilities of the Me 262 for use as a fighter-bomber.

Armament: Initially 3 X MG 151/20 in the fuselage nose and 2 X MK 108 in or on the wings; later weapons bay in nose with 4 X MK 108 or 2 X MK 103 and 1 X MG 151/20
Fuel: 2 X 900 liter tanks (protected) and 1 X 300 liter tank (unprotected)
Undercarriage: Mainwheels 840 X 300 mm, nosewheel 660 X 160mm
Takeoff weight: Normal 6,000 kg, max. ca. 7,100 kg

Leading edge slat over the entire wingspan, with provision for rocket-assisted takeoff; however no pressurized cockpit, ejection seat or speed brake.

The Stage 2 aircraft approximates the description contained in the design specification of March 25, 1943. For the first time this document contains performance figures, based on the results of flight testing to date.

The document lists the following air-dropped weapons for use in the fighter-bomber role: 1 X SC 500 or 2 X SC 250 or 1 X BT 700 torpedo (requires the removal of two weapons from the fuselage nose).

March 27, 1943
The RLM strikes the He 280 from the development plan in favor of the Me 262.

April 17, 1943
The Luftwaffe General Staff takes an interest in the Me 262 for the first time.

Hauptmann Späte of *Erprobungskommando* 16 flies the Me 262. Unfamiliar with its background, he considers the Me 262 ready for operational use.

April 18, 1943
Company pilot Willi Ostertag crashes near Hiltenfingen (in the vicinity of Schwabmünchen) while flying the Me 262 V2 and is killed. It is the aircraft's 48th flight. The cause of the accident is identified as a malfunction of the tailplane incidence adjusting mechanism, a problem which will become more common in the future, often with fatal consequences. Subsequently the tailplane adjusting mechanism's maximum allowable motion load is raised from 700 to 900 kg.

April 30, 1943
The responsible project engineers and Dr. Messerschmitt lay down the future path of the Me 262 program. The results of the discussions are recorded in a memorandum.

May 8, 1943
Project Submission IV "Me 262 Fighter and Fighter-bomber." Authors Althoff, Degel and Voigt submit the first detailed plans for series production, relative to the definitive version of the aircraft, including all the variants proposed to date.

Project Submission IV, which in the coming months is the subject of an ongoing series of additions and improvements, largely coincides with the design submitted to the RLM on March 25, 1943.

May 15, 1943
The Me 262 V4 (PC+UD), *Werknummer* 262 000 04, powered by two Jumo 004 A engines, takes off from Augsburg on its maiden flight. *Flugkapitän* Fritz Wendel delivers the aircraft to Lager Lechfeld. On July 26, 1943, the V4 crashes while taking off from Schkeuditz on its 51st flight. The aircraft is a total write-off.

May 22, 1943
General der Jagdflieger Adolf Galland flies the Me 262 V4 at Augsburg. Like *Hauptmann* Späte before him, he assesses the aircraft favorably (extract from Galland's original report):

1. "The aircraft represents a great step forward, which assures us an unimaginable advantage should the enemy adhere to the piston engine.

2. The flying qualities of the airframe make a good impression.

3. The engines are completely convincing, except during takeoff and landing.
4. The aircraft opens completely new tactical possibilities."

In spite of all the enthusiasm, at this point the Me 262 is in no way mature enough for operational use. The engines present great difficulties, while problems remain with the aircraft itself.

May 25, 1943
On the basis of *General der Jagdflieger* Galland's assessment Generalfeldmarschall Milch orders series production of the Me 262 to begin.

May 28, 1943
The RLM and the test detachment (*Erprobungskommando*), decide the production standard for the first 100 series aircraft, which are planned as fighters.

June 2, 1943
The General der Aufklärungsflieger, Oberst Hans Henning von Barsewich, calls for project drawings for a reconnaissance version of the Me 262.

June 6, 1943
First flight of the Me 262 V5 (PC+UE), WNr. 262 000 05. The aircraft has a fixed tricycle undercarriage which makes use of an Me 309 nosewheel unit, as well as two Borsig Rl-502 takeoff-assistance rockets beneath the fuselage, each capable of producing 500 kg of thrust for 6 seconds. The V5 is powered by two Jumo 004 A-0 engines.

With tire sizes of 770 X 270 mm (mainwheels) and 650 X 150 mm (nosewheel), the undercarriage of the V5 is not yet up to the standard of the strengthened production version (840 X 300 mm mainwheels, 660 X 160 mm nosewheel).

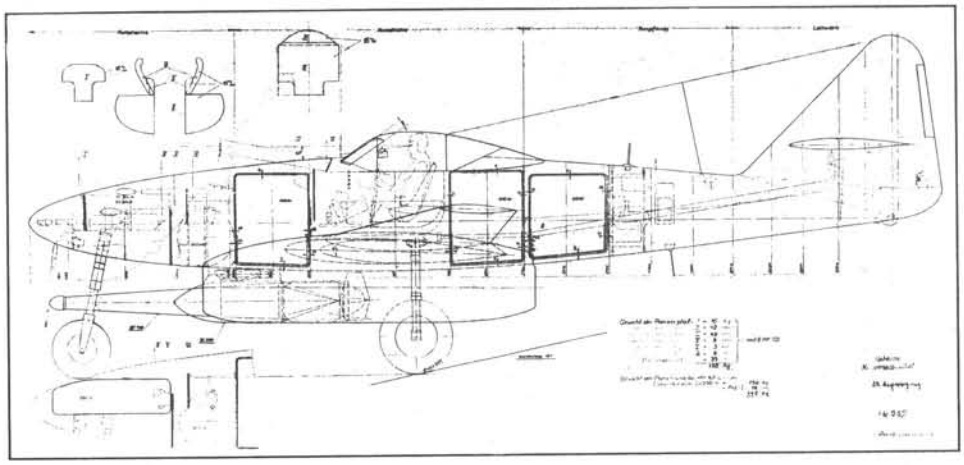
On August 4, 1943, while on its 74th flight, the Me 262 V5 is damaged as a result of a nosewheel leg failure. On February 1, 1944, following the completion of repairs, the aircraft suffers a nosewheel tire blow-out while being flown by *Hauptmann* Werner Thierfelder and crashes again. Repair work on the V5 is not completed before the end of the war.

June 12, 1943
Messerschmitt test pilot Lindner determines that the pressure suit proposed by the *E-Stelle Rechlin* for high-altitude (stratospheric) flights is totally unsuitable.

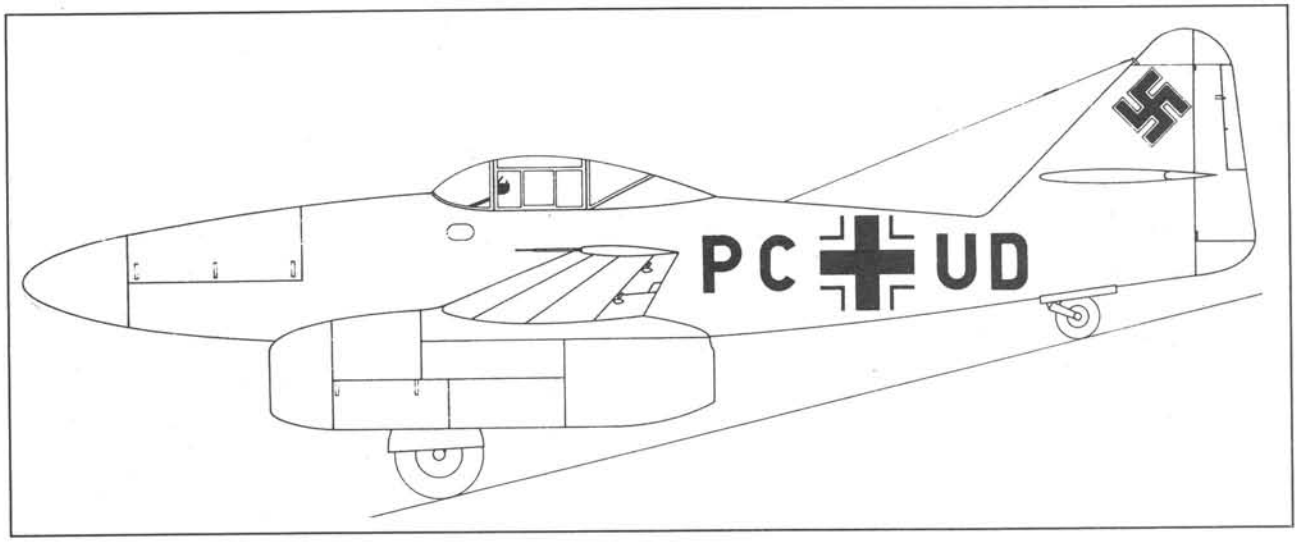
As an interim measure it is decided to equip the Me 262 V1, which is in the process of being rebuilt, with pressurization, so as to permit high-altitude testing of the engines.

From Project Proposal IV of May 1943: Me 262 armor and protected tanks.

Original drawing from May 11, 1943; the Me 262 as a fighter with six MK 108 cannon and, long before Hitler's idea, as a fighter-bomber with SC 500 bombs or a BT 700 bomb-torpedo.



Me 262 V4 (PC+UD, WNr. 262 00 004) with two Junkers Jumo 004 A engines. Drawing by Th. Mohr.



General der Jagdflieger Galland exchanges experiences with Messerschmitt test pilots Karl Baur and Fritz Wendel.

Professor Messerschmitt welcomes General der Jagdflieger Adolf Galland to Lager Lechfeld.

June 18, 1943
The Me 262 V5 is test flown by the E-Stelle Rechlin.

Summer 1943
Junkers tests the largely "strategic-materials-free" Jumo 004 B and delivers the first 004 B-0 pre-production engines to Messerschmitt.

The RLM, representatives of the Luftwaffe's test stations, and Messerschmitt officials work on the definitive production version of the Me 262. Main concern of the parties is determining the jet fighter's armament and equipment.

July 19, 1943
The rebuilt Me 262 V1 successfully completes its first flight with two Jumo 004 A engines, provisional pressurized cockpit, and 3 MG 151 cannon in the nose weapons bay.

Scarcely a year later, on June 7, 1944, the V1 crashes after 95 test flights.

July 25, 1943
Messerschmitt test pilot Lindner demonstrates the Me 262 V4 at Rechlin in the presence of Göring. On the return flight the following day, Lindner crashes while making an en route stop at Schkeuditz. The aircraft sustains 60% damage.

July 30, 1943
At Rheine airfield another German twin-engined, jet aircraft successfully makes its first flight. Flown by *Flugkapitän* Selle, the Arado Ar 234 V1, TG+KB, stays aloft for 14 minutes.

August 3, 1943
Birth of the world's first jet trainer: the Messerschmitt Design Bureau receives from the Project Bureau exact written and graphic figures and instructions for the Me 262 training aircraft (Me 262 Two-seater Project Submission, authors: Degel, Althoff).

August 4, 1943
The Me 262 V5 suffers an accident while taxying at Lechfeld; the aircraft is not fit to fly again until January 1944.

August 10, 1943
The future production aircraft is described in detail in a document created for the RLM (Me 262 A-1 fighter, specification with appendix for A-2 version).

August 11, 1943
The Me 262 V1 is fitted with (similar to the V2) the wing leading edge extension between the engines and fuselage.

Flight testing in the autumn of 1943 shows that the modification decisively improves low-speed handling, especially during takeoff and landing.

September 11, 1943
Althoff and Degel point out potential roles for the Me 262 in a specification based on the project specification of August 10, 1943.

The specification contains descriptions and drawings of the following variants of the Me 262 fighter:

Reconnaissance Aircraft I	2 X Jumo 004 C	2 X RB 75/30
Reconnaissance Aircraft II	2 X Jumo 004 C	2 X RB 75/30 1 X RB 30/30
High-speed Bomber I	2 X Jumo 004 C	1 X 1,000 kg or 2 X 500 kg
High-speed Bomber II	2 X Jumo 004 C	1 X 1,000 kg or 2 X 500 kg
Interceptor I	2 X Jumo 004 C	6 X MK 108 +1 X HWK RII/211
Interceptor II	2 X BMW 003 R	6 X MK 108
Interceptor III	2 X HWK RII/211	6 X MK 108
Training Aircraft	2 X Jumo 004 C or 004 B-2	2 MK up to 4 X 108

September 20, 1943
In Great Britain, Geoffrey de Havilland Jr. takes the de Havilland Vampire, powered by a D.H. Halford H-1, into the air on its maiden flight.

Gerd Lindner reaches a speed of 960 kph while flying the Me 262 V3 over Lechfeld at an altitude of 5,000 meters.

October 17, 1943
First flight of the Me 262 V6 (VI+AA), *Werknummer* 130 001. It is the first Me 262 with an hydraulically-retractable tricycle undercarriage and Jumo 004 B-0 engines. The aircraft crashes during its 28th flight on March 9, 1944, with Kurt Schmidt at the controls.

October 23, 1943
A second drop test, this time over Lake Constance, also goes wrong – once again on account of the failure of the recovery system.

November 2, 1943
The Me 262 is demonstrated to Göring at Lager Lechfeld. He discusses use of the aircraft as a fighter-bomber with Professor Messerschmitt.

November 5, 1943
Dr. Anselm Franz, director of Jumo 004 development at Junkers' Otto Mader Works, admits that the Jumo 004 engine has not yet achieved the level of maturity necessary for service use. Toward the end of the year *Oberst* Petersen, the officer in charge of the Luftwaffe's test stations, reported to the RLM's *Technische Amt* (LC 3 power plants): "Jumo 004 not yet ready for service use."

November 26, 1943
Gerd Lindner demonstrates the Me 262 V6 to Adolf Hitler at Insterburg, East Prussia. Hitler asks Messerschmitt, who is also present, whether the jet aircraft is capable of carrying bombs. Well aware of the work carried out in his project bureau toward a fighter-bomber version, Messerschmitt is forced to answer "yes." Afterward Hitler declares that the Me 262 is the "Blitzbomber" he has long sought. At first this "inspiration" is tacitly ignored by the people around Hitler and by Messerschmitt as well.

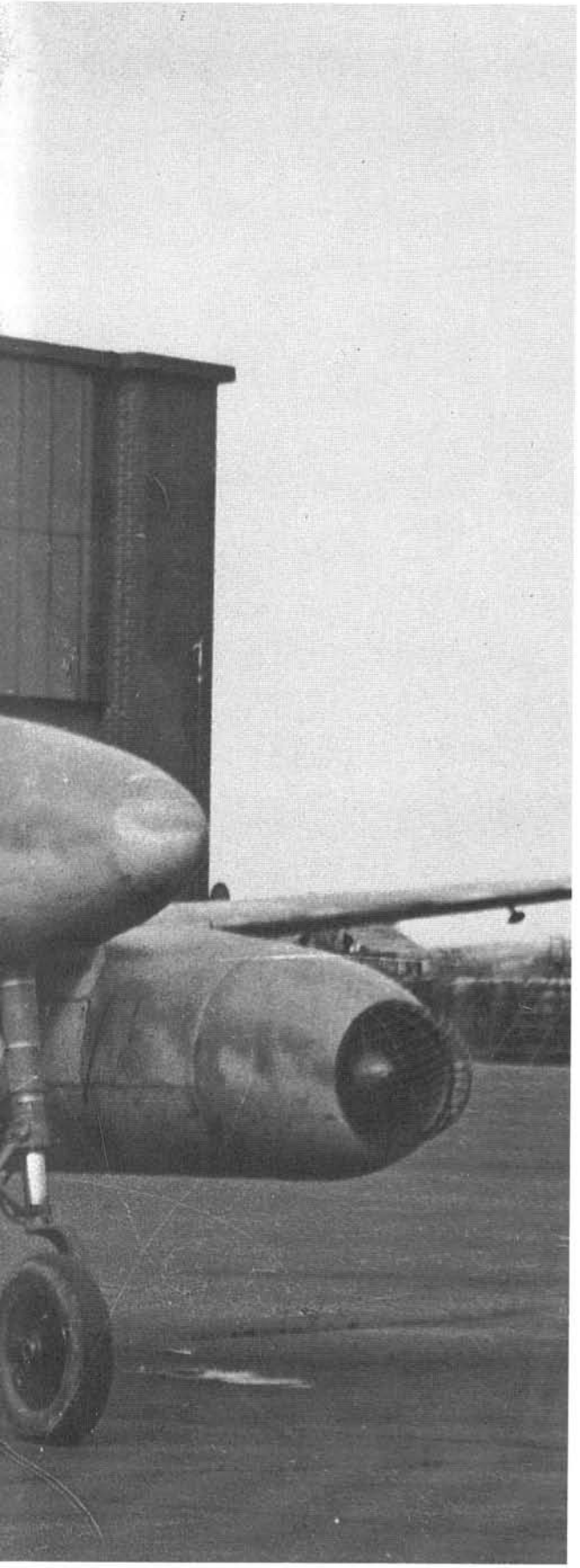
December 9, 1943
Hauptmann Werner Thierfelder of *Zerstörer Geschwader* ZG 26 is officially given the task of forming a Luftwaffe test detachment at Lager Lechfeld. However no production aircraft are yet available and there are no Me 262s flying, apart from the desperately-needed prototypes.

December 20, 1943
First flight of the Me 262 V7 (VI+AB), WNr. 130 002, powered by two Jumo 004 B-1 engines. On February 21, 1944, the aircraft is damaged in the course of its 17th flight. On April 11, 1944 it makes its 18th flight in a somewhat modified form (clear-view canopy, cockpit modified for pressurization). On May 19 the V7 crashes on its 31st flight and pilot Hans Flachs is killed.

December 21, 1943
Werner Thierfelder and *General der Kampfflieger Oberst* Dietrich Pelz fly the Me 262 V6.

At the year's end four Me 262 prototypes are available for testing.
Quantity production is nevertheless slated to begin at Leipheim at the beginning of 1944.
A primary concern at the turn of the year 1943/44 is weapons testing, which takes place in cooperation with the *E-Stelle Tarnewitz*.
Meanwhile the Me 262 V3 is used in an attempt to reduce drag by extending the canopy fairing to the vertical fin.


V5



The Me 262 V5 (PC+VE, WNr. 262 00 005), the first Me 262 with a tricycle undercarriage. The aircraft carries two 500 kg thrust take-off assistance rockets beneath the fuselage and protective wire baskets over the engine intakes.

A suggestion by the test station: a pressure suit for altitudes above 12,000 meters.

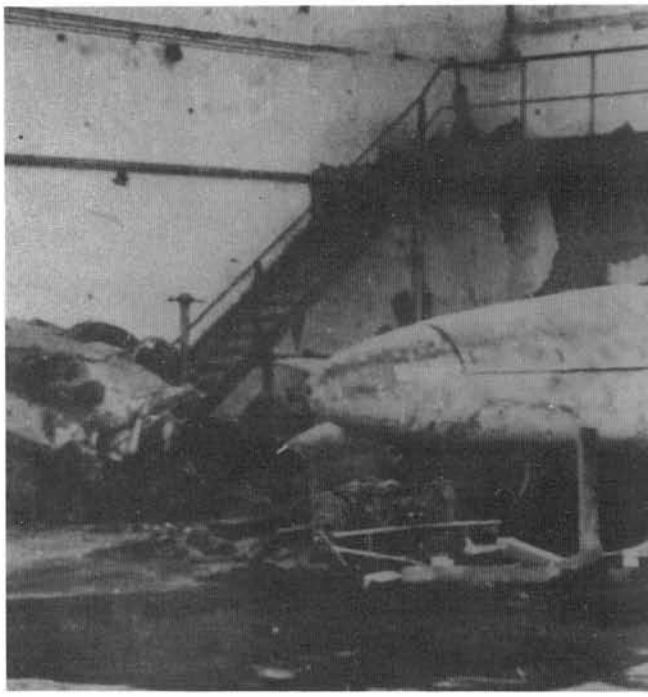
The expressions speak for themselves: From left: the director of the test shops Asam, project engineer Wöckner, test pilot Lindner in the pressure suit, and the director of flight testing Caroli. In the background is the tail of the Me 262 V5.

Gerd Lindner said of the pressure suit: "A medieval torture rack had nothing on it."

From left: Dipl. Ing. Cuno of the E-Stelle, Dipl. Ing. Caroli, and Gerd Lindner.

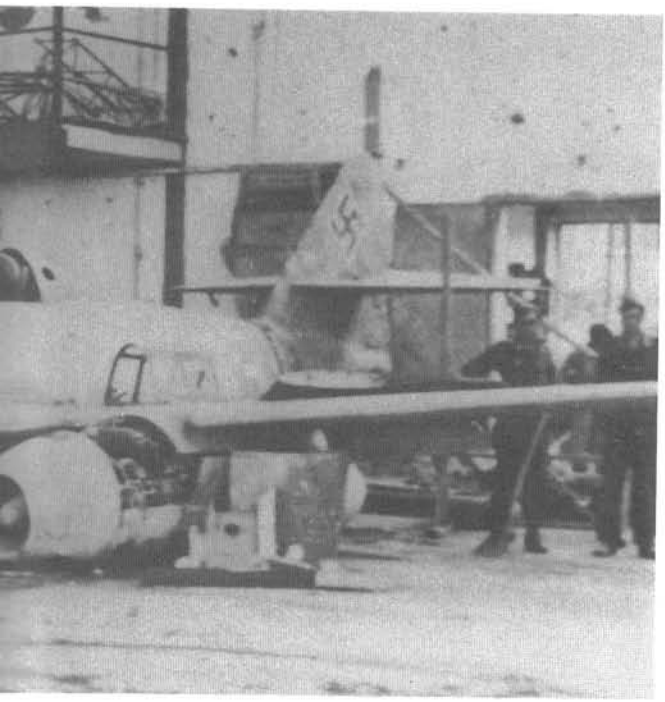
Lindner never risked flying the Me 262, in which space was somewhat limited, while wearing the "stratospheric diving suit." He concluded his report with the comment: "In any case the provisional pressurized cockpit was completed at the same time in which the suit would have been available."

The Me 262 V3 at Lager Lechfeld: this aircraft's role in the test program was mainly high-speed trials and aerodynamic investigations (pressure distribution, the influence of Mach number, etc.). Note the He 177s in the background.



The wrecked Me 262 V1 (PC+UA) with Junkers power plants and provisional pressurized cockpit in Lager Lechfeld's Hangar 5 (Messerschmitt hangar), which was destroyed in an air raid on August 19, 1944. In front of the V1 is the Jumo 210 G piston engine which had earlier been removed from the aircraft.

January 1944
Junkers receives authorization for quantity production of the Jumo 004 B-1 engine.



Construction of the zero- or pre-production series (recognizable by the letter "S") is to begin at Leipheim, however the beginning of series production is delayed until March 1944. The first pilots for *Erprobungskommando Thierfelder* arrive at Lager Lechfeld for conversion training, in preparation for the first military employment of the jet aircraft.

In the USA the first prototype of the Lockheed P-80 Shooting Star flies on January 8. The aircraft, which is powered by a British Halford H-1 engine, is flown by Milo Bircham.

January 19, 1944
First flight of the Me 262 V9 (VI+AD), WNr. 130 004. Prior to its conversion into the HG I, the aircraft is used for test purposes until about the beginning of September 1944. One of the programs involves experiments in electro-acoustical homing onto enemy aircraft.

The investigations are meant to evaluate a system intended to detect enemy aircraft, represented in the test by an Me 410. In early October modification work begins to transform the V9 into the HG I high-performance test-bed.

February 1944
In the course of the month Junkers delivers the first production Jumo 004 B-1 engines to Messerschmitt.

February 1, 1944
Werner Thierfelder crashes the Me 262 V5 at Lager Lechfeld. The aircraft is not repaired.

February 16, 1944
Firing trials with four MK 108 cannon in the presence of representatives of the RLM and E-Stelle Tarnewitz.

February 25, 1944
Messerschmitt's Regensburg and Augsburg factories are hit by a heavy air raid as part of "Big Week." However the company's design and project bureaus have been quartered in a former alpine infantry barracks in Oberammergau since autumn 1943.

Following the destruction of the building housing its offices, the Me 262 test department moves its entire operation to Lager Lechfeld. The test engineers make the twenty-kilometer trip from Haunstetten to Lager Lechfeld in an Opel P 4 automobile. Company testing resumes under the code-name "Lechfeld Auto Requirements" (referring to the Opel, as a written "supply requisition" was required for each use of the automobile).

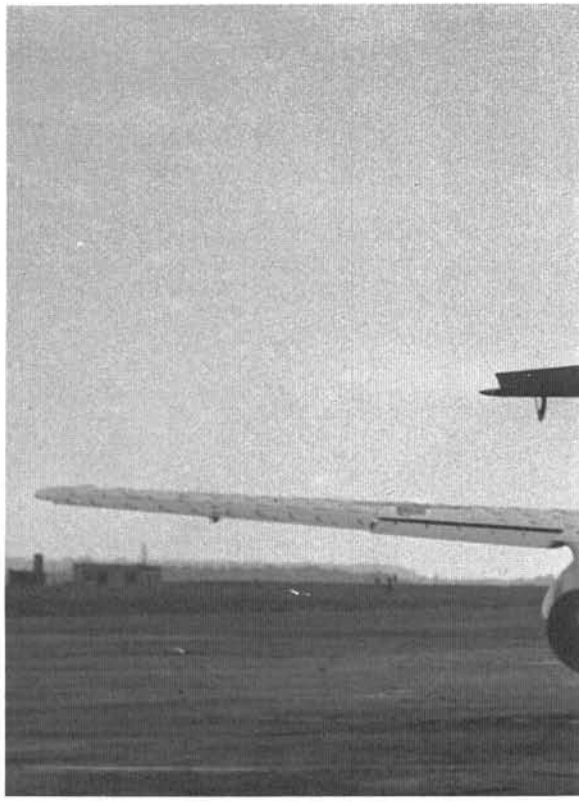
The Messerschmitt employees are housed in the control tower, but there too their safety is anything but assured. And so the test team moves from the control tower, which soon afterward is reduced to rubble, into the commander's office. When this is wrecked the team moves into the gymnasium and finally, by the end of the war, into a farm house.

The number of documents and instruments available to the test team grew smaller as the it was forced to move repeatedly. Test engineer Fritz Kaiser recalled: "As the installation of recorders required too much time and many measuring devices were already gone, we tried measuring flight performance by telemetry for the first time. It was the simplest form of telemetry: the pilot read the required instruments and several additional indicators. The engineer sat beside a mobile radio cab, recorded the data and issued instructions."

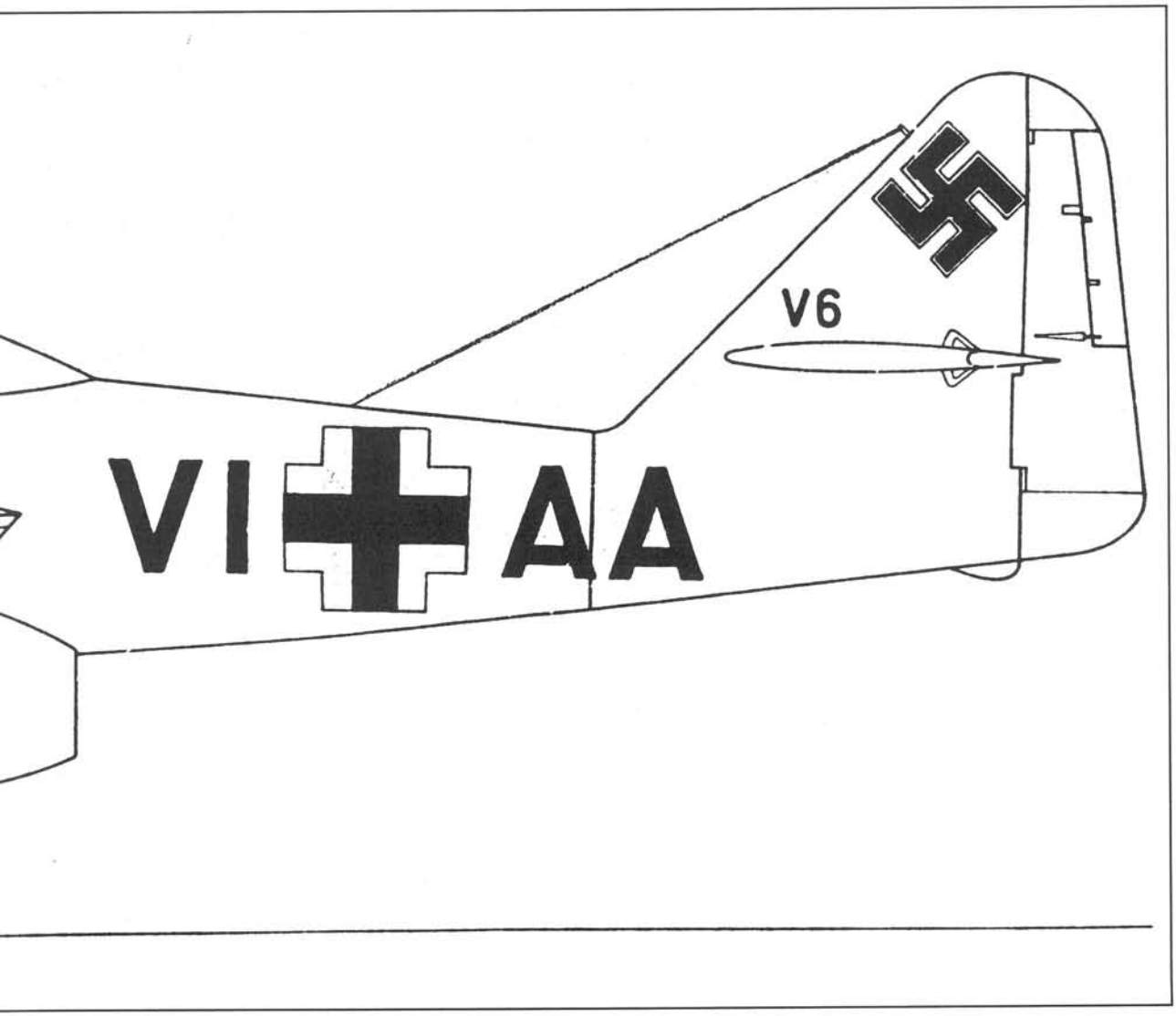
"A Luftwaffe female auxiliary in the radio cab maintained

The Me 262 V6 (VI+AA, WNr. 130 001), the first Me 262 with an hydraulically-retractable nosewheel and Jumo 004 B engines. Drawing by Th. Mohr.

The nosewheel unit of the V6 with external shimmy brake and scissors steering arm.
The V7 introduced an internal shimmy brake; later an external damper and scissors steering arm were installed. The photo was taken at the Augsburg factory airfield.



The Me 262 V6; the classically beautiful lines of the Me 262 became more evident with advent of the tricycle undercarriage.


V6
VI
AA

Hermann Göring at the demonstration of the Me 262 V6 at Lager Lechfeld on November 2, 1943; right Willi Messerschmitt.

The center of attention was the Me 262 V6, which was flown masterfully by Gerd Lindner. Like all Messerschmitt prototypes it wears an overall light grey finish (also see photo on Pages 44 and 45).

The jet aircraft after landing.

Also present were Dipl. Ing. Caroli (center) and General der Jagdflieger Galland (left).

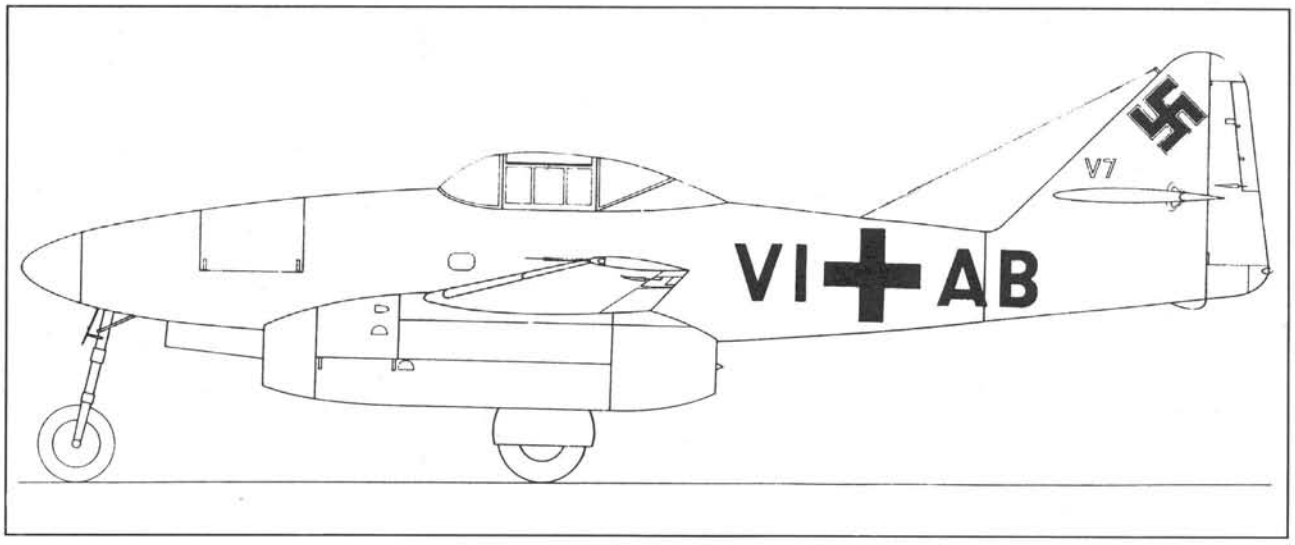
Reichsmarschall Göring congratulates Gerd Lindner.

radio contact with the Me 262. The Luftwaffe caused us difficulties as chatter came in on the frequency from all sides."

March 9, 1944
The number of flyable Me 262s is reduced further. Following the crash of the V5, on March 8, 1944, Kurt Schmidt is

involved in a fatal crash at Lager Lechfeld while flying the Me 262 V6.

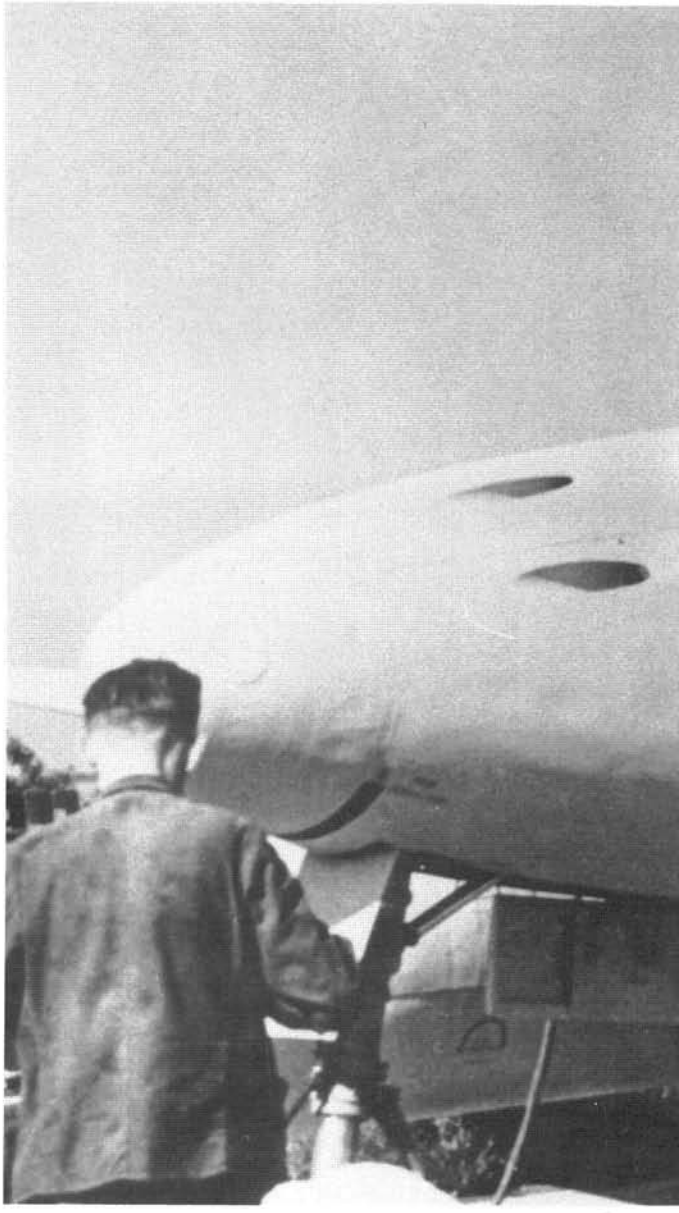
March 18, 1944
Maiden flight of the Me 262 V8 (VI+AC), WNr. 130 003, powered by two Jumo 004 B-1 engines.



The Me 262 V7 (VI+AB, WNr. 130 002). Drawing: Th. Mohr.

Crash landing by the Me 262 V7 on its 17th flight on February 21, 1944. Piloting the aircraft was Kurt Schmidt.

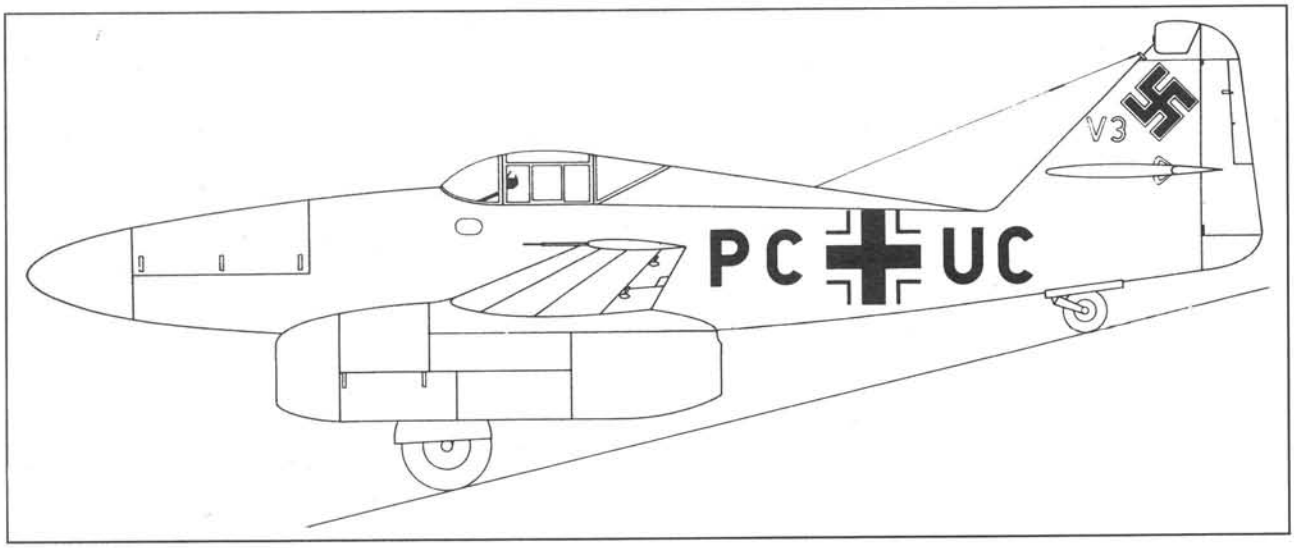
The Me 262 V3 with lengthened cockpit fairing. Ever greater disturbances (such as airframe vibration) were encountered as Mach number climbed. The cause was suspected to be vortices in the rear of the cockpit fairing. Tests with a lengthened cockpit fairing were supposed to eliminate these disturbances.
Drawing: Th. Mohr.



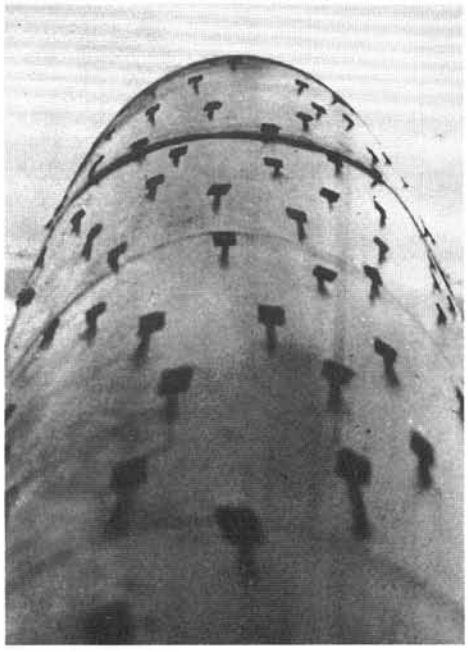
Fully repaired: the Me 262 V7 with a new clear-view canopy.

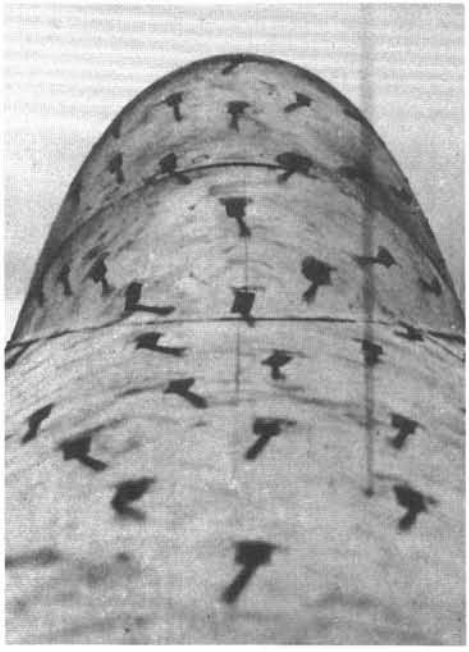
The aircraft serves to test the Me 262's nose-mounted armament of four MK 108 cannon. Following modification of the cockpit canopy the V8 is handed over to *E-Kommando Thierfelder*, becoming the test detachment's first jet aircraft. In the course of the aircraft's 258th flight the nosewheel leg collapses, a common occurrence at that time, and the aircraft sustains damage.

March 22, 1944
Me 262 "armored aircraft," an appendix to the specification of August 10, 1943, is a proposal for an aircraft with increased armor protection against the defensive armament of the Allied bombers. On May 13 the project bureau improves the plan under the designation "Armored Aircraft II."

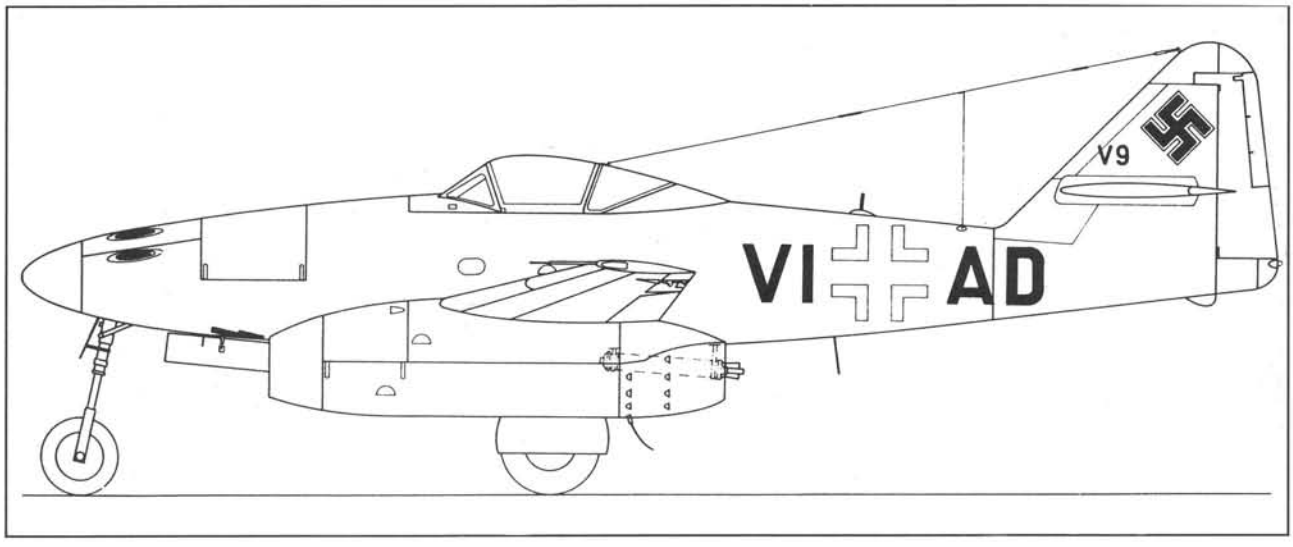

V3
PC
UC

Pictures taken by a robot camera mounted in the vertical fin: airflow on the lengthened cockpit fairing. Tests showed no evidence of airflow breakaway on either the normal or the extended canopy fairing; furthermore, it was feared that the latter would result in a worsening of damping due to an increase in dynamic stability. Today we know that such disturbances could probably have been eliminated only by applying the area rule to the Me 262.





Below: Me 262 V9 (VI+AD, WNr. 130 004). Drawing: Th. Mohr.



Opposite: Me 262 V8 (VI+AC, WNr. 130 003), seen here without takeoff assistance rockets. Drawing: Th. Mohr.

Acceptance flight testing of the Me 262 V9; Gerd Lindner during a break between two flights.

Routine work during the Lechfeld test program: Engineer Fritz Kaiser on an observation tower at the edge of the concrete strip with the measuring apparatus developed by Ertel and von Chlingensperg for determining the distance required by the aircraft to take off and reach a height of 20 meters.

March 28, 1944
The first aircraft to come off the Leipheim production line, WNr. 130 007 (VI+AG), makes its initial flight. The losses among the prototypes and the priority assigned to testing results in the first production machines being assigned to flight testing.

In future it often becomes necessary to take aircraft from the production line for modification and assignment to test units or factory test programs. One Leipheim-built aircraft, WNr. 130 010 (VI+AJ), is sent to Blohm und Voss' Wenzendorf factory for conversion into a two-seat aircraft.

At the end of July the test detachment based at Rechlin-Lärz takes delivery of the aircraft. On October 8, 1944, VI+AJ crashes on landing from its 47th flight and is written off.

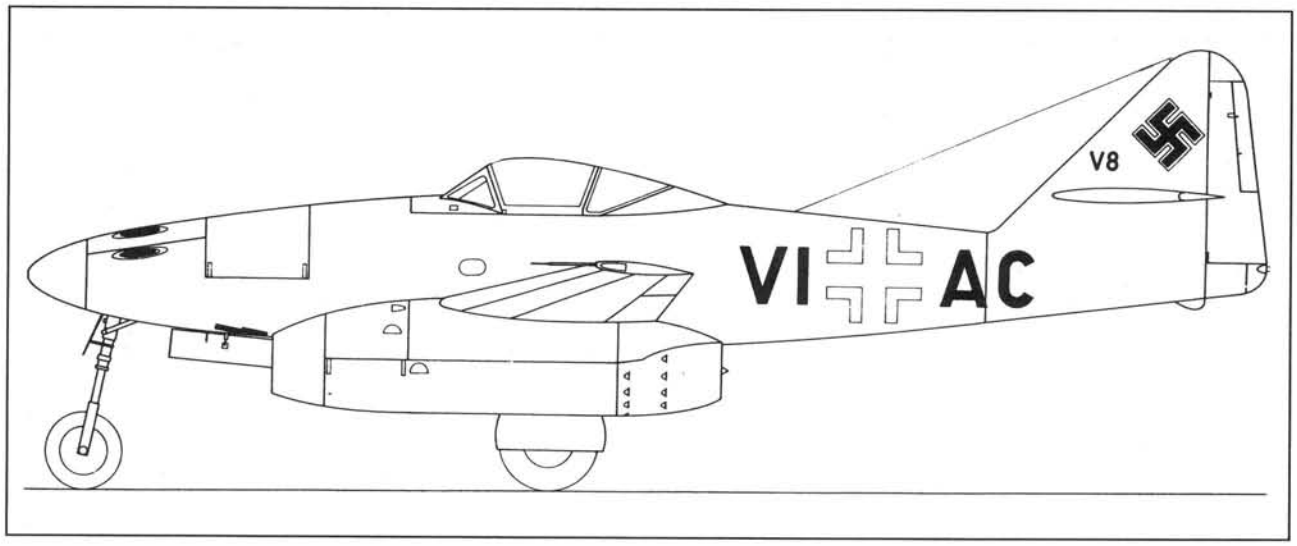
April 15, 1944
The last aircraft from the prototype series, the Me 262 V10 (VI+AE), WNr. 130 005, flies for the first time. It is the last Me 262 built totally at Augsburg-Haunstetten. The Me 262 V10 is the first aircraft to be modified for fighter-bomber testing.

May 27, 1944
At Lechfeld Gerd Lindner flies the Me 262 V10 with a single 250 kg bomb.

June 6, 1944
Allied troops begin the invasion of Europe on the coast of Normandy. The "Blitzbomber" comes too late.

Ironically the specification for the Me 262 A-1 "high-speed bomber" bears this date. The specification states that "the Me 262 A-1 fighter is to be employed as a high-speed bomber immediately."

June 10, 1944
The *E-Stelle Rechlin* (Lärz) receives its first Me 262, thus involving the Luftwaffe in the test program. Barely a month later the *E-Stelle* already has more than thirteen Me 262s. The start of testing is delayed four weeks by general difficulties with the undercarriage. Nevertheless, by September 20, 1944, Rechlin reaches 350 flying hours on the Me 262 in the course of more than 800 flights.



April 19, 1944
Erprobungskommando Thierfelder, the fighter test detachment, receives its first Me 262. It is the Me 262 V8, WNr. 130 003, coded VI+AC.

At the beginning of May the test detachment takes delivery of its first two production aircraft. *Hauptmann* Thierfelder begins training activities with the two aircraft, WNr. 130 008 (VI+AH) and WNr. 130 009 (VI+AI).

May 11, 1944
The Project Bureau (Althoff) puts forward another supplement to the specification of August 10, 1943: an Me 262 fighter with two BMW 003 A-1 engines.

May 19, 1944
Hans Flachs, who has been transferred from the operational test detachment to factory testing, crashes at Lechfeld while flying the Me 262 V7 and is killed.

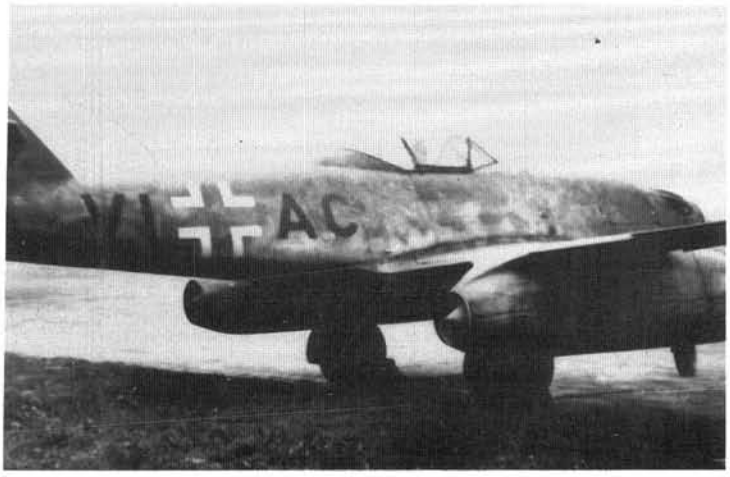
May 25, 1944
During a conference at the Obersalzburg Hitler makes emphatic demands for a "Blitzbomber." Present are Göring, Speer, Milch, Saur and representatives of the aircraft industry.

June 15, 1944 to July 13, 1944
Oberleutnant Tesch flies the Me 262 V10 with various external loads, including a single 500 kg bomb. In the month of June the Messerschmitt factories produce twenty-eight Me 262 A-2a fighter-bombers. Not only do they differ from the fighter version in having streamlined "Viking Ship" or ETC 503 bomb racks beneath the forward fuselage, but also through the removal of two MK 108 cannon and the addition of a further fuselage fuel tank behind the cockpit. Takeoff weight climbs by about 325 kg as a result of these measures.

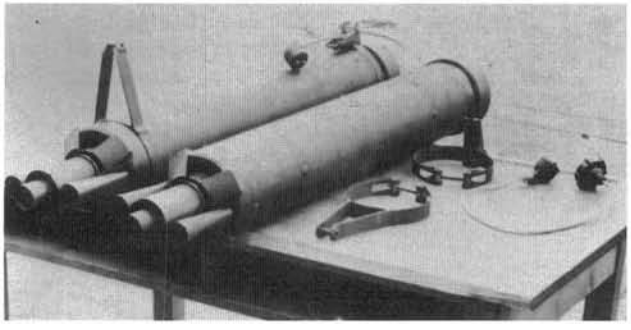
June 20, 1944
The first bomber pilots from KG 51 begin conversion training on the Me 262 A-2a at Lager Lechfeld. Under the leadership of *Major* Wolfgang Schenk they form "*Erprobungskommando Schenk*" for the "Blitzbomber" mission.

On July 20 the detachment transfers to France for operations with nine Me 262 A-2a fighter-bombers.

The unit enjoys less than intoxicating success as the modified fighters are unsuited to this type of operation. From this beginning the first *Gruppe* of KG 51 to fly the Me 262 A-2a in action is formed in September 1944. The unit's commander is *Major* Schenk.



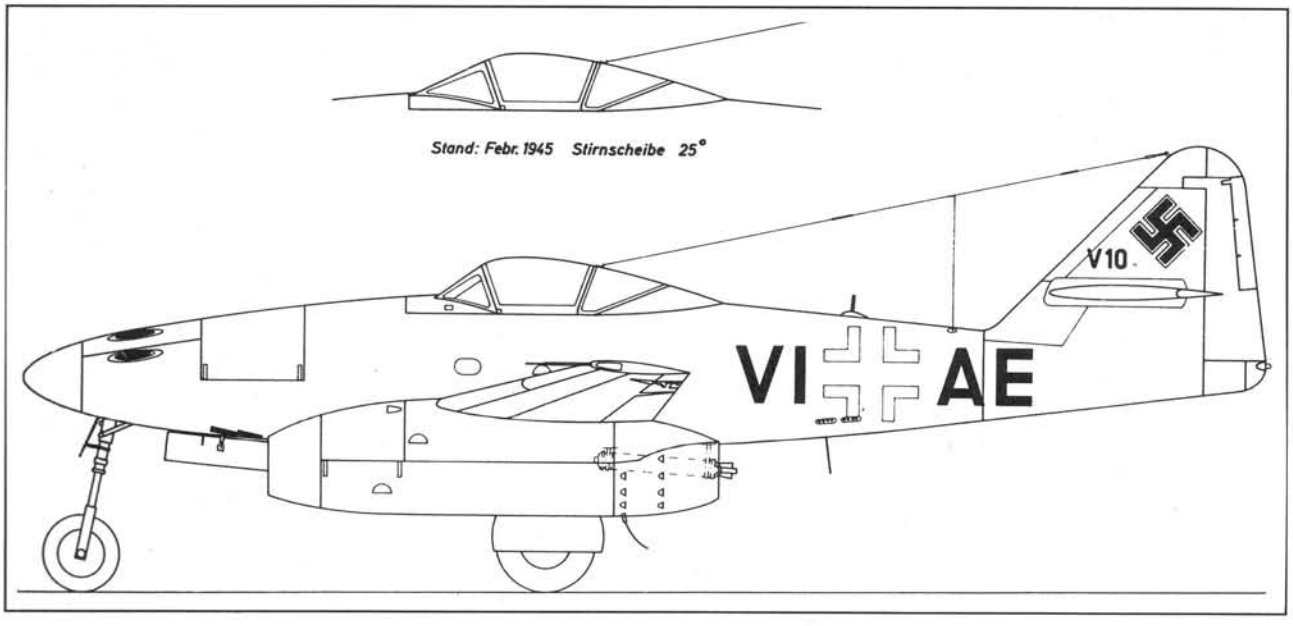
During testing: the Me 262 V8 with two RI 502 takeoff assistance rockets.



Borsig RI 502 takeoff assistance rockets with retaining bands; a view of the rocket nozzles. The ignition wires are visible at the front of the rockets.

A look into the cockpit of the V8: the left console with control box for the takeoff rockets.

After the change-over order of May 1944: the Me 262 V10 (VI+AE, WNr. 130 005), first trials aircraft for the fighter-bomber role. Drawing: Th. Mohr.



Later, in January 1945, the unit is reorganized again, this time for the fighter role.

June 25, 1944
Feldwebel Herlitzius attains a speed of 1,004 kph in a steep power-dive from 7,000 meters while flying WNr. 130 007 (VI+AG). Herlitzius had earlier been transferred from *Kommando Thierfelder* to the factory test program.

Summer 1944
Tests with the Me 262 V10 fighter-bomber continue. Additional "Blitzbomber" test-beds fly at Rechlin-Lärz. Among other things they are used to test the Zeiss firm's TSA 2A bombing calculator. (TSA = *Tief- und Sturzzielanlage.*)

July 18, 1944
Werner Thierfelder crashes near Landsberg in his Me 262 WNr. 130 011. Technicians determine separation of the turbine stator rings as the likely cause.

Several days after Thierfelder's death the *Kommando* achieves the success which has been so eagerly awaited: On July 26 *Leutnant* Alfred Schreiber shoots down a Mosquito reconnaissance aircraft while flying Me 262 A-1a WNr. 130 017. It is the first aerial victory by a jet fighter in aviation history.

Thierfelder's test detachment becomes the seed from which springs *Kommando Nowotny*, out of which in turn are formed the operational Me 262 units of JG 7.

Messerschmitt Flight Testing and Luftwaffe Operational Testing

Autumn 1944 – April 1945
In September 1944 the *E-Stelle Rechlin* conditionally releases the Me 262 for use in the fighter role; the aircraft's unconditional operational readiness cannot yet be certified. The main causes for complaint are the engines, weapons installation and undercarriage. The production quality of the jet fighter also receives frequent criticism; as well the training of jet pilots is hampered by the lack of training aircraft. The pilots, most of whom come from the heavy fighter *Geschwader* ZG 26, often require a great deal of time to become even halfway accustomed to the new aircraft. Much is in short supply, commodities such as time, aircraft and fuel, things required for thorough conversion training. The result of these shortages is numerous accidents and crashes.

For the factory flight test program and the Luftwaffe's *E-Stelle* this means an expansion and intensification of their work.

At the end of 1944 further production aircraft are assigned to the flight test program at Lager Lechfeld. At least some of the aircraft receive the V-numbers of prototypes which have been lost. Production aircraft are also handed over to the Rechlin-Lärz and Tarnewitz *E-Stellen*.

During late 1944 and early 1945 a total of about 35 production aircraft are tied up in test work at the various test centers.

With a multitude of modifications and conversions, the Me 262 is developing in the direction of a multi-purpose aircraft.

This seems logical, as the single-engined pursuit fighter which is to replace the Me 262 in this role is already on the drawing boards of the German aviation industry. Series production of this high-performance fighter, which is to be powered by an Heinkel He S 011 turbojet, is supposed to begin in 1945!

General Messerschmitt Flight Testing

Flight testing was divided into the two major areas of flight characteristics and flight performance.

The variety of roles selected for the basic design, which have been presented here, gives some indication of the scope and the problematic nature of the task which faced flight test director Caroli and his team at Lager Lechfeld. Much space was taken up by investigations into the directional and lateral stability of the Me 262. The basis for this activity was the yawing motions about the vertical axis which appeared at high speeds, which had a considerable influence on an aircraft's suitability as a weapons platform.

WNr. 170 056 and, to a lesser degree, WNr. 130 167 were used to flight test modifications aimed at improving lateral stability (ventral fin on forward fuselage, capped and cropped vertical fin).

In the end this work had no effect on the production aircraft as the aircraft's speed range was totally sufficient at that point in time and because the modifications tested resulted in other, quite uncomfortable characteristics (for example a deterioration in controllability).

Also falling within the previously outlined problem area were the flights carried out by Gerd Lindner in 130 167 (V167) in December 1944 to ascertain rudder effectiveness. For these tests the V167 was fitted with a "yaw angle measuring device" which was mounted on a 1.2-meter nose probe, which made it possible to establish a relationship between pedal force, rudder deflection and the yaw angle of the aircraft's fuselage.

Other elements of the test program included:

- Flights with the BMW-003 A-1 engine in WNr. 170 078 by Karl Baur and Gerd Lindner in December 1944. Result: the BMW power plant still did not appear to be ready for service use, as engines had to be changed four times in the course of the brief flight test program.
- Performance flights and fuel consumption measurements
- Flights with rocket assist. Two takeoff-assistance rockets mounted on fuselage sides producing 500 or 1,000 kg of thrust (RI-502 or RI-503 solid-fuel rockets).
- Preliminary tests for the next generation of jet fighters
- Overcoming of weak points and eliminating shortcomings such as:
  Improvements in the tricycle undercarriage
  Installation of disc brakes
  Pressure distribution measurements (including on the cockpit canopy on account of shattering panes)
  Tests with the fuel tank and reservoir system, as well as the correcting of minor problems such as sealing the cockpit canopy against rain water and overcoming the problem of leaking fuel fouling the radio equipment, as well as several other problems, details of which would far exceed the space available.

On studying the work of the Messerschmitt test team it becomes clear that not only was the Me 262 the most advanced aircraft in the world, but that the experience gained in the course of flight testing and the resulting solutions

pointed the way to the future. The Messerschmitt team's answers to the then new problems, as well as their new methods and proposals, had a decisive influence of the postwar development of the high-speed jet aircraft and today form part of modern aviation technology.*

Two examples:

1. The pressure measurements taken by Messerschmitt engineer Tilch, with their observations of the pressure wave and its movement, may be characterized as the first steps on the road to the supercritical wing.

2. Messerschmitt test engineer Fritz Kaiser developed a method by which the pilot can be shown how to reach a specified altitude and speed as quickly as possible with the optimum fuel consumption.

The technique developed by Kaiser (High Mach Number Diagram, Kaiser Climb Technique) has today found wide use in aviation technology, especially in calculating the performance of fast jet aircraft.

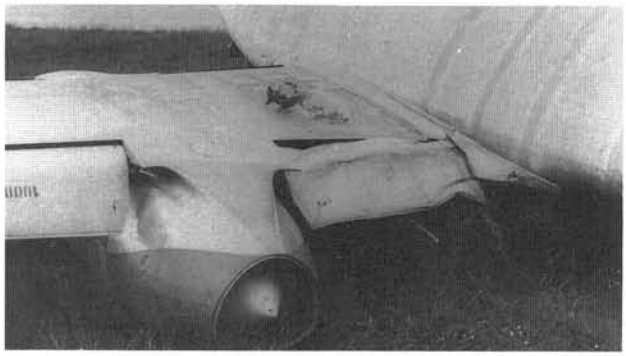
The Fighter Aircraft

The formation of *Kommando Nowotny* did not mean the disbandment of the fighter test detachment at Lager Lechfeld. Charged mainly with training and instructional duties for the jet fighter units then in the process of being formed, on October 27, 1944 it received the designation III./EJG 2. In November 1944 Knight's Cross holder Heinz Bär took over the command of the unit, which was to score about 40 victories before the end of the war. *Oberstleutnant* Bär, who occasionally shot down a Mosquito or a bomber for "practice," ended the war with 220 confirmed kills. *Bussard I* (Bär's code-name) achieved at least 16 of these while flying the Me 262, first with EJG 2 and later with JV 44.

This total made Bär one of the most successful jet pilots of the Second World War, alongside Kurt Welter, Georg Peter Eder, Rudolf Rademacher and Franz Schall.

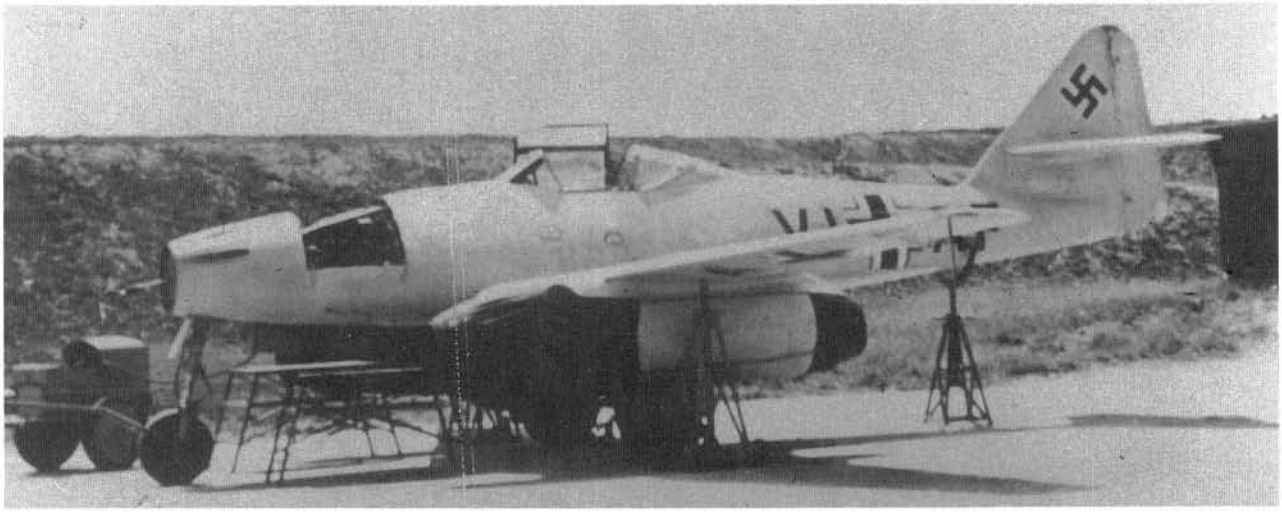
At the end of September Messerschmitt, with Hitler's permission, shifted production priority from the "Blitzbomber"

*See: W. Radinger/W. Schick *Messerschmitt Geheimeprojekte*, Aviatic Verlag, 1990.



Two views of another early Leipheim production aircraft following a landing accident caused by undercarriage failure.

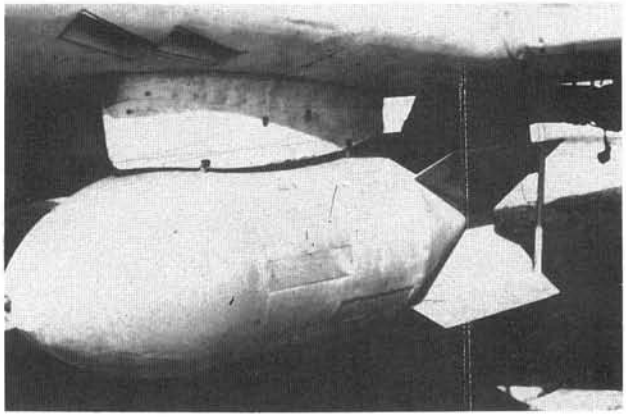
Officer in charge of Erprobungskommando 262: Hauptmann Werner Thierfelder, a South African of German extraction. In this photo taken in the summer of 1944 he is seen standing in front of one of the Erprobungskommando's Me 262s which has suffered a nose-wheel leg failure. From left: Gottsmann, Thierfelder, Caroli and Lindner.



Early series aircraft from the Leipheim production line: Me 262 S1 (VI+AF, WNr. 130 006), first flight April 19, 1944. Here the aircraft is seen on jacks in order to bore-sight the weapons system.

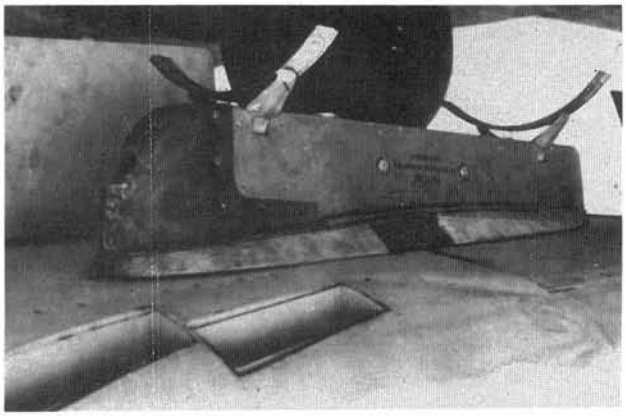
The remains of the Me 262 V7, which crashed at Lager Lechfeld at about 1830 on May 19, 1944 while on its 31st flight. The aircraft's pilot, Hans Flachs, was still on board when the aircraft crashed.

One eye-witness stated: "After jettisoning the canopy the aircraft made a half-roll to the right and crashed into the ground in an inverted attitude at an angle of about 40-50 degrees."



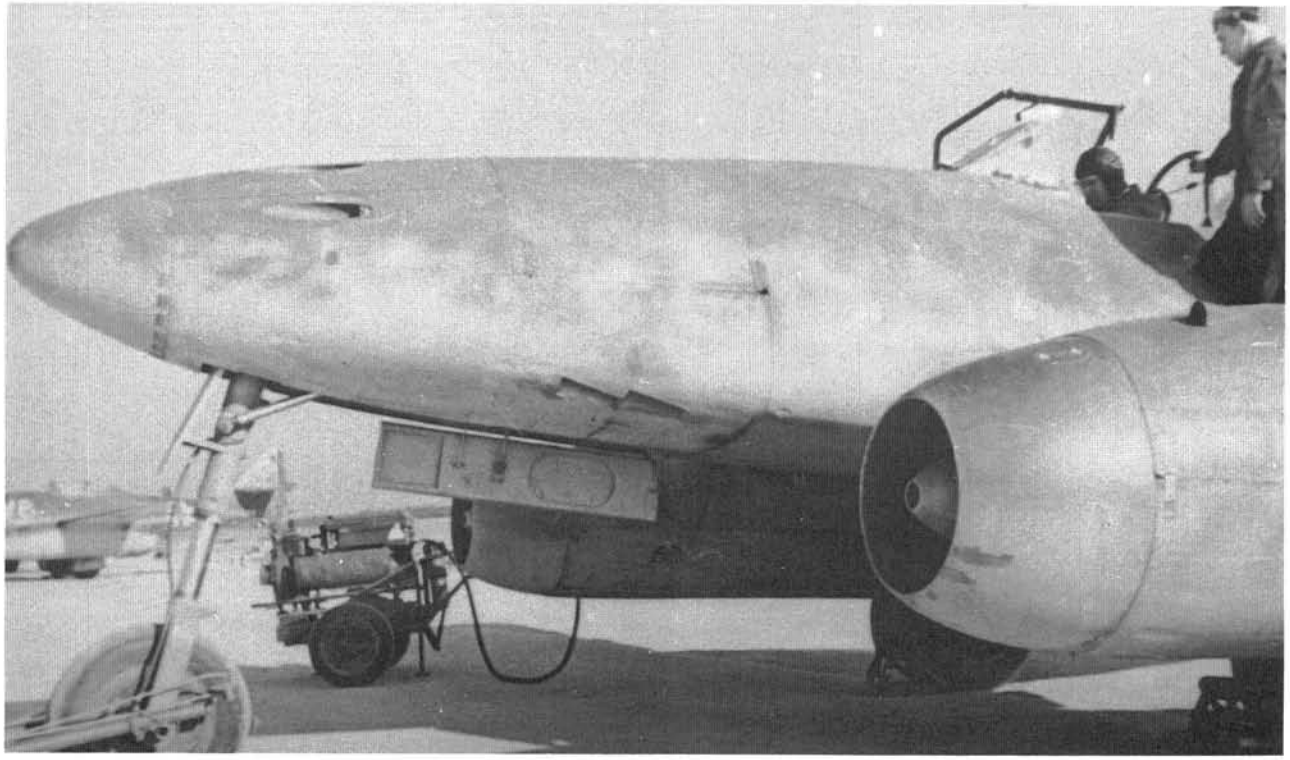
The shallow angle at which the aircraft struck the ground and the furrow left by the vertical fin are evident in this photo.

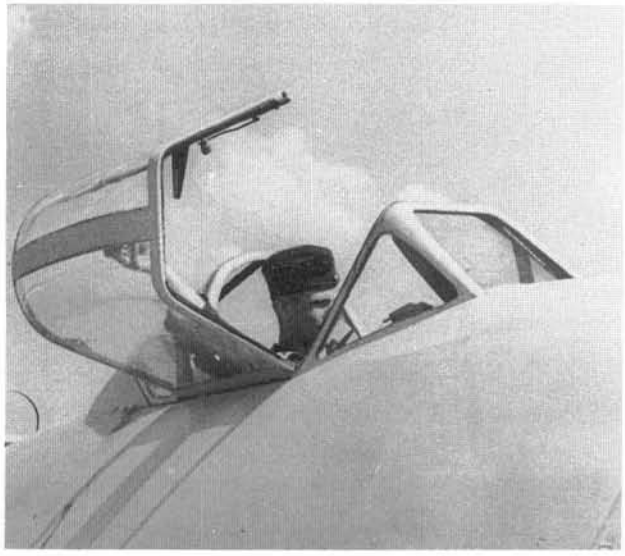
Fighter-bomber testing; the Me 262 V10 with an SC 500 bomb on a Messerschmitt-designed "Wikingerschiff" rack (May 1944).



An alternative to the "Viking Ship": the Me 262 V10 with an ETC 503 bomb rack.

Neither rack – the "Wikingerschiff" nor the ETC 503 – was completely satisfactory and both represented interim solutions; ultimately the ETC 504 was to be used.





Part of the daily routine of Erprobungskommando 262 in May/June 1944: pre-takeoff checks in an Me 262 A-1a. In the background is the Me 262 V8, which was handed over to the E-Kdo.

Close-up photo of WNr. 130 167, SQ+WF (first flight May 31, 1944), which participated in fighter-bomber trials alongside the Me 262 V10 wearing this light grey finish. The aircraft later received a standard camouflage finish and the designation V167.

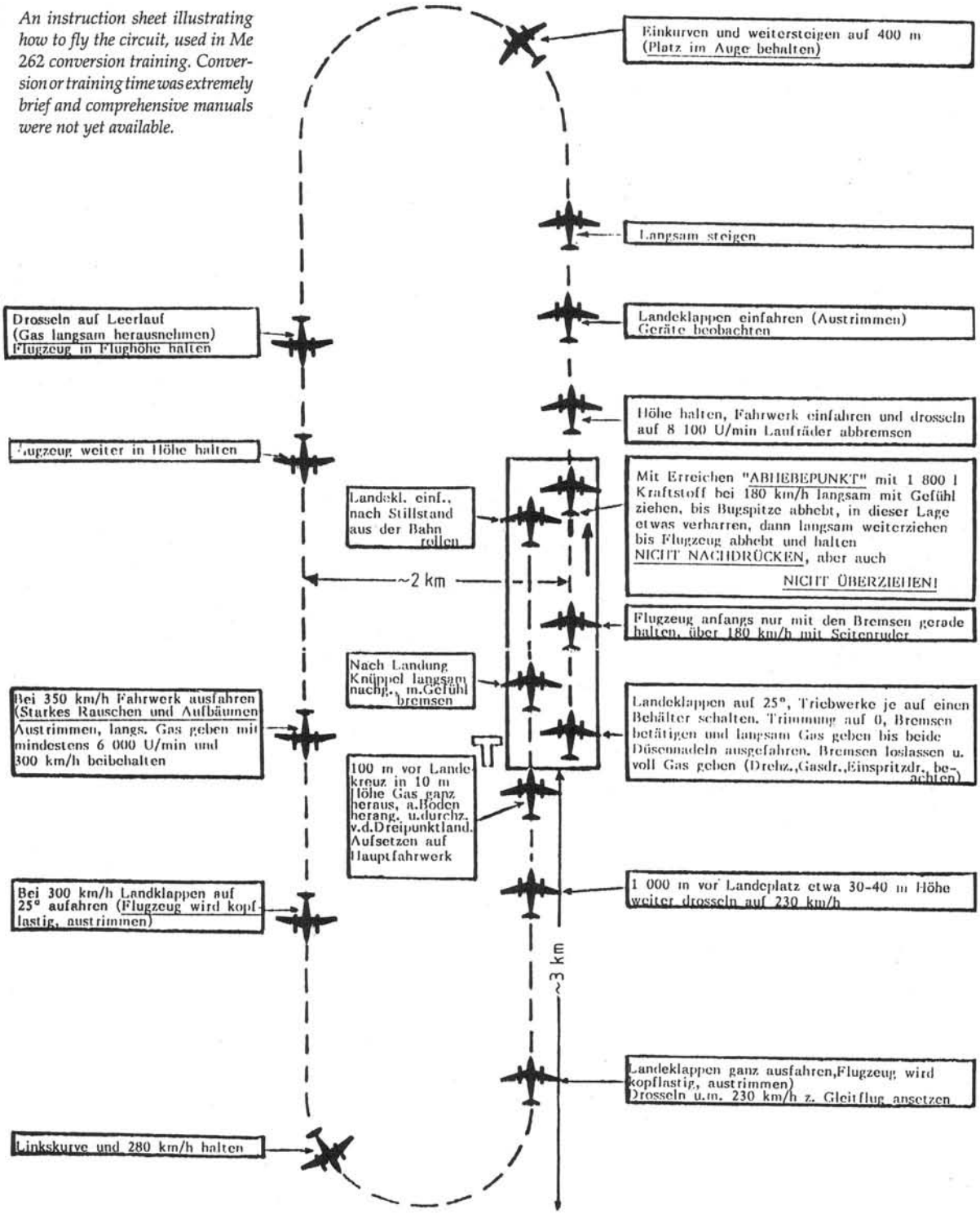
Successful check-out. In the center is Oblt. Ernst Wörner of ZG 26, seen holding the obligatory fir bough which "instructor" Gerd Lindner pressed into his hand after his first solo flight in the Me 262.

Wörner was later placed in charge of Me 262 conversion training while with III./EJG 2.

This happened too: Lindner bandages the head of Messerschmitt employee Wilhelm, whose head was grazed by the wing of a taxying aircraft.

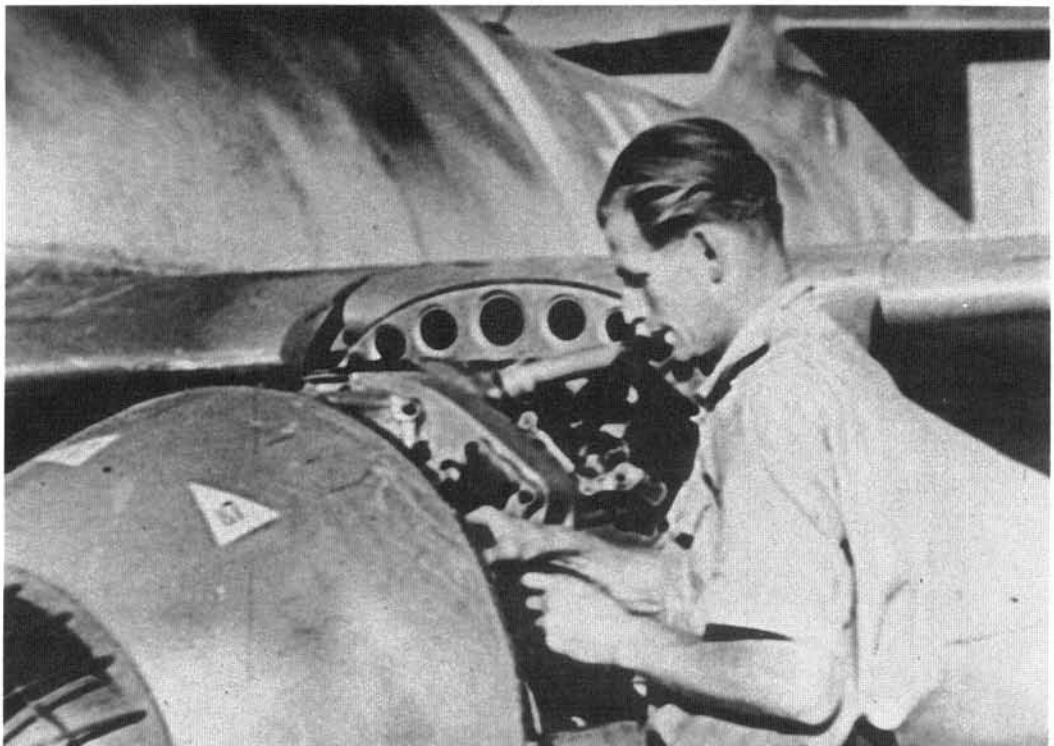
DIE PLATZRUNDE AUF UNSEREM SILBERVOGEL

An instruction sheet illustrating how to fly the circuit, used in Me 262 conversion training. Conversion or training time was extremely brief and comprehensive manuals were not yet available.



Start und Landung = Heilige Handlung

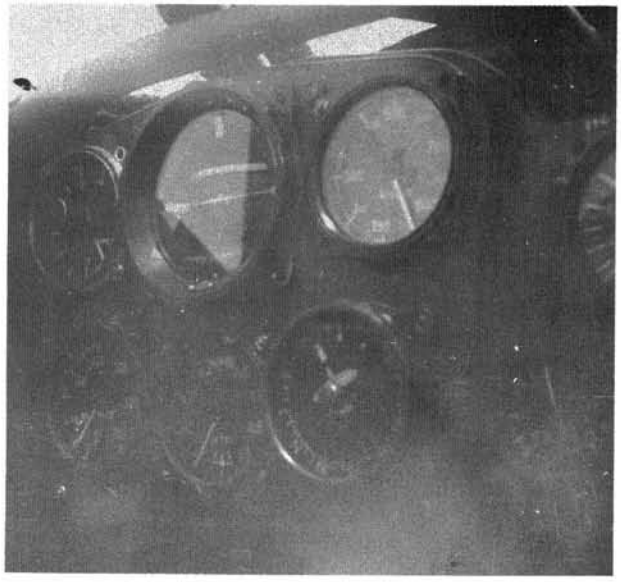
Parade formation of Erprobungskommando 262 aircraft at Lager Lechfeld.



Maintenance on the right engine of WNr. 170 067, "White 3."

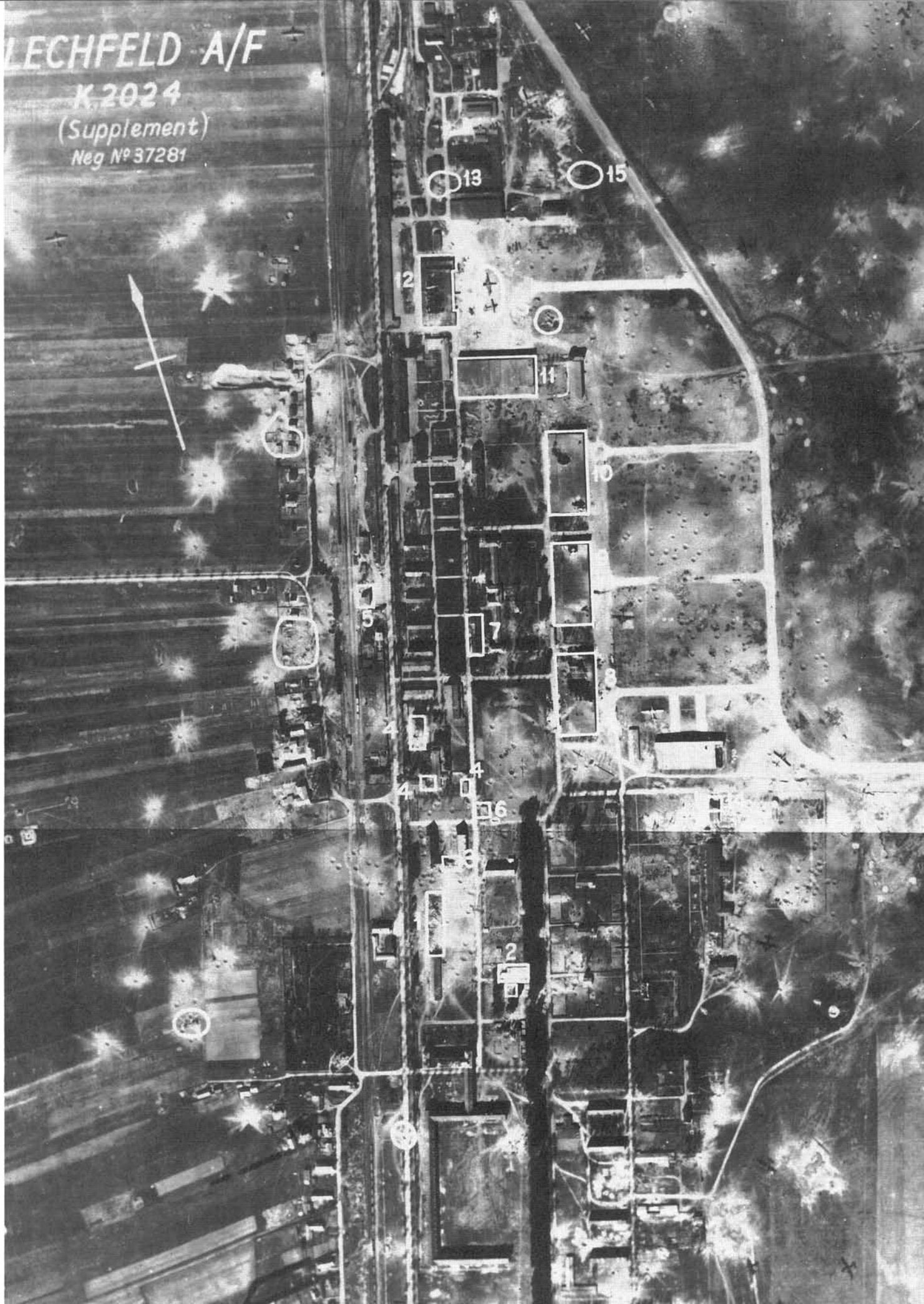
Air attack on the Lager Lechfeld test center, July 18, 1944. The explosions were photographed from a neighboring village.

A photograph of the attack taken from an American aircraft flying at a relatively high altitude. The 1,850-meter-long concrete runway is plainly visible.



The Me 262 became the second aircraft to exceed 1,000 kph, after the Me 163. The airspeed indicator (to the right of the artificial horizon following an exchange of places with the vertical speed indicator) shows 985 kph; allowing for the angle of parallax of the robot camera and the outside air temperature produced a corrected speed of 1,005 kph.

The aircraft used in this test, Me 262 S2 (WNr. 130 007 VI+AG), was a "standard" model from the Leipheim series with metal-skinned control surfaces, external antenna and production-type cockpit canopy.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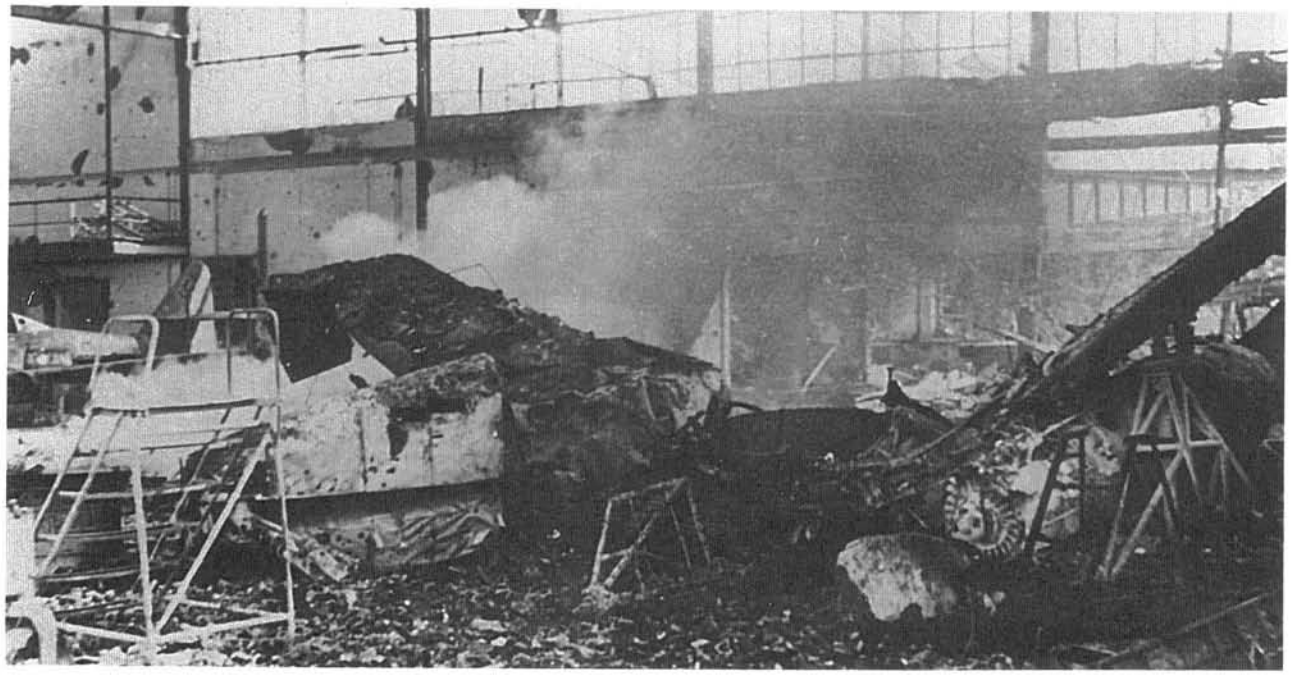


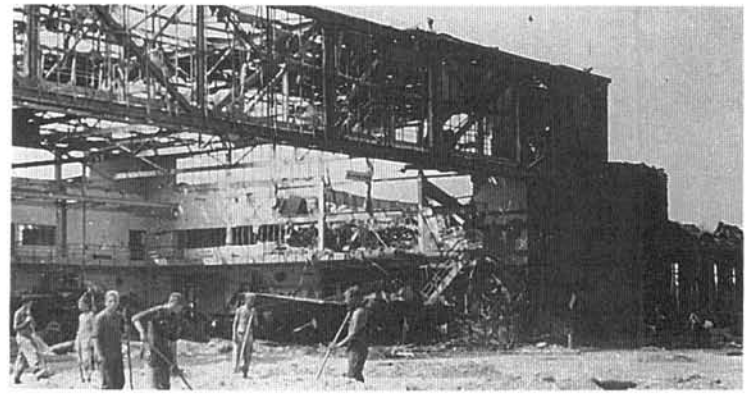
This photograph shows the airfield apron and hangar complex after the attack, including Hangar 5, which housed the Messerschmitt flight test program.

There were numerous He 177s on the airfield at this time, some of which were parked in the field to the left of the road and railroad tracks.

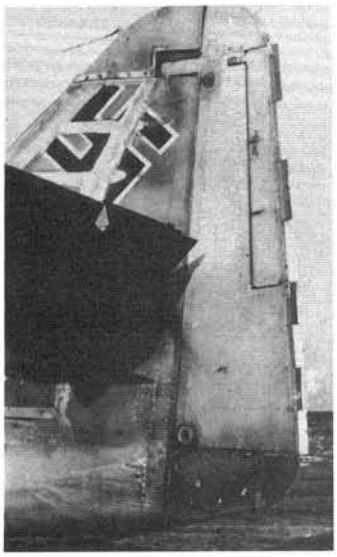
On the ground a scene of destruction. The Messerschmitt hangar is a smoking heap of rubble; visible in the corner is the Me 262 V1 which crash-landed in June.

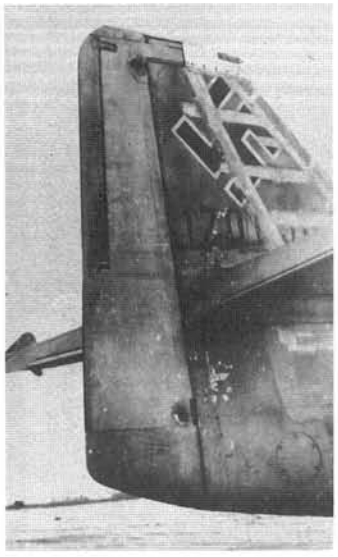
Fire-fighting and clearing-up work inside and in front of the Messerschmitt hangar.

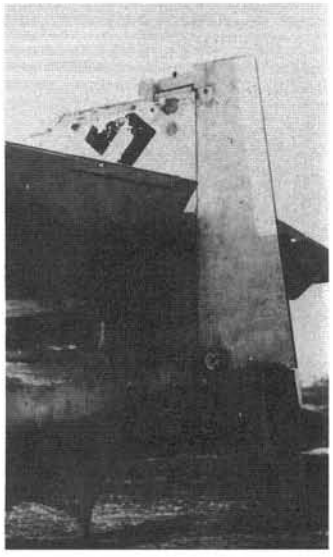
Amazingly, test activities were not halted for a lengthy period by this attack.



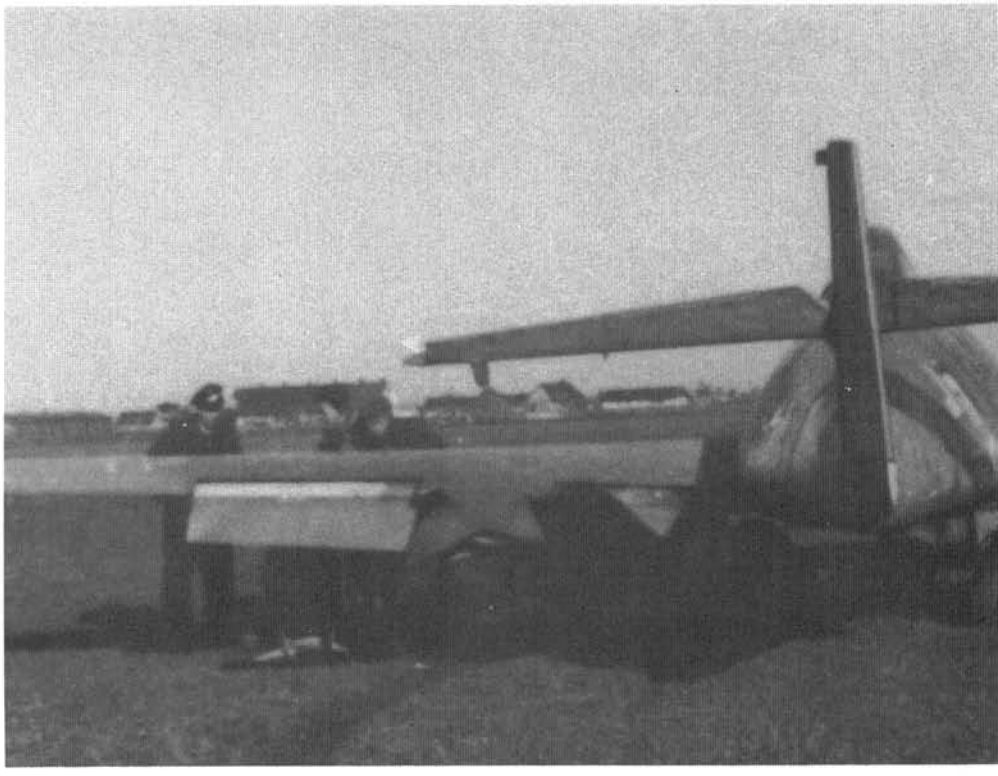
Experiments aimed at improving directional stability at high speeds: the step-by-step shortening of the vertical fin of the Me 262 V056 in order to achieve improved lateral damping behavior.



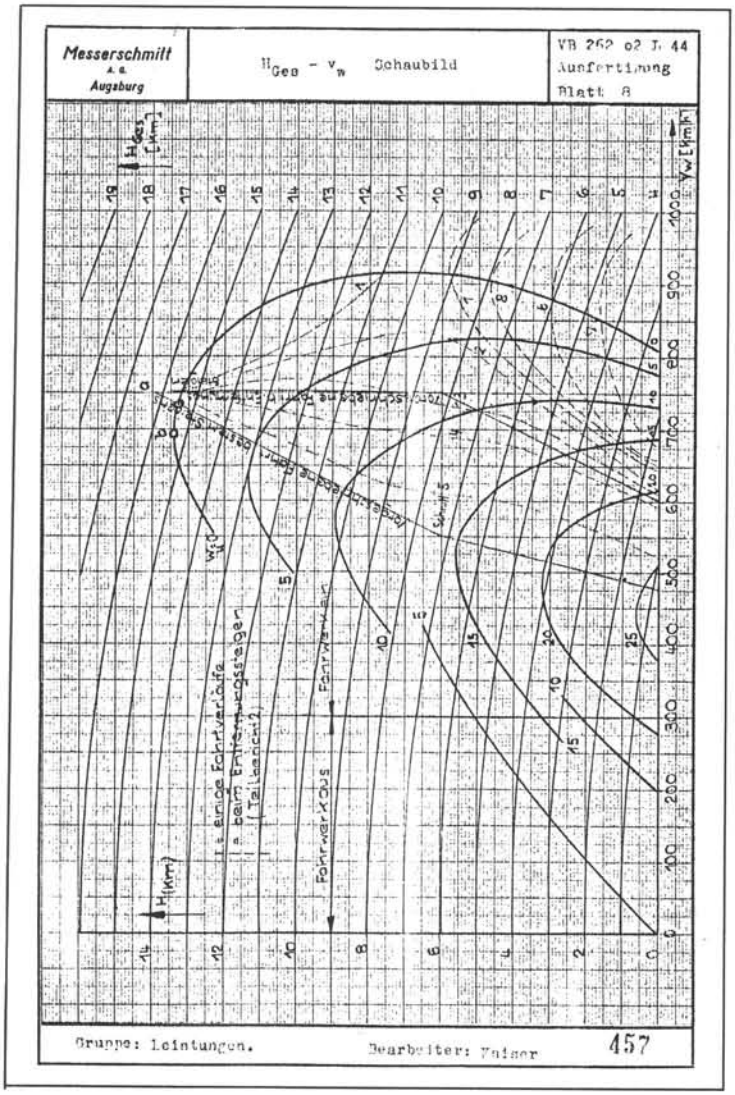




Crash-landing by the V056 with capped vertical fin on December 12, 1944. Lindner had to land the aircraft with one engine seized and a broken-off Riedel starter.



Lindner observed of this "controlled crash": "Luckily the landing gear retracted just before the nosewheel locked; otherwise it would have gone into the munitions bunker!"



Kaiser diagram for the Me 262.

back to the fighter version of the Me 262; in early November authorization was received to concentrate Me 262 production exclusively for the fighter role.

Fighter Armament

The armament of the jet fighter was a constant topic of discussion during development and testing. An important reason for this activity was the heavy defensive armament of the Allied bomber formations and the resulting desire to enable defending German pilots to carry out effective attacks without being forced to fly within range of the enemy's defensive weapons.

Most of the practical development and test work toward this end was done by the manufacturer's flight test program at Lager Lechfeld, in cooperation with the Luftwaffe test stations at Rechlin and, in particular, Tarnewitz.

– Fixed Cannon Armament

The armament of the "pursuit fighter" was initially envisaged as three MG 151/15 (15mm) cannon. In the end the production model Me 262 A-1 received four MK 108 (30mm) cannon and the standard Revi 16b gunsight as "interim" armament. One of the planned solutions was a heavy mixed armament of two MG 151/20 (20mm), two MK 103 (30 mm) and two MK 108 (30mm).

The Me 262 A-1a/U5 represented a step in this direction. The weapons bay of this version, of which only one example (WNr. 111 355) was built, contained six MK 108 cannon, which represented an enormous amount of firepower. Meanwhile at Tarnewitz two further Me 262s were used to test the MK 103 and MG 151/15 weapons. This facility also conducted tests with the EZ 42; this programmable, lead-computing gunsight was supposed to replace the Revi 16b reflector gunsight.

Noteworthy in addition to the efforts to concentrate individual fixed weapons as a means of increasing firepower, was the attempt begun in late 1944/early 1945 to equip the Me 262 with a long-ranging, large-caliber weapon. After the BK5 cannon failed to live up to expectations, at the end of February 1945 WNr. 111 899 was fitted with a 50mm Mauser MK 214 A. Messerschmitt pilots Hofmann, Baur, and Lindner, and Luftwaffe *Major* Herget flew the aircraft, by now designated the Me 262 A-1a/U4, or "Pulkzerstörer" (formation destroyer), during the course of test activities at Lechfeld in March/April 1945, and carried out firing trials with the disfigured fighter.

The second Me 262 converted to carry the MK 214 (WNr. 170 083) crashed near Cherbourg on July 18, 1945 while on a transfer flight. Its German pilot, Ludwig Hofmann, who was flying the aircraft on American orders, escaped by parachute.

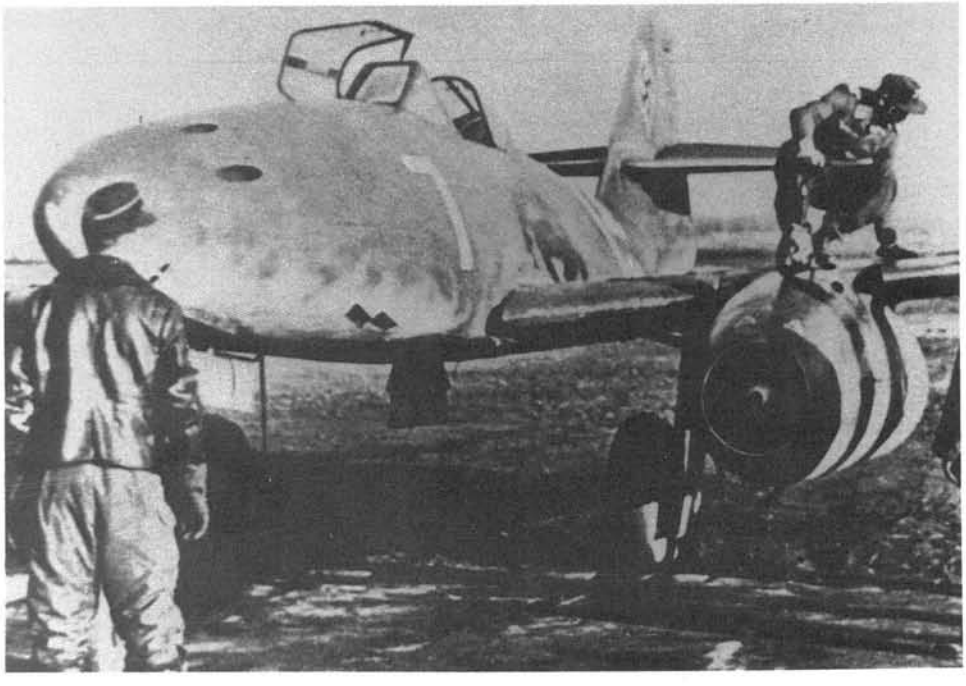
– Unguided Air-to-Air Rockets

The relatively long range, the enormous explosive power, and the generally uncomplicated design and installation of unguided air-to-air rockets made these weapons extremely interesting to the military. The experimental installation of the WGr. 21 on the jet fighter brought less than satisfactory results; installation of the heavy R 100 BS rocket projectile (BS = Incendiary Shrapnel) on WNr. 111 994 also failed to produce the desired results.

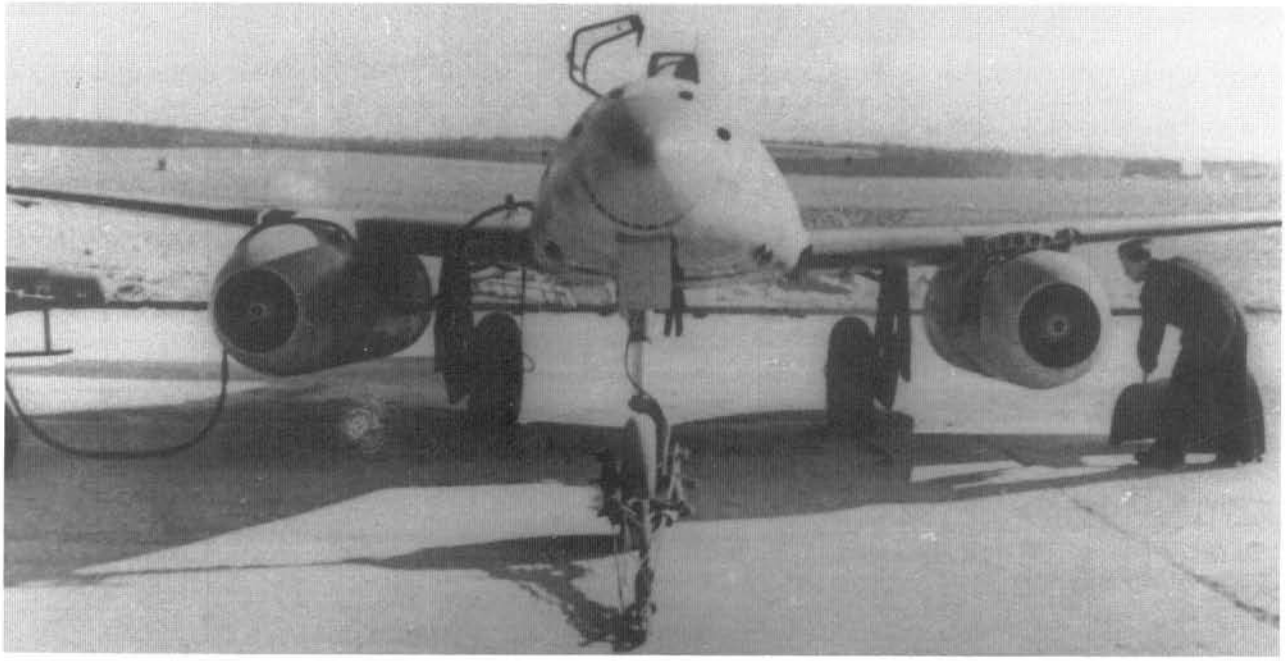
The solution was found in the R4M (M = Explosive Head) air-to-air rocket. Following the conversion of a number of Me 262s using simple means, the first operational use of this

En route stop by an Me 262 at the airfield belonging to the Blumenthal/Nuremburg repair facility in early 1945: as may be seen, the arrival of the jet attracted a great deal of interest.

III./EJG 2 at Lager Lechfeld, November 1944: Knight's Cross wearer Major Erich Hohagen with Oblt. Ernst Wörner in front of Me 262 A-1a "White 7." In the background on the right is a two-seat Me 262 B-1a training aircraft.



"White 7" once again, this time with Ofw. Buchner on the wing.



Men of the ground personnel prepare a fighter of III./EJG 2 for a sortie.

"White 6" of III./EJG 2.

Oberst H. Trautloft trains on the Me 262 B-1a two-seater.

easily-produced weapon took place on March 18, 1945. About sixty Me 262s were subsequently equipped to carry 12 of these approximately 4 kg rockets under each wing; another six aircraft were equipped to carry 24 rockets under each wing.

With four 30mm cannon in the fuselage nose and its R4M rocket armament, the Me 262 became the absolute terror of the Allied bomber crews. The air war had taken a decisive step into a new dimension.

– Guided Air-to-Air Rockets
A further, very expensive, very advanced, air-to-air weapon was the wire-guided Ruhrstahl X-4 designed by Dr. Max Kramer. By comparison with the R4M, this rocket projectile, which was powered by a BMW rocket motor, represented a complicated and thus very costly weapon.

In the first months of 1945 Gerd Lindner flew WNr. 111 994 with an X-4 beneath each wing.

The test pilots never flew combat sorties with this aircraft. Development of the X-4 was cancelled in favor of the R4M after a bombing raid knocked out production of the BMW 109-548 liquid fuel rocket motor.

According to a memo dated November 5, 1944, flight testing was also to investigate the suitability of the radio-controlled Hs 298 as an armament for the Me 262.

According to this document the carriage of four X-4 weapons on an ETC 70/C1 rack or three Hs 298s on a launching device with launch rails was planned.

The Interceptor Fighter

A version of the Me 262 with supplementary rocket propulsion, first proposed in 1943, combined the tactical advantages of a fast-climbing target defense fighter in the style of the Me 163 with the longer endurance of a pursuit fighter.

Because of its excellent climbing performance, an Me 262 equipped in this way would be capable of intercepting a surprise attack, make several firing passes at the enemy and, circumstances permitting, pursue him during his withdrawal.

At the end of July 1943 Messerschmitt staff members Degel and Althoff began extensive investigations into this mode of operation. The two engineers proposed three configurations:

– Interceptor I, with two Jumo 004 C jet engines and one Walter HWK R II-211 rocket engine, armament six MK 108;

– Interceptor II, with two BMW 003 R jet engines with integral 109-718 rocket engines, armament six MK 108 cannon;

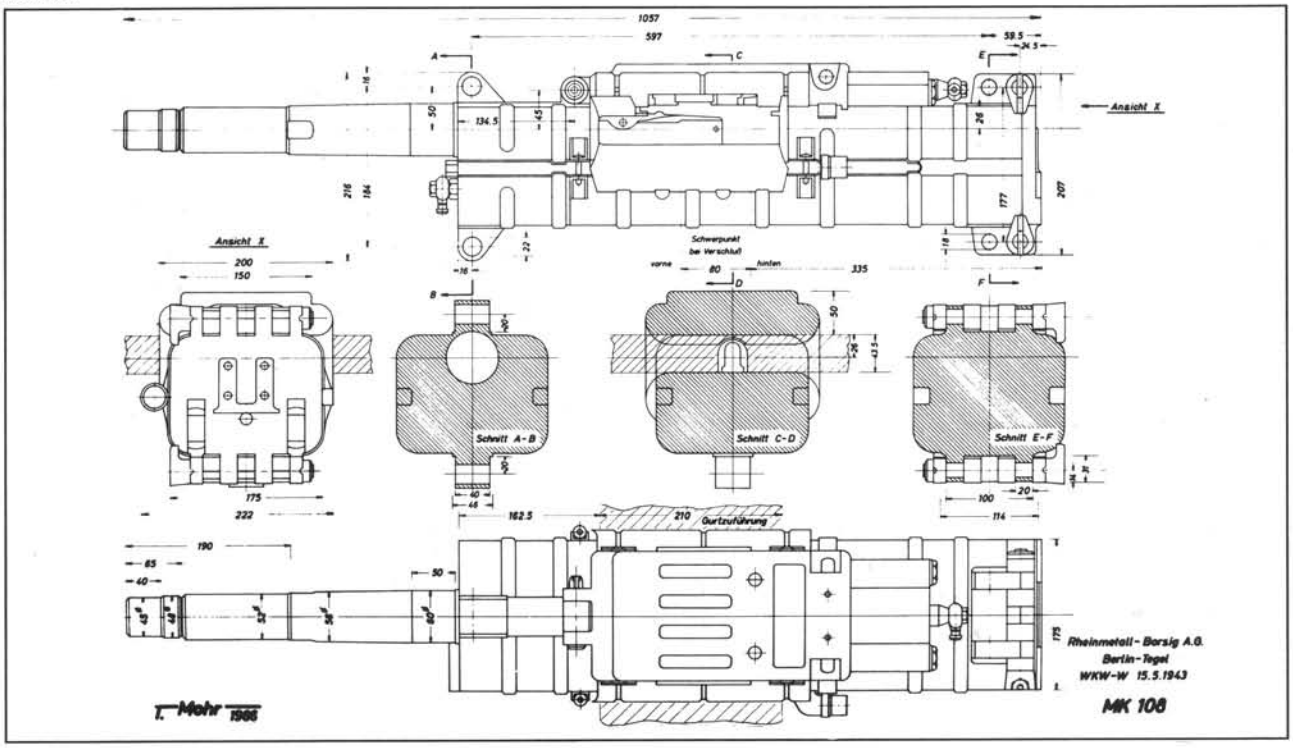
– Interceptor III, with two HWK R II-211 rocket engines in place of the jet engines and an armament of six MK 108 cannon.

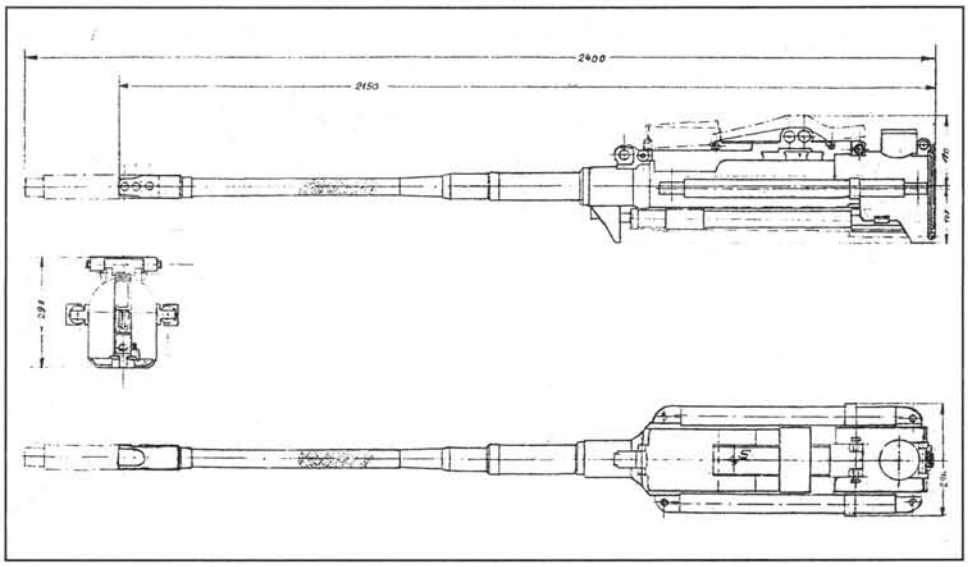
The first two proposals were in fact built and commenced flight testing from Lager Lechfeld prior to the end of the war. The third proposal, the Interceptor III, was not built. In any case a pure rocket fighter was available in the shape of the Me 163.

Interceptor I
The precisely formulated concept put forward by Degel and Althoff first took on a tangible form in autumn 1944.

On September 2, 1944, in what had once been the stables of the former alpine infantry barracks, the Upper Bavarian Research Institute of Oberammergau began converting WNr. 130 186 into the Me 262 C-1a. The installation of the HWK 509 A-2 rocket engine in the rear fuselage necessitated extensive

30mm MK 108 aircraft cannon, interim standard armament of the Me 262.



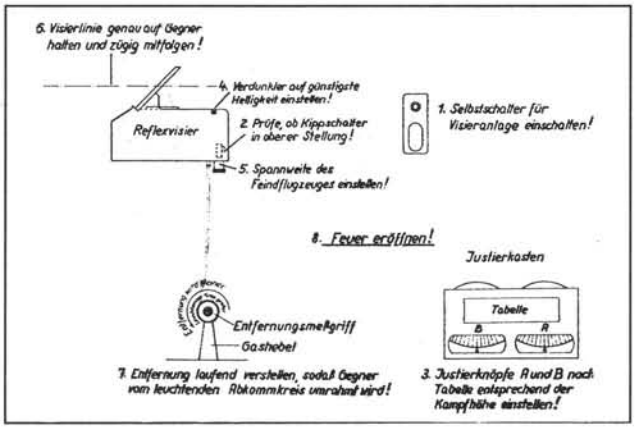


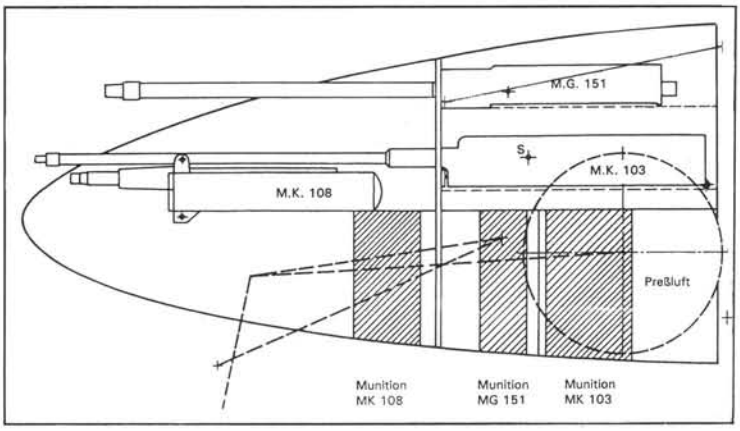
Heavy-caliber weapon for use against Allied bombers: 50mm MK 214 aircraft cannon. This is an original installation drawing from 1943.

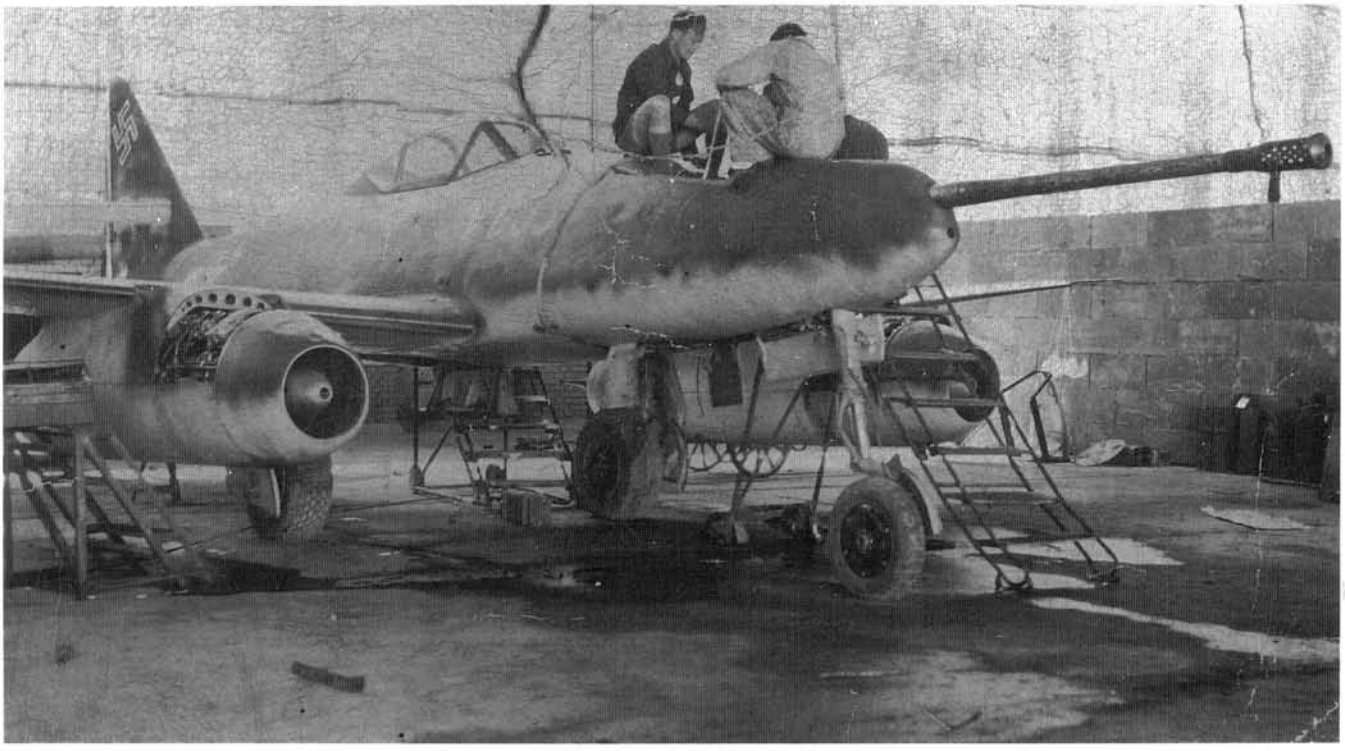
EZ 42 electronic sighting system.

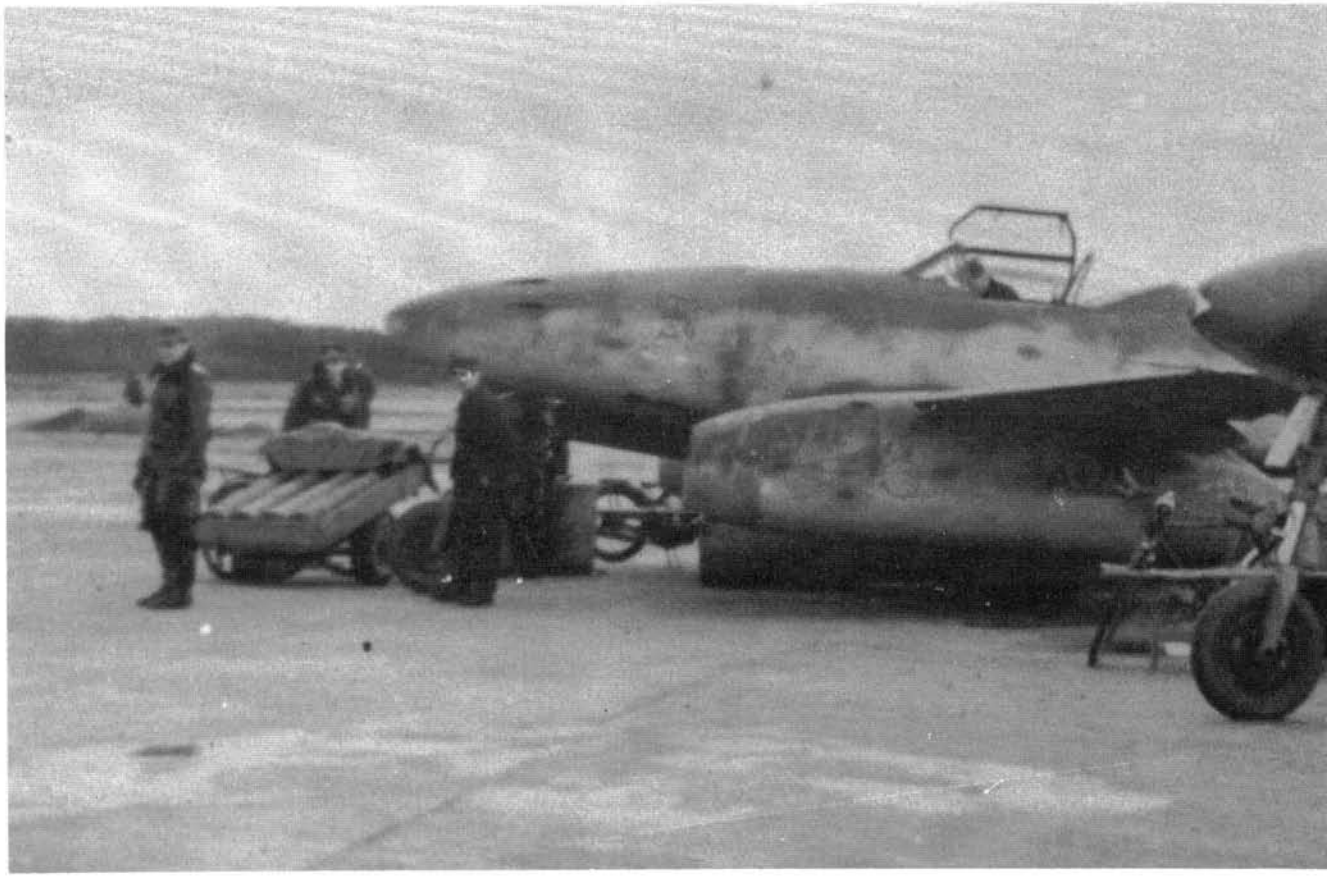
Fuselage nose of the Me 262 A-1a/U1 fighter with a mixed armament consisting of two MG 151 (each with 146 rounds), two MK 103 (each with 72 rounds) and two MK 108 (each with 66 rounds).

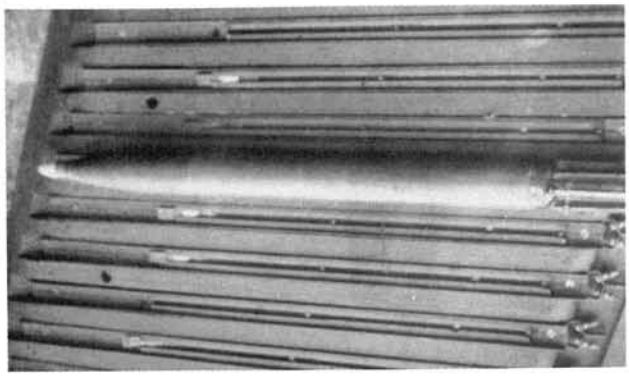
Me 262 A-1/U4 with installed MK 214.

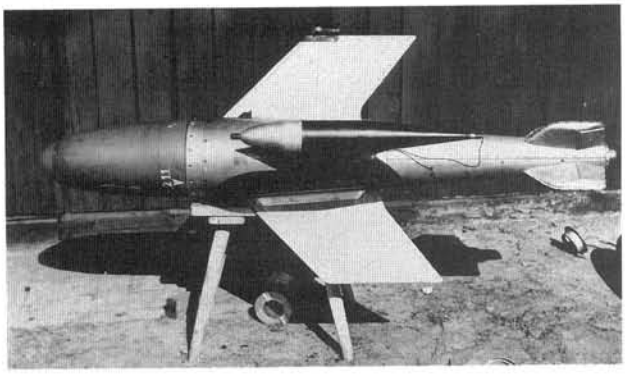




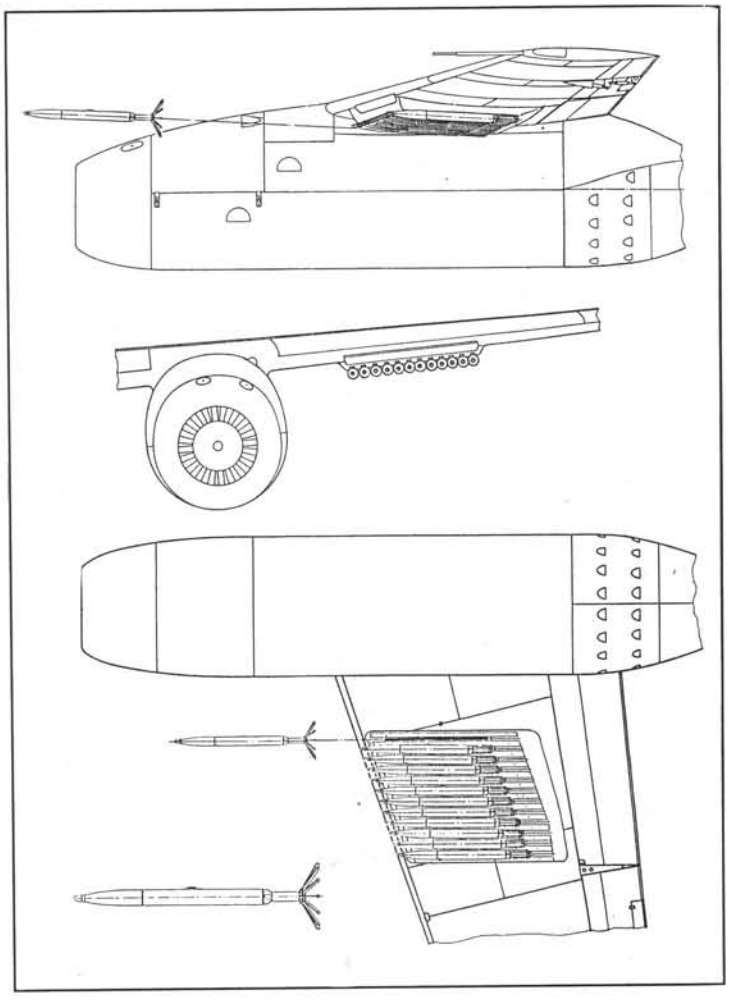








Unguided R4M air-to-air rockets in their launch rack.



Arrangement of R4M launch rack on the wing of an Me 262 A-1a.

Ruhrstahl X-4 wire-guided air-to-air rocket.

Me 262 A-1a "Green 1" of III./JG 7 with launch tubes for the unguided WGr. 21 rocket. The unusual camouflage scheme worn by the aircraft is striking.

changes in the fuel tank system, which had to be modified to accept the additional rocket fuel (*T-* and *C-Stoff*).

Easy accessibility to the rocket engine was achieved by removing the entire tail unit bearer. In addition the great heat to which the aft fuselage was subjected by the exiting jet of gas made it necessary to shorten the aircraft's rudder.

At the end of October 1944 the Todt organization transported the Me 262 C-1a from Oberammergau to Lager Lechfeld by road, using a special vehicle.

Following assembly of the aircraft and two flights on jet power alone, the first static test of the Walter rocket engine took place on October 25, 1944.

Hindered by the new technology, by Allied air attacks, by bad weather, and most of all by material shortages and lack of fuel, it wasn't until January 27, 1945 that Gerd Lindner made the first flight with the rocket motor functioning. With the thrust from the three engines Lindner was able to reach an altitude of 8,000 meters in three minutes.

Six more flights followed the successful maiden flight of the aircraft, which was designated the V186.

On March 23, 1945, a bright moonlit night, an enemy aircraft attacked the interceptor test-bed in its blast pen and inflicted serious damage. In the summer of 1945 the demolished Me 262 C-1a was taken to Farnborough as war booty. There this extraordinary aircraft was examined by specialists of the Royal Aircraft Establishment before it was finally scrapped.

Interceptor II

In mid-November 1943 BMW intensified work on a combined turbojet-rocket engine (TLR).

The project combined a BMW 003 A-1 jet engine with a BMW 109-718 liquid fuel rocket engine.

In this form the unit produced a takeoff thrust of approximately 2,000 kg, with 800 kg of this coming from the 003 A and 1,250 kg from the rocket engine.

Messerschmitt decided to equip a production aircraft with engines of this type.

The conversion of WNr. 170 074 into the Me 262 C-1b was likewise undertaken by the test shop in Oberammergau. On December 20 the Todt organization delivered the Me 262 V074 to Lager Lechfeld. The aircraft was known as the *Heimatschützer II* or Interceptor II.

Following reassembly the aircraft was at first flown on jet power only. As had been the case with the *Heimatschützer I*, enormous difficulties were encountered with the rocket propulsion system. The greatest problem was leaking of the corrosive rocket fuel, and this prevented an early first flight.

This and other problems resulted in delays and it was not until March 23, 1945 that both TLR engines completed a satisfactory static run.

Finally, on March 26, Karl Baur catapulted into the spring sky over Lechfeld on full thrust. In only 1.2 minutes he reached a height of 8,200 meters. The flight and subsequent landing took place without incident.

A second flight was made days later but conditions precluded further testing.

After the war the USA, Great Britain and France all made serious efforts to develop a fast-climbing interceptor fighter with mixed propulsion. However this relatively complicated and somewhat dangerous technology was soon overtaken by the development of effective anti-aircraft missiles and the creation of powerful afterburning engines.

The Me 262 as a Bomb Carrier

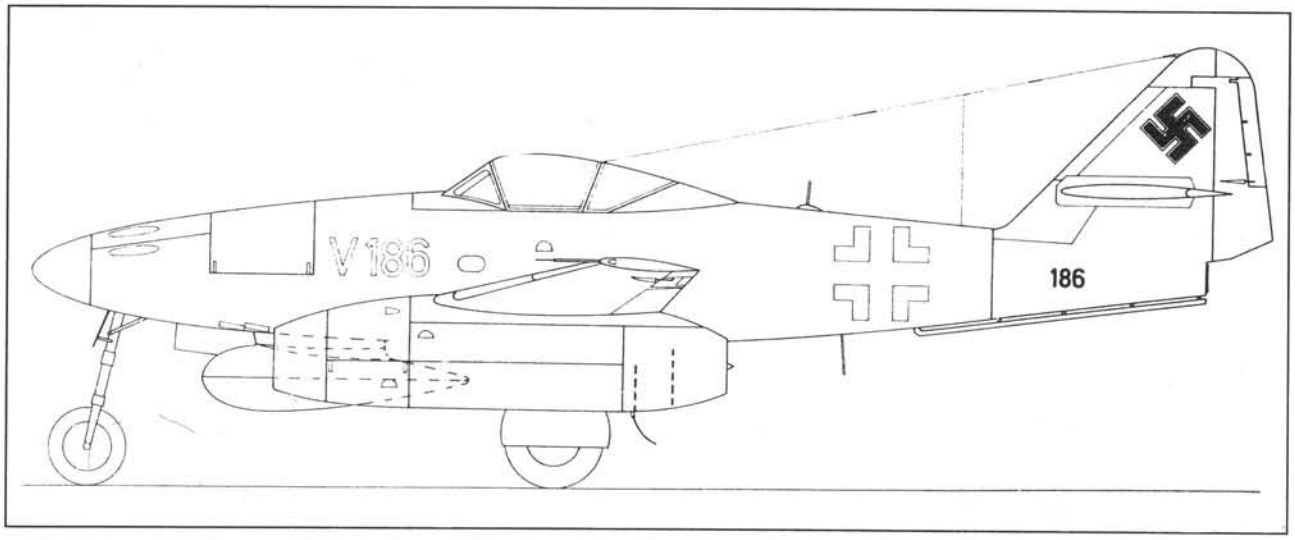
The Fighter-bomber (Schnellkämpfer or Blitzbomber)

In spite of the changeover of Me 262 production to the fighter version, the *E-Stellen* and Messerschmitt continued work to produce an operationally-suitable fighter-bomber. At the end of 1944 the *E-Stelle Rechlin* was primarily engaged in testing diving attacks. For this purpose the test station used *Werknummern* 130 164, 130 188 and 170 070, all of which were equipped with the TSA-A2 low-level and dive-bombing system.

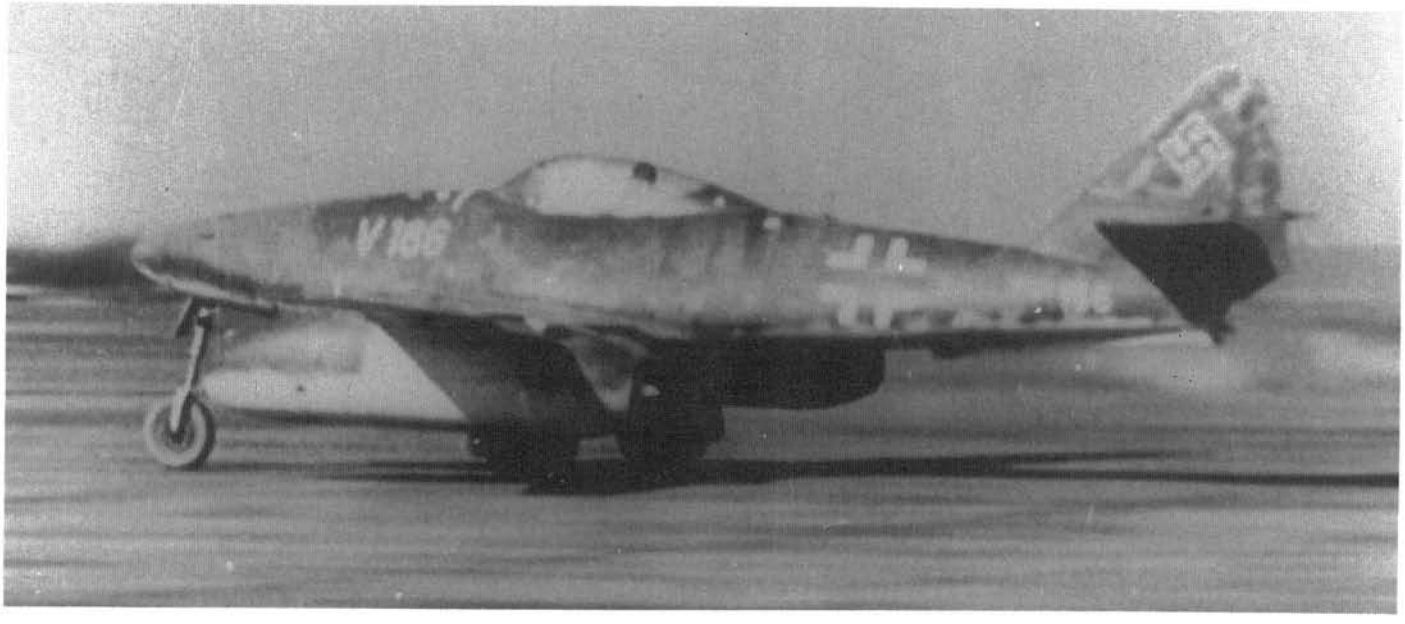
The Rechlin pilots achieved promising results with this semi-programmable onboard computer system produced by Zeiss. "In so far as one can bomb at all using the standard Revi for reasons of visibility, four times as many aircraft are required to achieve the same results as with the TSA-A2." (Rechlin report on January 15, 1945). A fighter-bomber variant equipped in this way was designated the Me 262 A-2a/U1.

Finally, a further fighter-bomber test-bed was available to "Auto Requirements Lechfeld" (code-name for the Messerschmitt flight test program) in the form of WNr. 170 303. Test pilot Herlitzius flew this aircraft, which was initially designated the V7 and later V303, with bomb loads of up to 1,000 kg and two takeoff assistance rockets. These flights also provided their share of difficulties. There were problems with the takeoff assistance rockets, and Herlitzius reported that the machine pitched up after release of the two 500 kg bombs. It is understandable that this was hard on the

Side view of the Me 262 V186, prototype for the Heimatschützer I (also known as the Interzeptor I). Drawing: Th. Mohr.

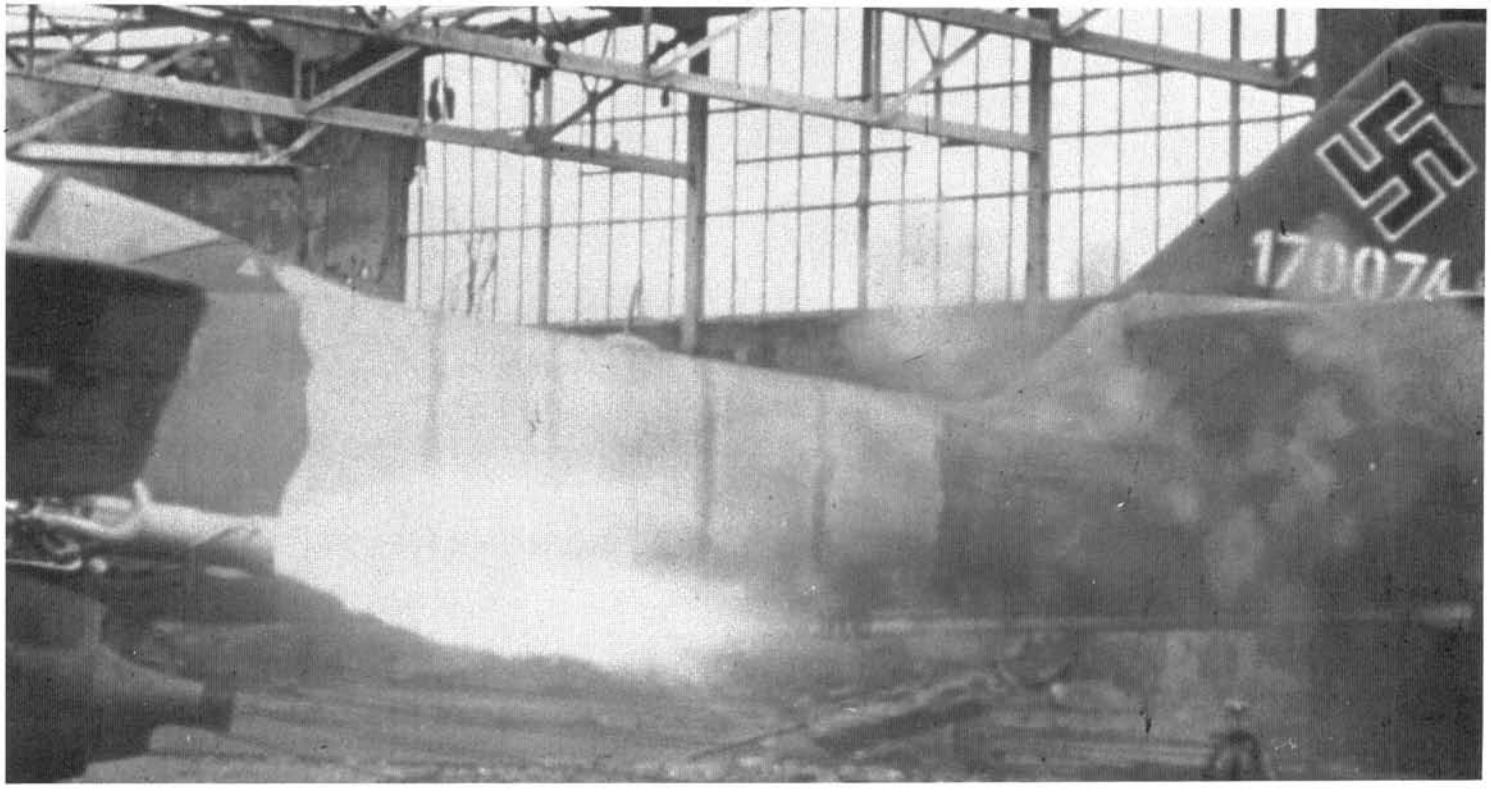


The V186 flying test-bed, which was equipped with an auxiliary rocket motor, photographed during takeoff.



The Me 262 V074, prototype for the C-1b version (the "B" indicated the use of BMW engines) or Heimatschützer (Interzeptor II). The aircraft, which was powered by two BMW 003 A-1 jet engines with superimposed BMW 109-718 liquid fuel rocket motors, was photographed during a successful static engine run on March 23, 1945.

The V074 received a completely new "camouflage scheme" as a result of the aircraft paint being unable to withstand the heat generated by the rocket motors.



nerves, as the bombs were released at a speed of about 700 kph at a height of approximately 800 meters.

Professor Messerschmitt and his Oberammergau Project Bureau under the direction of Dipl. Ing. Woldemar Voigt took advantage of these practical lessons, and prior to the end of the war they produced a series of high-speed bomber and bomber projects based largely on the Me 262.

After the war this work inspired the aviation industries of the victorious powers to produce a series of successful designs.

The High-speed Two-seat Bomber

At the end of October 1944 the flight test program at Lager Lechfeld received an example of the Me 262 A-2a/U2, which bore the *Werknummer* 110 484. In place of the usual weapons bay, this version of the Me 262 had a glazed wooden nose section and was equipped with a Lotfe 7H bomb sight for horizontal bombing. A bombardier lay prone in the nose of the aircraft, and using the 7H bomb sight was expected to be able to bomb accurately, even from high altitudes.

In early January the V484 was joined by the similarly equipped WNr. 110 555 (V555), which also featured the *Lotfekanzel* II (bomb sight nose).

Soon afterward both "Lotfe bombers" were equipped with the K22 automatic pilot from Siemens.

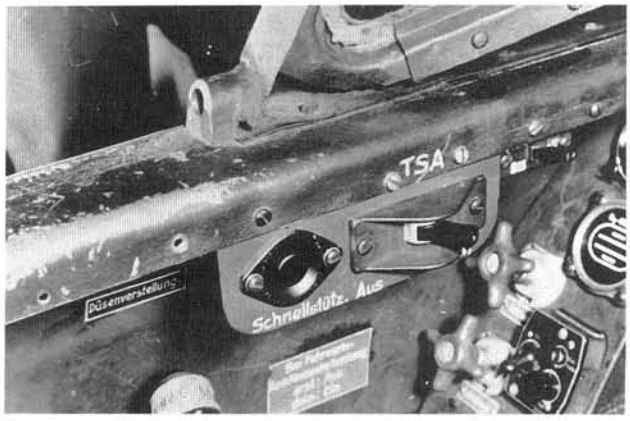
Karl Baur, Gerd Lindner and others achieved very satisfactory results with the V484 and V555, which led to the conclusion that the Me 262 A-2a/U2 was well-suited for its intended role as a high-speed bomber.

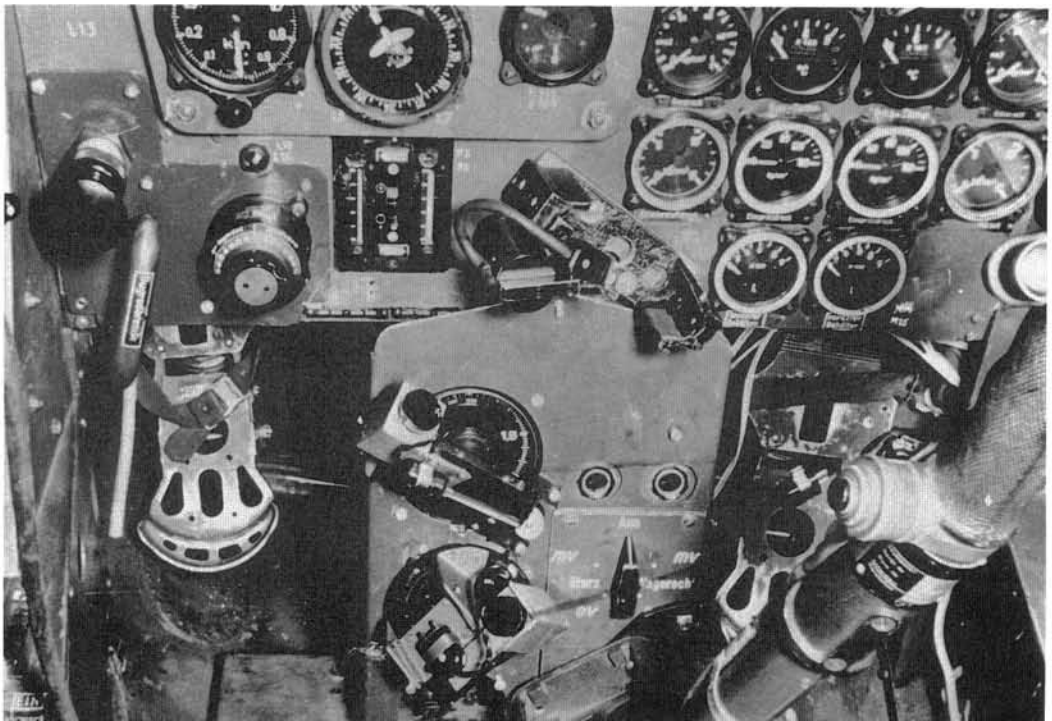
Deichselschlepp

Messerschmitt investigated a rather unusual bombing method in cooperation with the *Deutschen Forschungsanstalt für Segelflug* or DFS (German Research Institute for Gliding Flight). On October 30, 1944 the Me 262 V10, VI+AC, took off with the wings of an Fi 103 (better known as the V 1) on a 4-meter-long tow bar.

On November 18 and 21 Gerd Lindner carried out flights with loads (SC 500 and SC 1000 bombs) suspended beneath the Fi 103 wing. Other loads which were to be carried in this way were a 900-liter fuel tank or a BT 700 bomb-torpedo. Once at the target, the weapon (or the fuel tank when empty) was jettisoned with the tow bar by igniting the explosive attachment bolts. The advantage of this method was that it enabled relatively large loads to be carried without the need for undercarriage modifications and with no significant increase in takeoff distance.

Serious problems were encountered during the initial flights, however: once Gerd Lindner had to land with the bomb still in place, and another time the towed load broke away from the aircraft with a loud crack.





Installation of the semi-programmable Low-level and Dive-bombing System (TSA) in the Me 262 A-1a/U1 fighter-bomber.

Center Left

TSA switch.

Center Right

Visual indicator.

Bottom

Control panel.

Further trials were carried out at Lager Lechfeld in February 1945, which likewise ended with the bomb breaking away. During the flights with towed loads there were problems with instability, barely controllable oscillations, and mechanical problems, and the logical consequence was the cancellation of the program.

The Reconnaissance Aircraft

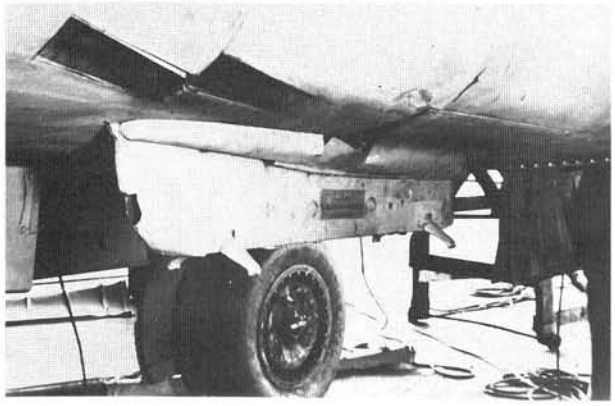
The long-desired and much discussed jet-powered reconnaissance aircraft first appeared as an interim measure. Following the guidelines laid down in the section titled "Possible Roles for the Me 262" from the specification produced in the summer of 1943, about a year later Messerschmitt began converting small numbers of Me 262 A-1a fighters to the A-1a/U3 interim reconnaissance aircraft. In keeping with the Reconnaissance Aircraft I proposal from July 1943 the four MK 108 cannon of the standard fighter version were replaced with two Rb 30/50 cameras in the fuselage nose. Several aircraft were equipped with a single MK 108 in the fuselage nose in addition to their reconnaissance equipment.

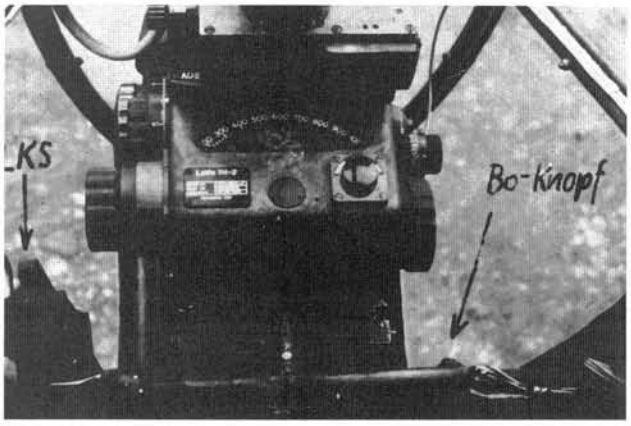
In October 1944 Knight's Cross wearer Oblt. Herward Braunegg formed a unit equipped with the Me 262 A-1a/U3. Designated *Einsatzkommando Braunegg*, the unit initially flew tactical reconnaissance missions in southern Germany. In early 1945 the *Einsatzkommando*, which until the end of the war operated its often small number of serviceable aircraft from Lager Lechfeld, was incorporated into NAG 6.

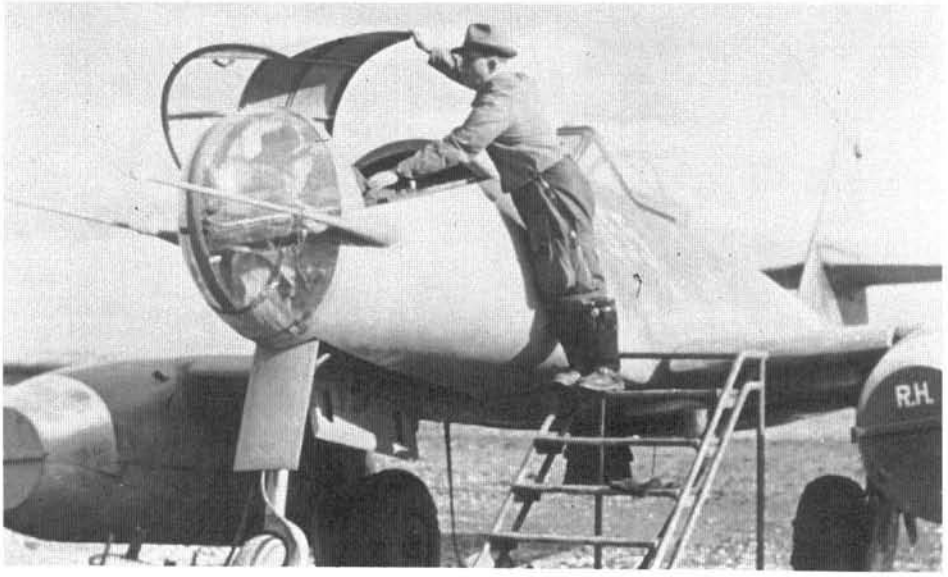
The Night Fighter

It is known that as early as the spring of 1943 the RLM was giving consideration to use of a version of the Me 262 equipped with an acoustic search device in the night fighter role. The RLM concluded that: "From an operational point of view, the use of the Me 262 as a night fighter does not seem to be out of the question, since its superior climbing and diving speeds may not make it absolutely necessary for the aircraft to go to a 'waiting position'."

Use of the Me 262 as a night fighter was not foreseen in the "Possible Roles for the Me 262" section of the September 11,







The ETC 504 bomb rack, which finally met all the demands for use on the Me 262 fighter-bomber.

Frontal view of Werknummer 110 484, the first Me 262 A-2a/U2 "Lotfe Bomber," seen here carrying two SC 250 bombs.

"Work station" of the bombardier, who occupied a prone position, in the Me 262 V484.

The second Me 262 converted to carry a bombardier in a glazed nose position was WNr. 110 555.

1943 specification. However none of the aircraft then available to the Luftwaffe was capable of intercepting by night the Mosquitoes which accompanied the Anglo-American bombers. During the night raids the very fast, twin-engined "wooden wonder" took on the roles of bomber, night fighter and, what was particularly vexing, pathfinder for the bombers.

It is no wonder therefore that the calls from the German night fighter force for a superior aircraft grew ever louder. The experiences of the past months with Mosquito reconnaissance aircraft operating by day showed that jet aircraft were the best answer to combating this type of aircraft.

Tests relating to the electro-acoustical detection of propeller-driven aircraft, which carried out during 1944 with an Me 262 and a twin-engined Me 410, pointed in this direction. However this promising work did not find any practical application.

On July 18, 1944 representatives of Siemens, Telefunken, the RLM and Messerschmitt discussed the installation of radar in the Me 262 for various purposes (night and bad-weather fighting, use against naval targets, etc.).

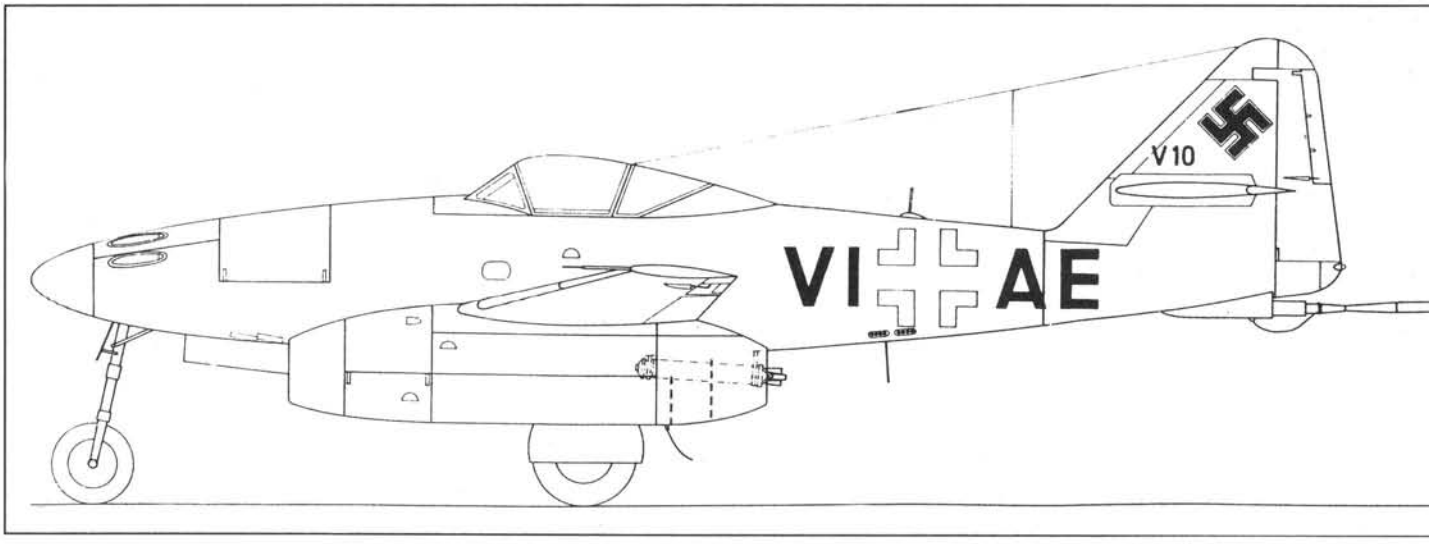
In early September 1944 the responsible offices and Messerschmitt AG initiated serious efforts to develop and build a night fighter based on the two-seat Me 262 B-1a training aircraft. Conversion of the aircraft to Me 262 B-1a/U1 night fighter standard was to be undertaken by the main workshops of Deutsche Lufthansa at Berlin-Staaken. The

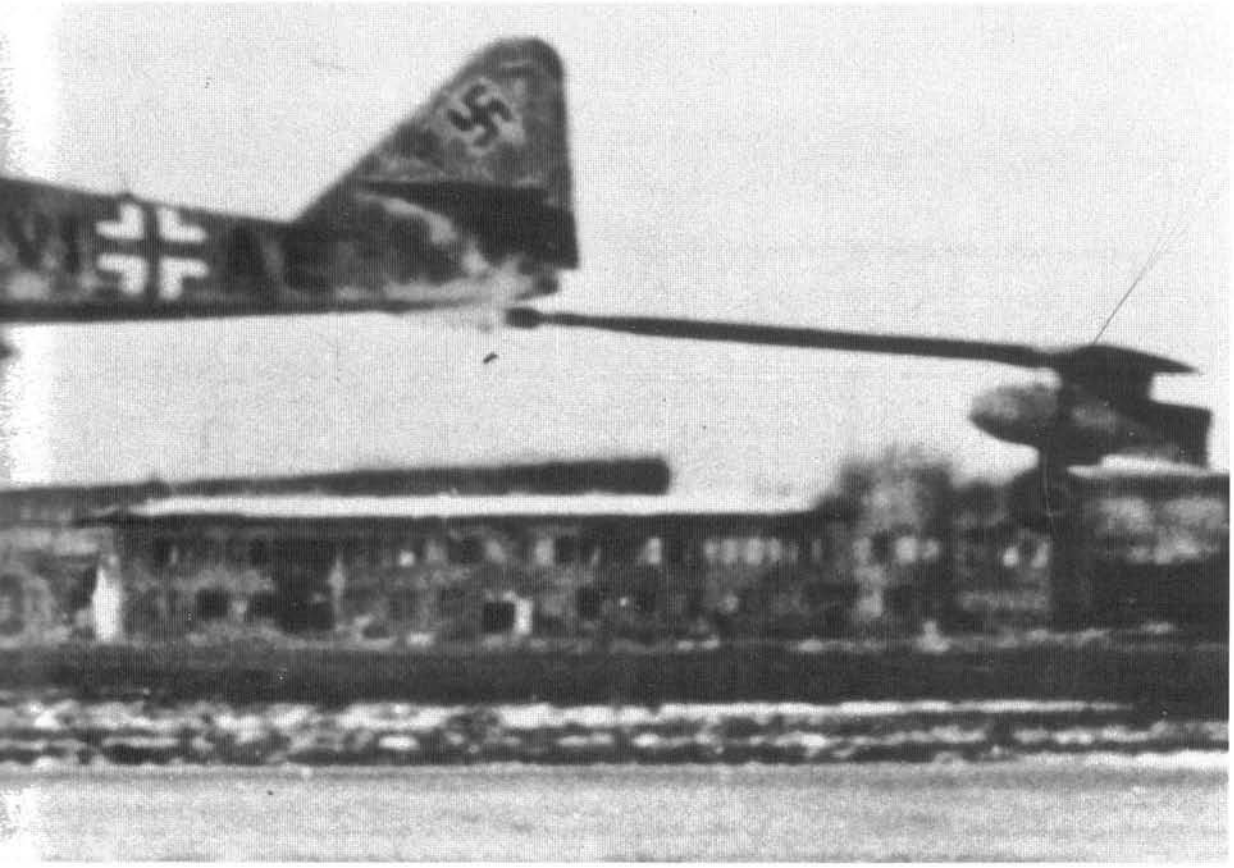
Center

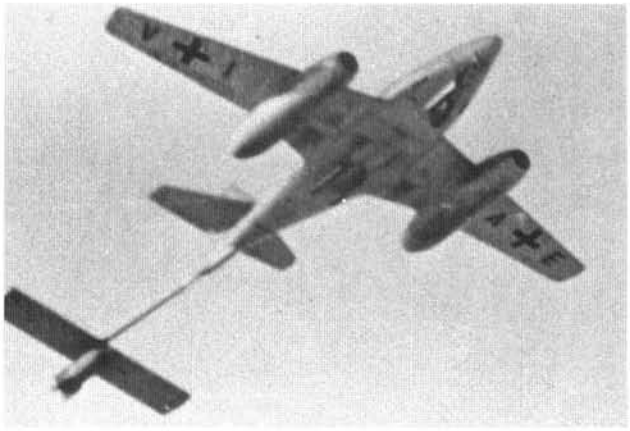
The Me 262 V555 photographed just after lifting off from the runway. The bombardier feared nothing so much as the well-known collapse of the nosewheel, as this placed him in an extremely vulnerable position.

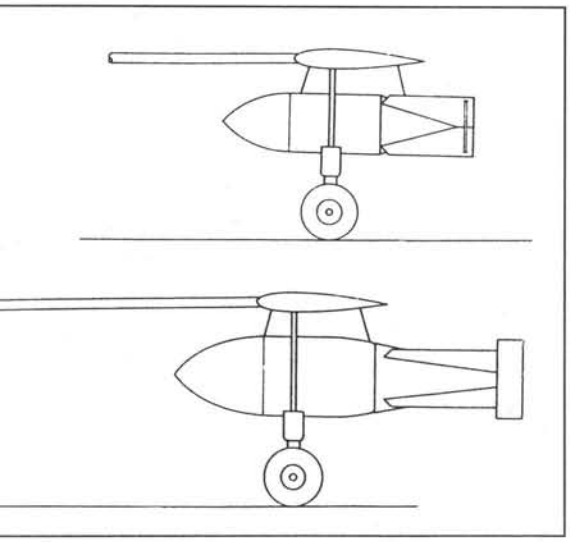
Bottom

The Me 262 V10 VI+AE with towed bomb loads, SC 500 (above) and SC 1000 (below). Drawing: Th. Mohr.









Top

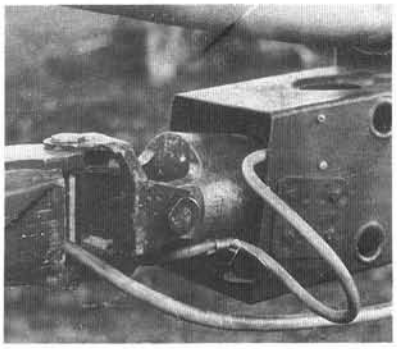
The unusual team lifts off under the skillful control of Gerd Lindner

Center Left

... and flies, at least at first, stably; however as speed increased so too did the problems. Lindner's comment: "The trials will always stay in my memory."

Center Right

The SC1000 on the tow bar beneath the V1 wing.



Bottom

Coupling beneath the rudder of the Me 262 for the four-meter-long tow bar, which had a diameter of 100mm.

work mainly involved the installation of electronic equipment (FuG 218) and alteration of the fuel tank system.

Professor Messerschmitt, who saw this model only as an interim solution on the road to the actual Me 262 B-2 night fighter, remained responsible for the overall development.

Meanwhile, taking into account the bomber stream methods employed by the RAF, two Luftwaffe officers with the *E-Stelle Rechlin* tried something else: In October/November 1944 *Oberst* Hajo Hermann and *Major* Otto Behrens flew experimental "Wilde Sau" (Wild Boar) night fighter sorties in the single-seat Me 262 A-1a WNr. 170 095. This night-fighting method, which Hermann had proposed in 1943 and which was practiced by JG 300, required only searchlight and illumination flare support and dispensed with the usual night fighting equipment. Behrens and Hermann achieved respectable tactical results, and their Me 262 night sorties were to have a spectacular sequel over Berlin: when, on October 18, 1944, *Leutnant* Kurt Welter was awarded the Knight's Cross after 33 victories, he used the opportunity to present his proposals for night fighting with the Me 262 A-1a to the Luftwaffe General Staff. The presentation made an impression and Welter was given the green light for the bold undertaking.

On December 12, 1944, flying a slightly modified Me 262 A-1a, Welter scored the first night victory by a jet fighter.

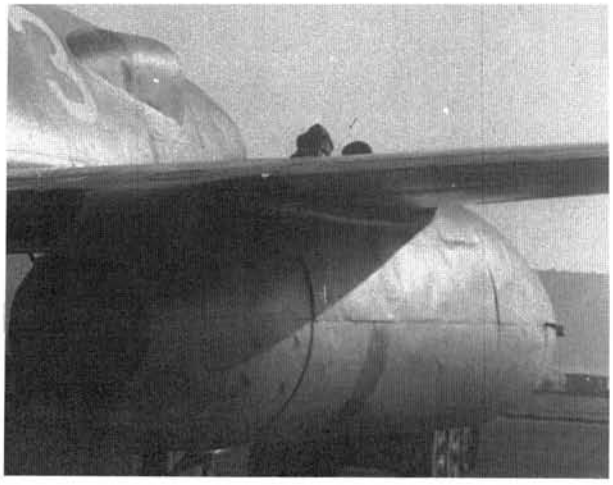
Welter subsequently flew night fighter missions, usually on his own, as *Kommando Welter*. In January 1945 *Kommando Welter* became the 10th Staffel of NJG 11 (10./NJG 11). A report dated February 19, 1945 stated: "For several days Kommando Welter, which belongs to NJG 11, has been stationed at Burg, near Magdeburg. Oberleutnant Welter flies night fighter missions using the Wilde Sau method. The only additional equipment his aircraft have compared to the standard model is UV lighting, a map reading lamp and an emergency turn-and-bank indicator. Welter, who until now has been the only one to fly combat missions, has already scored five victories with this type. Welter's five pilots are in the midst of conversion training. The Kommando possesses six aircraft. It is expected that all aircraft will see action in the near future."

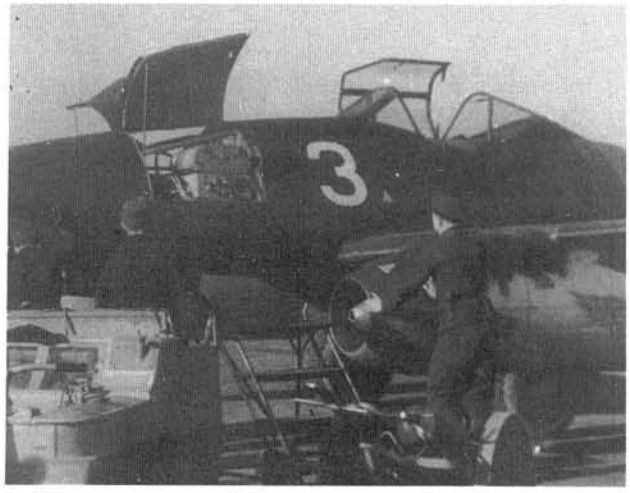
An NSU Kettenkrad tows an Me 262 tactical reconnaissance aircraft of Kommando Braunegg to the end of the runway. Note the single MK 108 cannon in the fuselage nose.

A view of the two Rb 30/50 cameras installed in place of the four MK 108 cannon of the standard fighter version. The machine is painted in the standard camouflage scheme with the aircraft number in white and a yellow fuselage band.

Identifying feature of the Me 262 A-1a/U3 interim reconnaissance aircraft: the camera bulge.

After the mission the analysts wait for the Rb 30/50 camera which has just been removed from the aircraft.





Finally, in March 1945, *Kommando Welter* received the first Me 262 B-1a/U1 interim night fighters. Just prior to the end of the war the unit transferred to Schleswig, where it was captured by the advancing British.

Kurt Welter ended the war with a total of 63 confirmed victories, 56 of them by night, which he achieved in 83 combat missions. Included in this total are 25 four-engined bombers and no less than 35 Mosquitoes. His 35 kills by night and day as the pilot of an Me 262 (according to a statement by a fellow Staffel member) makes him the highest scoring jet fighter pilot to date. This outstanding pilot was killed in a traffic accident on March 7, 1947.

Messerschmitt's efforts to create a specialized night fighter went on with undiminished intensity against the backdrop of this operational testing.

On March 9 at Lager Lechfeld Karl Baur flew the Me 262 V056 equipped with nose-mounted antenna array and vertical blade antennas in the wings. The aircraft was to provide information about the behavior of the antenna array at very high speeds and the most favorable shape of the antennas themselves. In addition it was to ensure that the antennas would be able to remain fully functional when the four MK 108s were fired.

The V056 was equipped with the radar antennas only and not with the radar itself. The aircraft was not intended for operational testing.

The Me 262 B-2a night fighter took shape at the beginning of 1945. A schedule produced for the Americans in June 1945 lists the night fighter as ready to fly in mid-April. By then, however, testing or even use in combat was out of the question.

But the plans of the Oberammergau Project Bureau went far beyond that; the latest engines and most modern aerodynamics were to be used in a more capable night fighter derived from the Me 262 B-2a. However the proposal of February 12, 1945, with two He S 011 turbojets in the wing roots and a 45 degree swept wing, and the "definitive" proposal of March 27, 1945, with reduced sweep-back remained more of an academic nature.

The High-speed Aircraft

Professor Messerschmitt, who had become involved in the development of the swept-back wing in early 1940 and who was responsible for extensive basic research, was already planning to equip the Me 262 with 35 degrees of wing sweepback in April 1941. (Swept wing II)

However the priority assigned to the production aircraft forced a temporary suspension of this work.

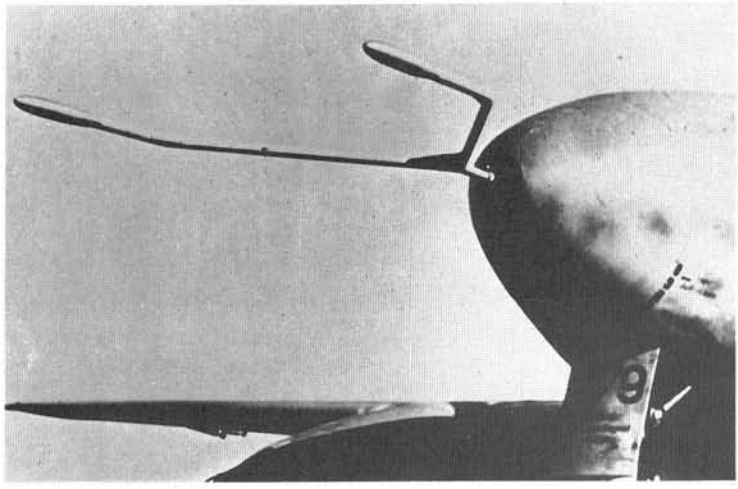
It was not until July 1943 that Prof. Winter stated in a memo: "Our Me 262 is currently flying at a Mach number of 0.75, or very close to the point beyond which the influences of compressibility make themselves strongly felt. Flight testing with the Me 262 is already pointing to this. Therefore a revival of the swept wing Me 262 project, which is suspended at this time, appears advisable, and if that is the case also a participation in the trials planned by Heinkel together with the DFS." Note: this refers to drop tests with scale models of the P 1068 (preliminary work on a multi-jet bomber with swept wings) by the German Research Institute for Gliding Flight at Ainring. On February 10, 1944 Dr. Erben of Messerschmitt and Dr. Göthert of the DVL set up a program for drop tests with a total of 24 models of the Me 262 in 1:5 scale. Purpose of the tests was the investigation of stability behavior at high Mach numbers and determination of the drag coefficient as a function of the Mach number. In charge of conducting these tests was Prof. Ruden of the DFS in Ainring.

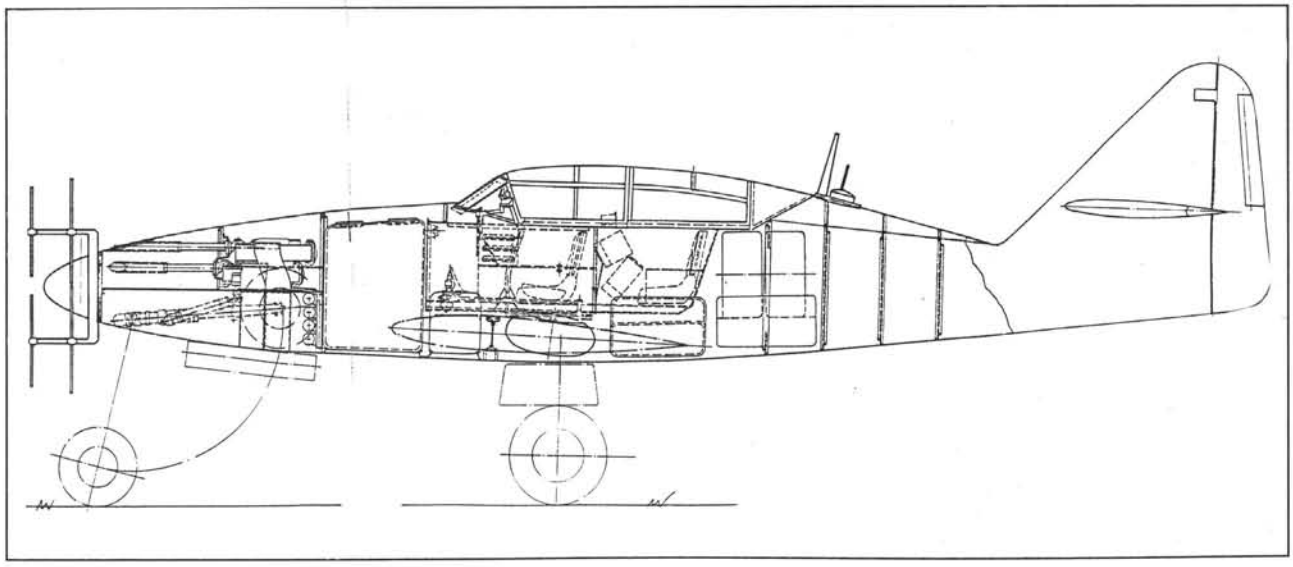
Not long afterward, on February 16, 1944, the Oberammergau Project Bureau (Seitz Group) followed this with the "High Speed Program," which discussed the way in which a "maximum speed aircraft" was to be created on the basis of the 8-262. In the course of subsequent research work and the associated planning for new fighter and bomber aircraft, the Me 262 eventually evolved into the starting point for the program and became the test-bed for the aircraft of the future.

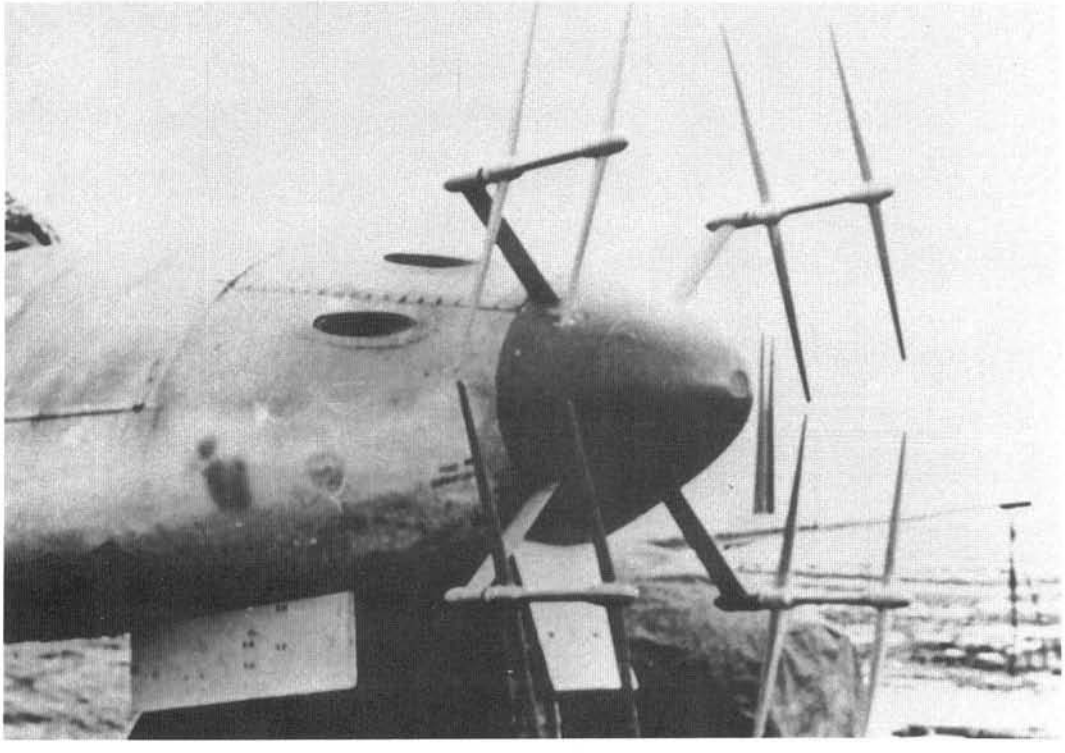
Me 262 V9 VI+AB, which was fitted with nose-mounted probes for tests in electro-acoustical homing.

Aircraft of 10./NJG 11 lined up in parade formation following their surrender to the British at Schleswig-Jagel in May 1945. At this point the Kommando consisted of four Me 262 A-1a single-seaters and two Me 262 B-1a/U1 two-seat night fighters.

The second aircraft from the right is Me 262 B-1a/U1 "Red 6", WNr. 110 306. "Red 8", WNr. 110 305, remained behind at Magdeburg.







Top

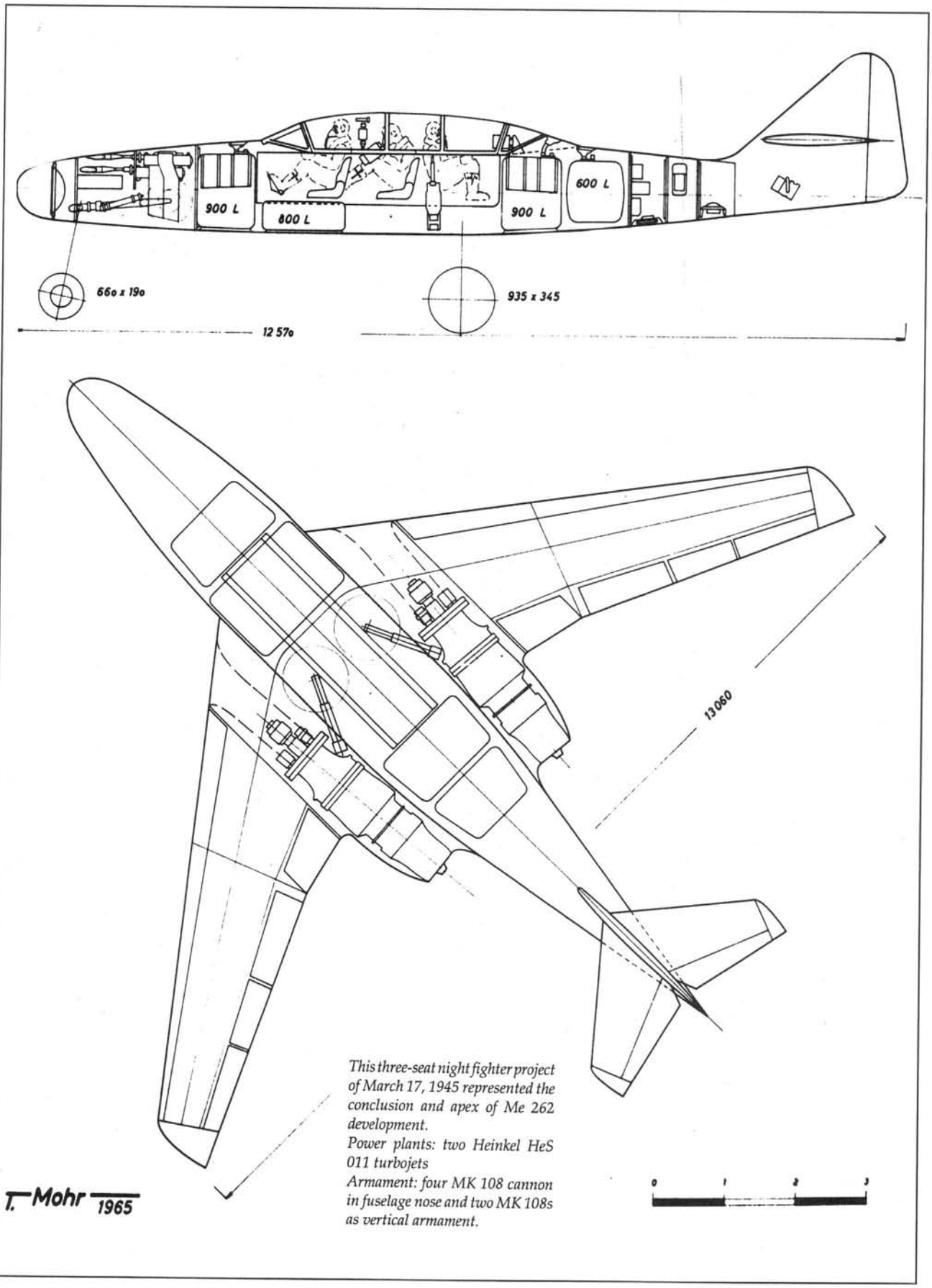
Drawing with antenna installation added taken from the Me 262 Night Fighter Project Submission (Training Aircraft Conversion Stage I) of October 5, 1944.

Center

The second Me 262 B-1a/U1 captured at Schleswig-Jagel, "Red 12", WNr. 111 980.

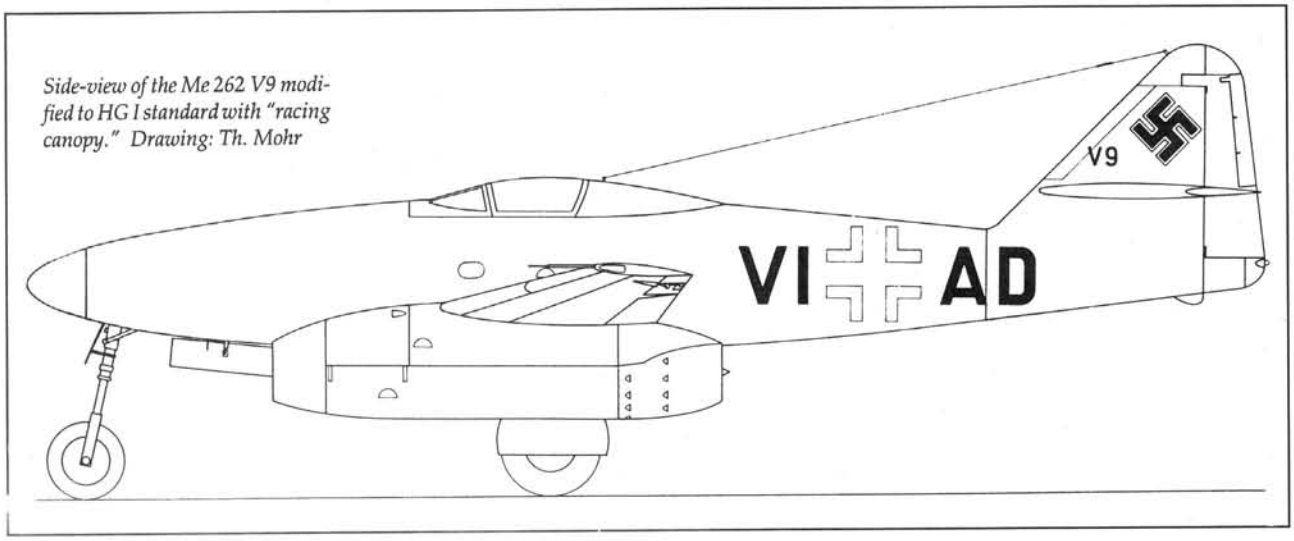
Bottom

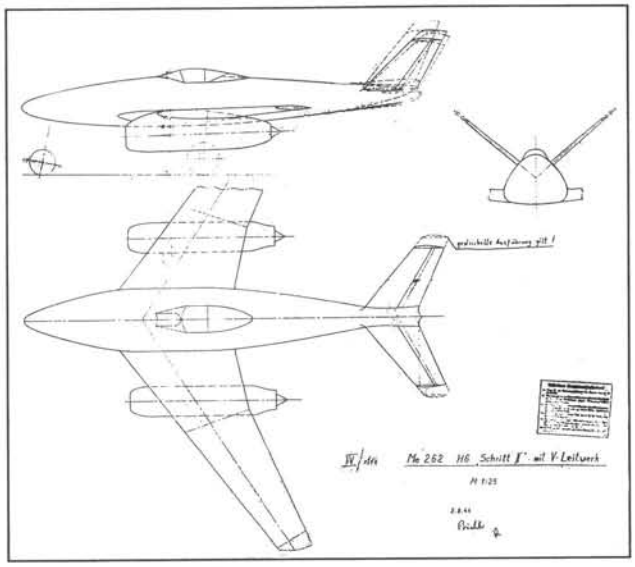
Aerodynamically-shaped antenna masts were supposed to reduce to a minimum the drag caused by the antenna installation. Here a trial antenna array on the V056 at Lechfeld, early 1945.

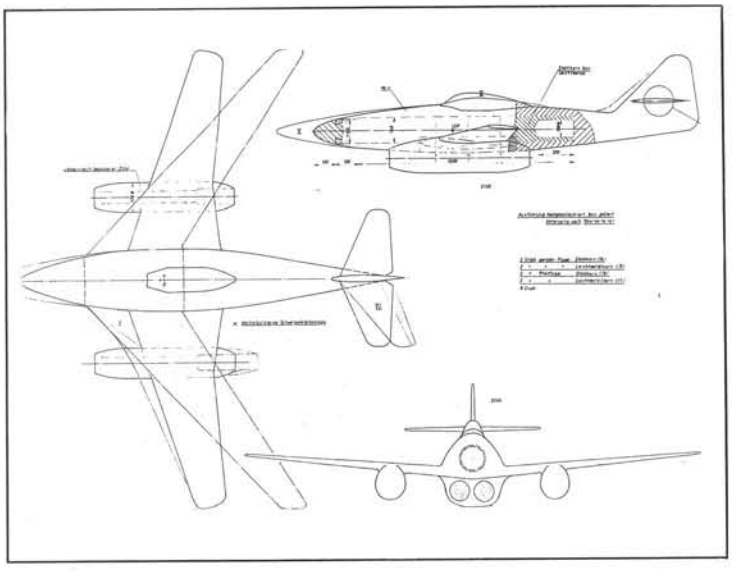


This three-seat night fighter project of March 17, 1945 represented the conclusion and apex of Me 262 development.
Power plants: two Heinkel HeS 011 turbojets
Armament: four MK 108 cannon in fuselage nose and two MK 108s as vertical armament.

Side-view of the Me 262 V9 modified to HG I standard with "racing canopy." Drawing: Th. Mohr







The first Me 262 high-speed testbed, the V9, with "racing canopy" and standard tail surfaces, photographed while landing at Lager Lechfeld.

Original drawing of the Me 262 HG II with V-shaped tail surfaces dated August 2, 1944.

January 26, 1944 drawing of the Me 262 free-flight model for trials with the DFS at Ainring. Discernable in the drawing are modifications to the fuselage nose, cockpit canopy and engine installation beneath the fuselage.

Practical realization of the theoretical considerations and the extensive test and wind tunnel work was to proceed in three stages:

Me 262 HG I (High Speed Stage I)

On October 1, 1944 the Me 262 V9, WNr. 130 004, went into the workshop for conversion. The aircraft received a low profile, streamlined canopy ("racing canopy"), swept-back horizontal tail surfaces and an enlarged fin and rudder. In this form the V9 began flight testing at Lager Lechfeld on January 18, 1945 as the Me 262 HG I. Test pilot Karl Baur complained about the low canopy and in the course of five flights discovered stability problems caused by the new tail unit.

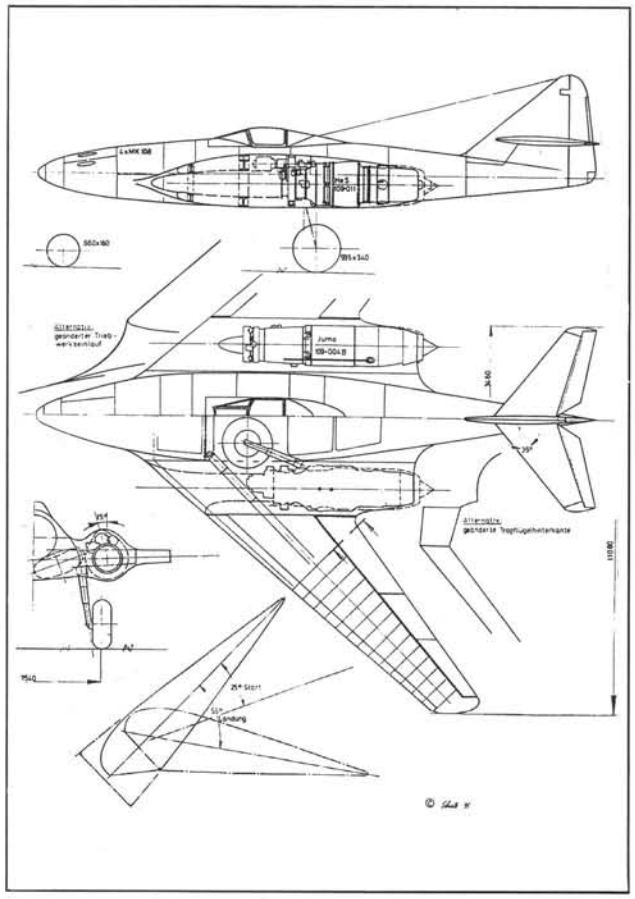
After reverting to the standard tail unit the aircraft carried out another 20 test flights in March 1945 with Lindner and Baur at the controls. Purpose of the flights was pressure distribution measurements on the "racing canopy."

Me 262 HG II

In the next stage Messerschmitt made significant modifications to Me 262 A-1a WNr. 111 538. Apart from the changes introduced in the HG I (swept horizontal tail surfaces, racing canopy), the main identifying feature of the HG II was the aircraft's wing, which featured 35 degrees of sweep on the 25% line. Test flights with this aircraft were intended primarily to test the wing for the single-jet fighter. At this time Messerschmitt was weighing the swept wing with a V-tail or standard tail surfaces against an all-wing design.

According to the schedule drawn up in June 1945, the high-speed aircraft was supposed to begin flight testing in mid-March 1945. However the aircraft never flew as it was badly damaged in an accident on the ground and the war ended before the damage could be repaired.

Redesign of the Me 262 HG III.



Messerschmitt HG III

This radical design of December 1944 formed the basis for the night fighter proposal of February 12, 1945. The only suggestion of its close family relationship to the Me 262 was in the use of the latter's fuselage.

The HG III changes consisted of:

- 45 degree swept wing (46.5 degrees on the 25% line) with use of Me 262 outer wing sections,
- Engines (2 X Junkers Jumo 004 D or 2 X Heinkel He S 011) in center of wing at wing root,
- Main undercarriage attachment at wing roots, forward wheel retraction, retracted position in fuselage center section beneath cockpit,
- Swept tail surfaces of HG I initially, later swept V-tail,
- Canopy for high-speed testing ("Racing Canopy I").

The aircraft was supposed to attain speeds of 1,050 kph at zero altitude and 1,100 kph at 6,000 meters. Messerschmitt was feeling his way up to the sound barrier step by step.

The project bureau worked intensively on this design and also carried out extensive wind tunnel investigations. However, like the night fighter and many other futuristic designs and studies, this aircraft had no chance to fly before the end of the war.

Engineers and Pilots

The following engineers and pilots played significant roles in the testing of the Me 262:

Trials Officer:

Dipl. Ing. Caroli

Messerschmitt AG Civilian Test Pilots:

Fritz Wendel, *Flugkapitän*
Dipl. Ing. Karl Baur, *Flugkapitän*, Chief Pilot Research Test Flying
Gerd Lindner
Wilhelm Ostertag
Kurt Schmidt
Heinz Herlitzius, *Feldwebel* detached from the Luftwaffe
Ernst Tesch, *Oberleutnant* detached from the Luftwaffe
Hans Flachs, *Unteroffizier* detached from the Luftwaffe
Ludwig Hofmann

Messerschmitt AG Flight Test Engineers:

Performance:	Handling Characteristics:
Jung	Hähndel
Krauss	Hörstke
Fritz Kaiser	Kalinowski
Reichel	Prestele
	Tilch
	Zeiler

Airframe:	Special Development:
Kraus	Reitinger
	Träger

Equipment:

Witte
Bosch
Richter
Joachim

Weapons:

Bayer
Langsch
Hayd

War's end at Lager Lechfeld.

The more or less damaged machines which belonged to the flight test program and to the detachments and units stationed at the airfield have been "assembled" behind a hangar where they form an aircraft graveyard for which any aviation museum would be more than thankful today. In the foreground is the Me 262 V9, which had been restored to its original configuration, and on the far left the Me 262 V10, the fighter-bomber test-bed.

During the winter of 1945/46 American GIs used the scene as a background for souvenir photos. Recognizable is the Me 262 V078 (here without fuselage nose section) which was test-flown by Messerschmitt as the Me 262 A-1b powered by two BMW 003A turbojets.

Fritz Wendel, looking justifiably self-conscious as he leans against the tail of the Me 262 V3, which he took on its maiden flight at Leipheim airfield on July 8, 1942.

The Me 262 V3 was powered by Jumo 004 turbojets and was equipped with a tailwheel undercarriage.

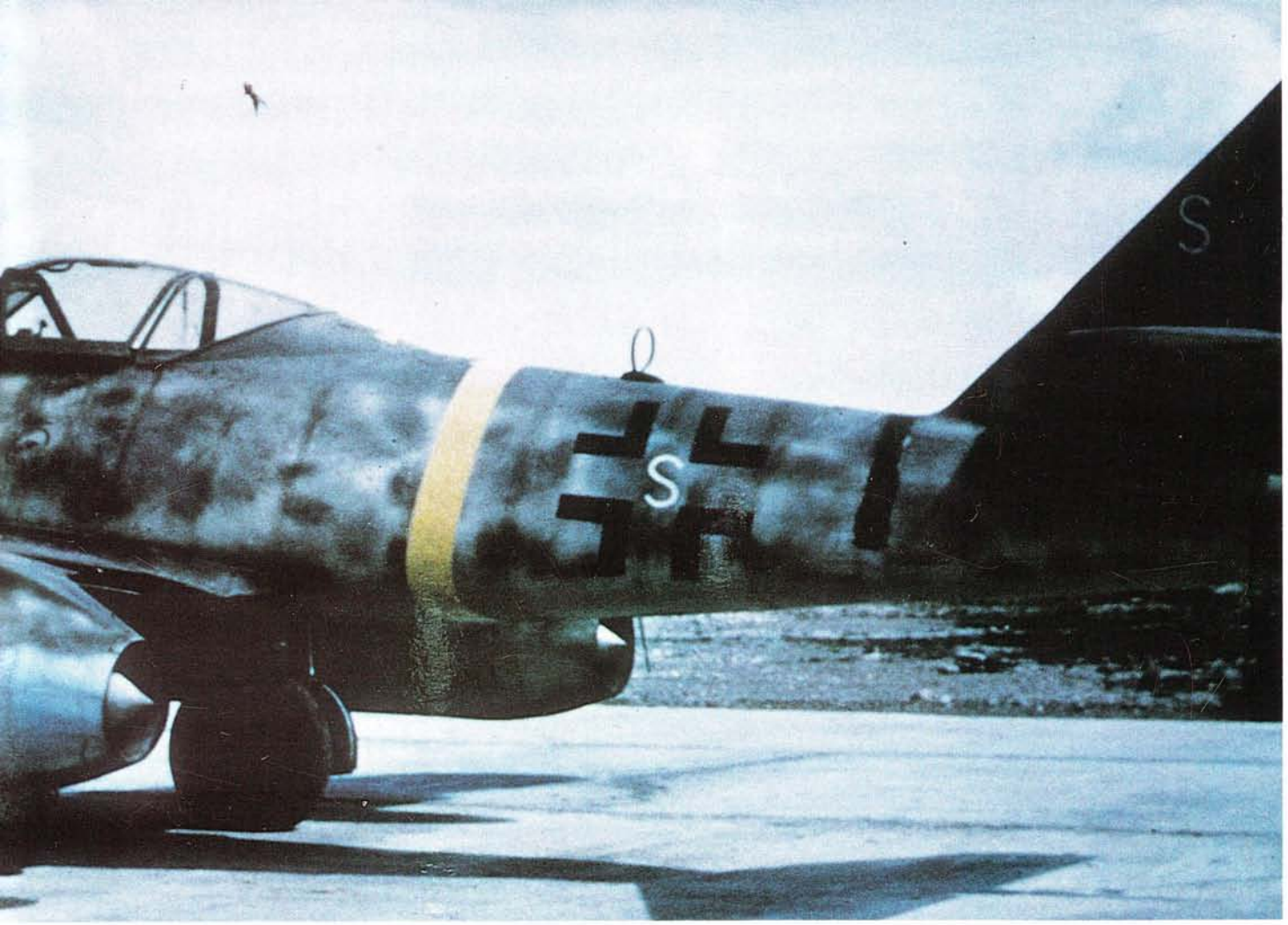
Me 262 A-1a WNr. 130 167, first flight on May 30, 1944 as the second V5, later V167.

The V167 made nearly 300 flights in the course of the Messerschmitt flight test program. The aircraft was employed mainly for stability investigations, for trials with external loads, and later as a test-bed for a new nosewheel fork (early 1945) and for the new EZ 42 gunsight (first flight March 14, 1945).

Here the V167 is seen with a yaw angle measuring device mounted on a 1,200-mm-long nose probe. Using this aircraft, in December 1944 the Messerschmitt AG undertook measurements of rudder effectiveness (rudder forces) in the course of extensive investigations into the directional stability of the Me 262.

He took the Me 262 past the 1,000 kph mark: Messerschmitt test pilot Heinz Herlitzius.

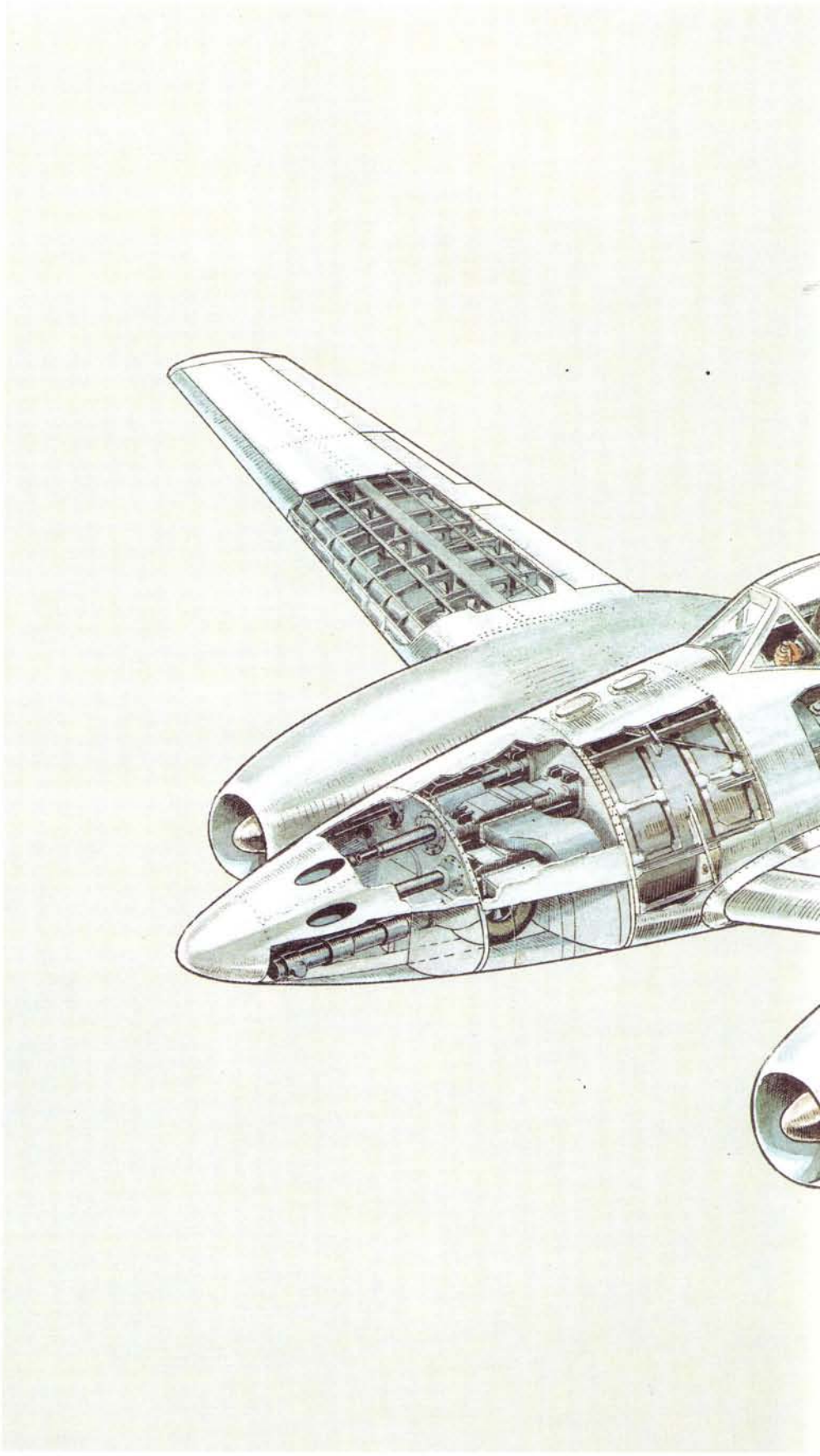
The "men in black" were another vitally-important part of the test program at Lechfeld, ensuring that flight operations were as trouble-free as possible.

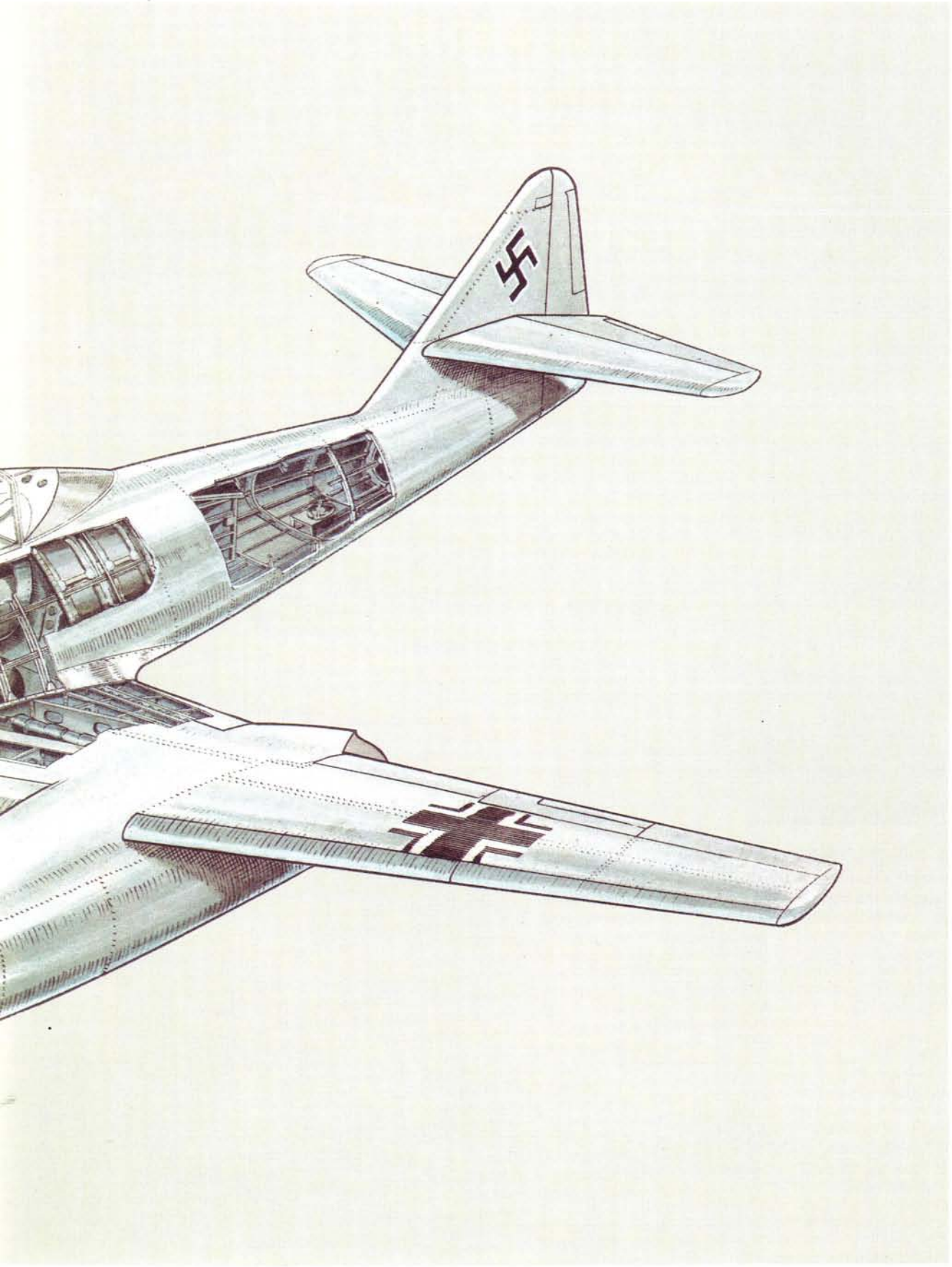


Me 262 A-1a "White 17" of III./EJG 2 wearing a camouflage scheme consisting of RLM colors 74, 74 and 76. This machine obviously belonged to the Stab of III./EJG 2. The Gruppe's aircraft wore markings similar to those of Kommando Nowotny, with white numbers on both sides of the forward fuselage. When an aircraft was lost its number was passed on to another; for example WNr. 110 371 was "White 14" until it crashed on January 31, 1945. The number was then worn by WNr. 111 646 until it crashed on February 20, 1945! A further marking used by III./EJG 2 was the 300-mm-wide, yellow band between the cockpit and the fuselage Balkenkreuz.

Oberstleutnant Heinz Bär (far left) became Kommandeur of III. Gruppe of Ergänzungsjagdgeschwader 2 at the end of 1944. Here he is seen in discussion with Engineer Curt Zeiler (flight characteristics).

Original colored drawing from the graphics department of the Messerschmitt AG, Augsburg (1944).



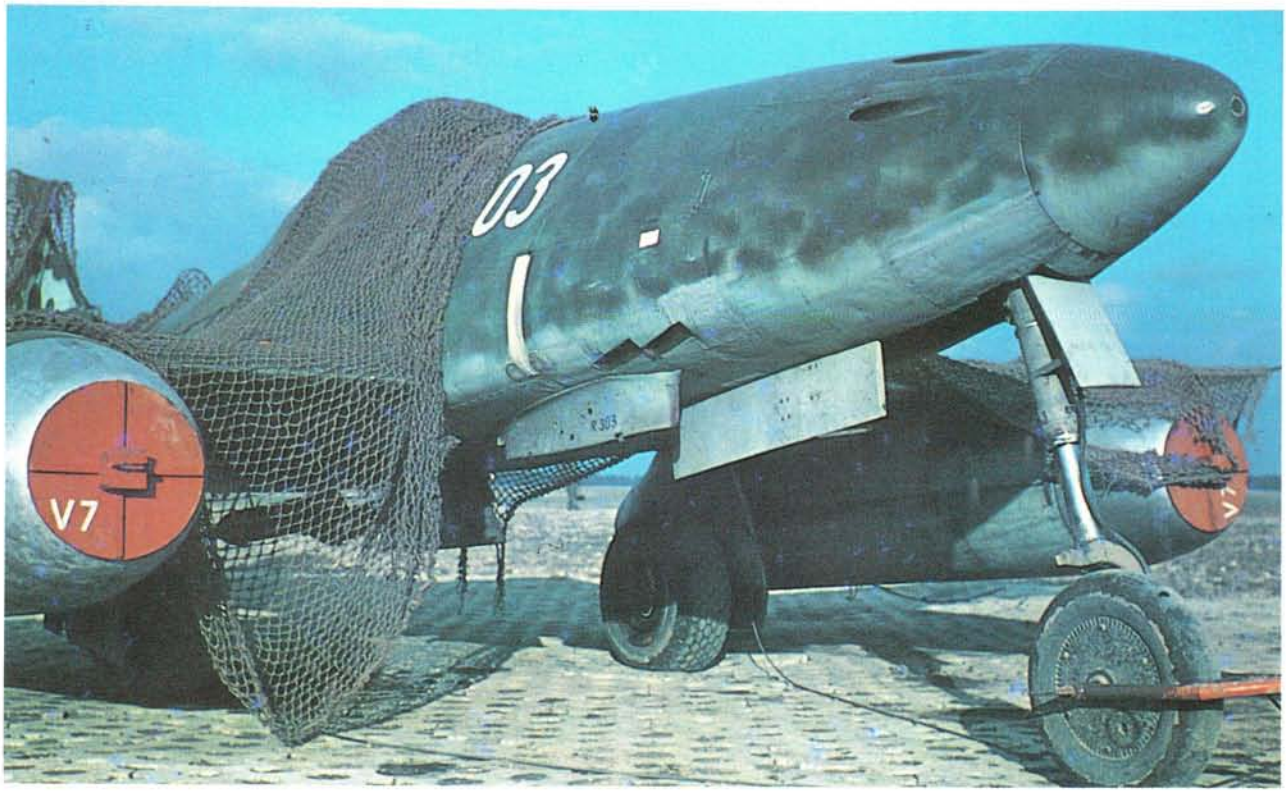


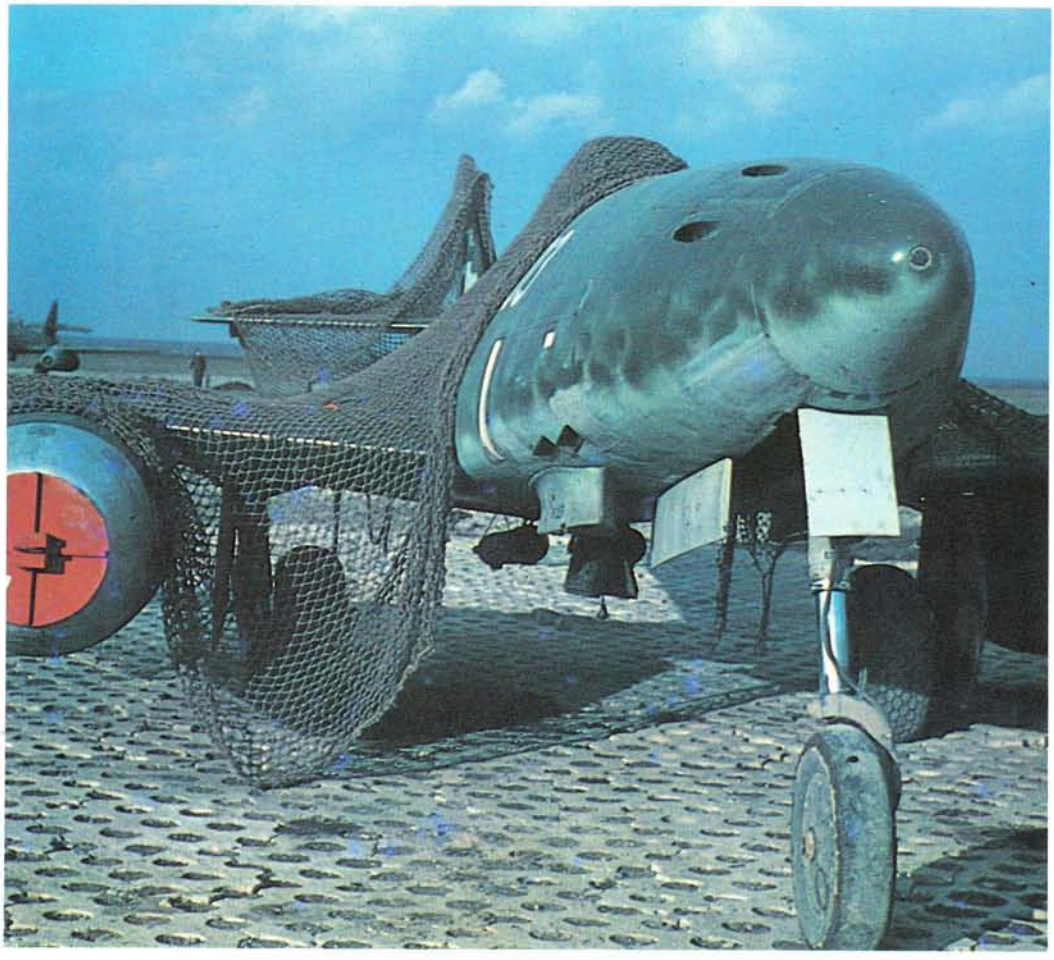
Scramble! Me 262 A-1a fighters of III./EJG 2 about to take off on a sortie; Lager Lechfeld, early 1945.

Me 262 A-1a fighter, Werknummer 110 604, built at Schwäbisch Hall. Note: Another well-known shot of this machine was turned into a colorful picture by a photo retoucher, who added a "Red 1" for good measure.

Since then "Red 1" has become an integral but false element of Me 262 literature.

Close-up photo of an engine gondola; clearly visible is the intake of the Jumo 004 B with Riedel starter in the cone and starter ring.





After the crash of WNr. 130 007 this aircraft, WNr. 170 303, became the second V7 (also V303). First flown in mid-October 1944, it was used initially for performance measurements and subsequently in the "Schnellstbomber Program", whose objective was the creation of an operational fighter-bomber with an increased weapons load.

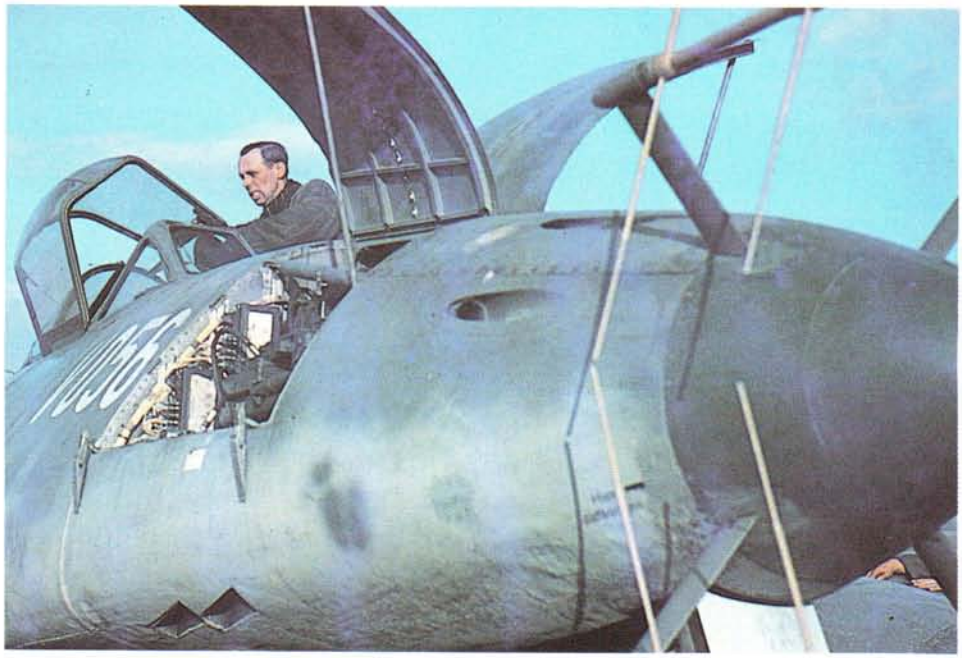
Visible beneath the fuselage of WNr. 170 303 are two Rheinmetall-Borsig RI-503 take-off assistance rockets, each with a rated thrust of 1,000 kg. These units were indispensable for take-offs with an external load of 1,000 kg, helping to keep the aircraft's takeoff distance within reasonable limits. Since, apart from length, the dimensions of the RI-503 were similar to those of the RI-502 (rated thrust of 500kg), which had already been tested on the Me 262 V5, it was possible to mount the more powerful units on the existing (but reinforced) attachment points on the fuselage underside in the area of the rear fuel tank cover panel.

Loading the V303 with an external payload of 1,000 kg; armorers prepare an SC 500 bomb for a test flight. In addition to high-explosive bombs (SC), it was planned that the Me 262 should also carry weapons dispensers (AB) and bomb-torpedoes (BT) in the fighter-bomber role.

Nosewheel collapse! In this case an Me 262 A-1a/U3 (interim) reconnaissance aircraft. This photo provides a good view of the two Rb 30/50 cameras and the single MK 108 cannon in the fuselage nose.

Speedy removal of the damaged aircraft was advisable on account of the constant threat of strafing attacks. An interesting point here is the Opel "Blitz" truck which has been converted into a recovery vehicle.

On account of their limited range, the interim reconnaissance aircraft of NAGr. 6 flew mainly battlefield reconnaissance missions from Lager Lechfeld.



In this and the preceding illustrations one can clearly see the round antenna rods. A change to shaped rods with a profile of 25% thickness represented a significant theoretical speed increase of 56 kph at 800 kph; speed loss caused by antenna drag was reduced to 13%. Test flights revealed several problems (for example "propeller-like turning of the antennas"), but these could be overcome by simple means (report dated March 15, 1945).

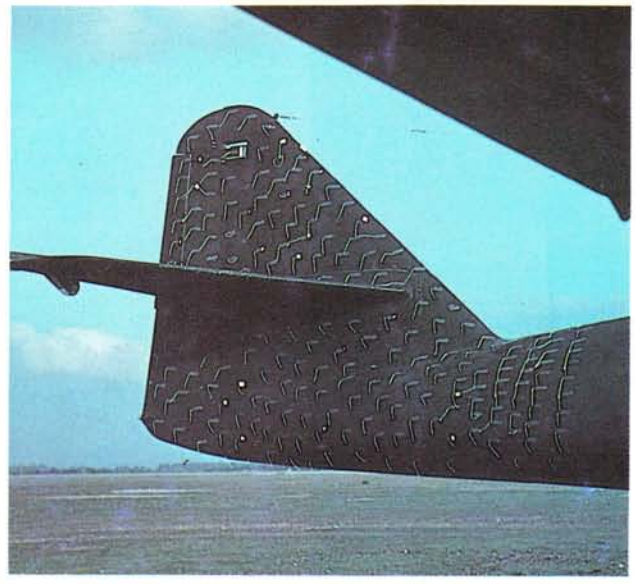
Bottom

By just before the end of the war the vertical fin of the V056, which had been modified several times in the course of testing, was returned to its original form. While the aircraft's fuselage nose and wing were "adorned" with antennas, the fuselage tail section was pasted over with wool tufts and painted black. As before, the aircraft was employed for investigations into directional stability and lateral damping. These trials, which had not been concluded by the end of the war, were supposed to make the Me 262 a better gun platform at high speeds.

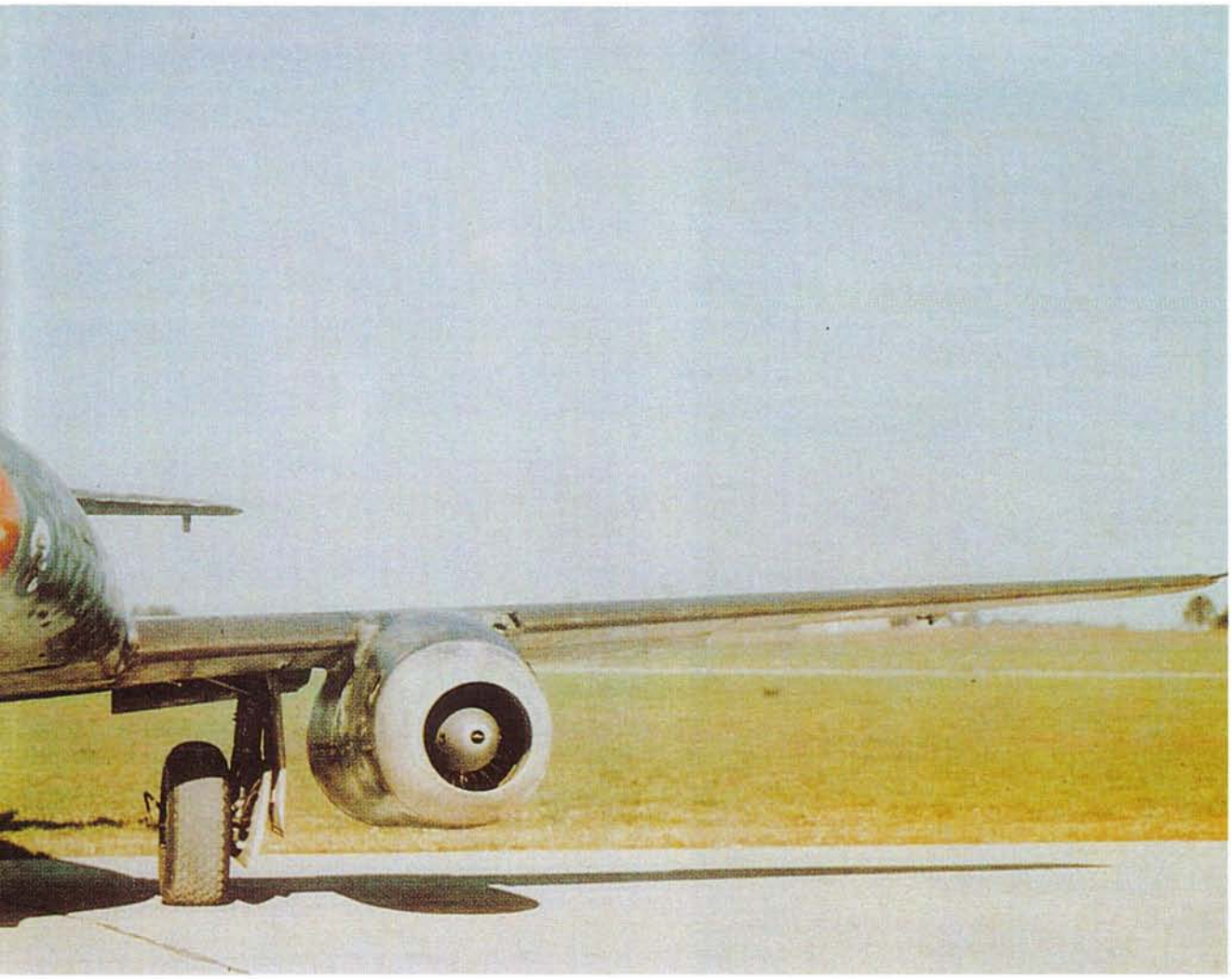
On the basis of preliminary work which had been under way since September 1944, on January 15, 1944 "Auto Requirements Lechfeld" was instructed to equip an Me 262 with various antenna arrays in order to discover the most advantageous version for the B-2 night fighter. The objective was the most aerodynamically-favorable model of antenna and the most advantageous arrangement of the system.

In the end the Messerschmitt aerodynamicists preferred the Morgenstern antenna, or a completely faired antenna installation in the fuselage nose.

Preliminary work for the Me 262 B-2 night fighter. In this photo the V056, which had been involved in the flight test program since summer 1944, is equipped with the "Hirschgeweih" antenna array of the FuG 218 airborne radar. In addition two vertical antennas were mounted on the left wing. The first flight of the V056 with this equipment was made by Karl Baur on March 9, 1945.




FE-610



Top

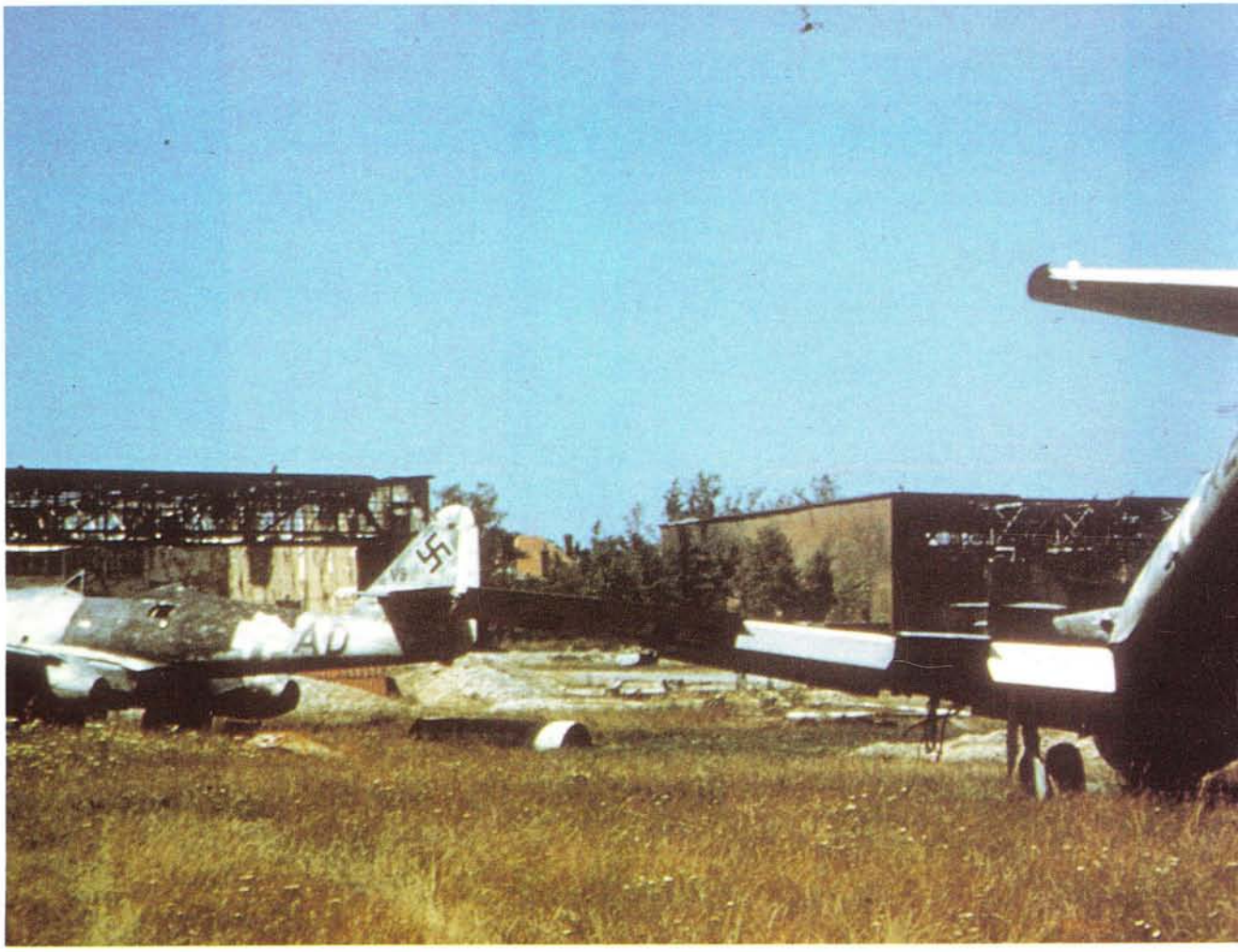
Me 262 A-2a FE 110 (Foreign Equipment) at Wright AFB, Dayton Ohio, in October 1945.

This aircraft was apparently a fighter-bomber of Kommando Schenk; it was initially dubbed "Pauline" by the Americans and later became "Doris."

The aircraft's bomb racks had been removed by the time this photo was taken.

Bottom

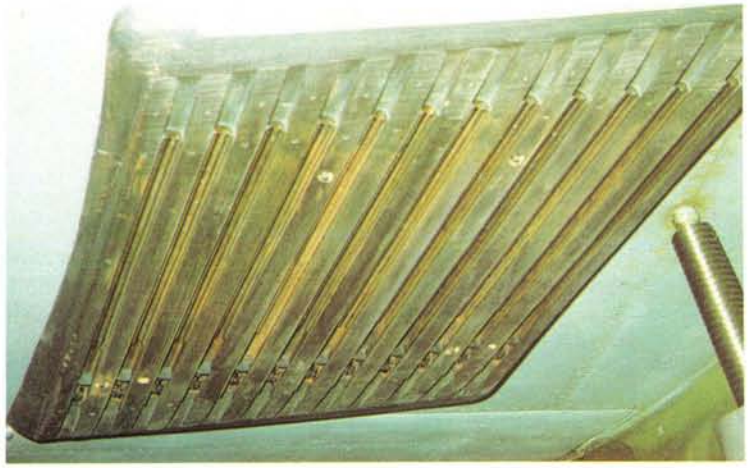
Me 262 B-1a/U1 interim night fighter of Kommando Welter (10./NJG 11), WNr. 110 306, "Red 6", FE-610. These photos were also taken at Wright AFB in October 1945. Of particular interest is the aircraft's armament, which consists of two MK 108 and two MG 151/20 cannon.

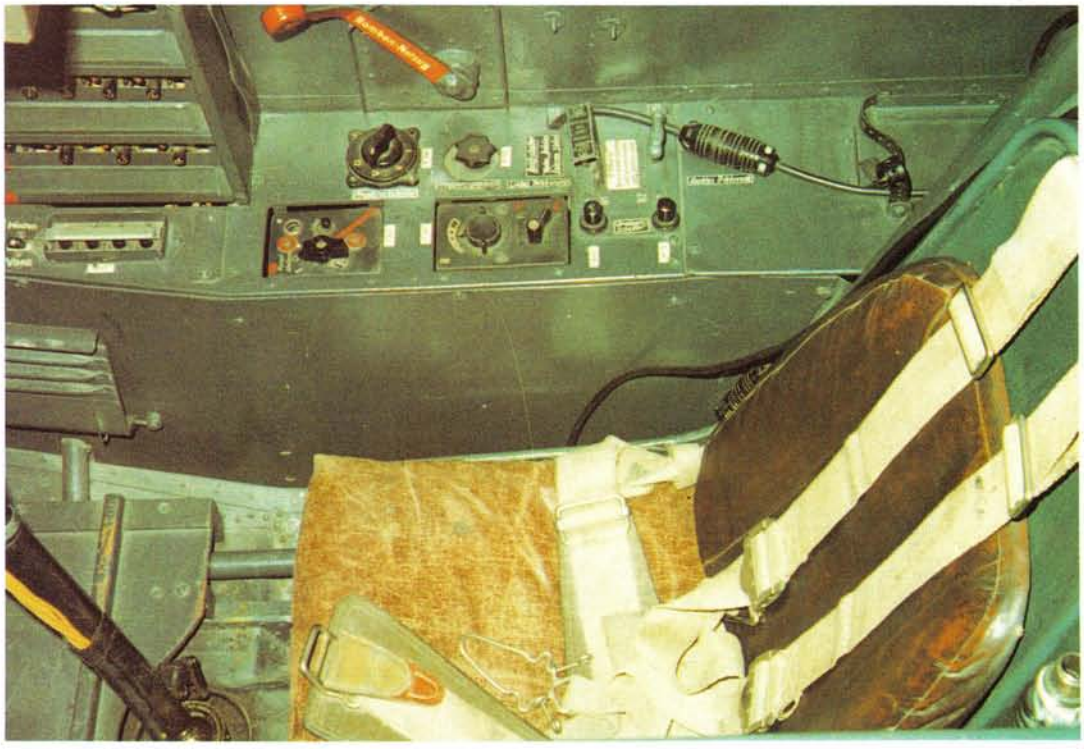


Autumn 1945. The more or less damaged jet aircraft of the Messerschmitt flight test program and of the test and operational detachments lay between the destroyed hangars at Lager Lechfeld airbase. In the foreground is the engineless Me 262 V10, left the Me 262 V9, which had been restored to production standard.

Launch rack for 12 X R4M air-to-air rockets beneath the wing of an Me 262. This photo was taken in the Deutsches Museum.

Damaged Me 262 A-1a aircraft litter the Munich-Salzburg autobahn near Neubiberg right after the end of the war. Here is WNr. 111 685 9K+SH of I./KG(J) 51.

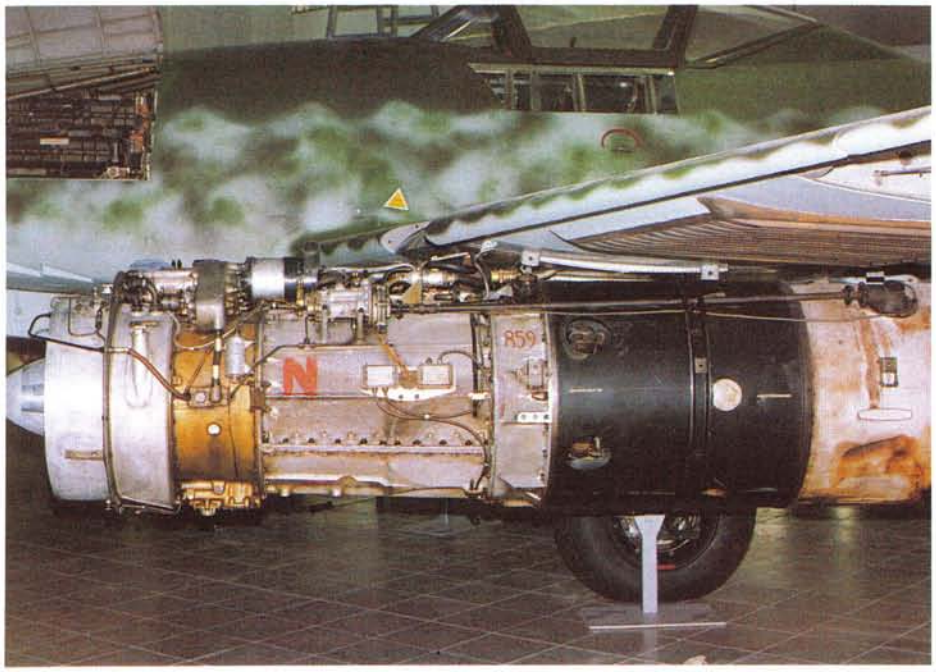




Cockpit of the Me 262 A-1a with blind flying panel (left), engine monitoring instruments (right) and reflector gunsight. Both photos were taken in the Deutsches Museum.

Cockpit of the Me 262 A-1a; visible in this view are the pilot's seat and right console.

Beautifully restored in the National War Museum, Johannesburg, South Africa: Me 262 B-1a/U1 interim night fighter WNr. 110 305. This aircraft was the second "Red 8", as the first wearer of this code number fell victim to a falling hangar roof at Burg while in service with Kommando Welter (10./NJG 11).



Me 262 A-1a with engine cowling removed in the Deutsches Museum.

Production

The first ten prototypes of the Me 262 were built in the test shops at Messerschmitt's Augsburg-Haunstetten factory under the direction of Moritz Asam. Their construction lasted until the beginning of 1944.

By the time *Generalfeldmarschall* Milch ordered quantity production of the Me 262 in May 1943, the effects of the war, by then in its fourth year, could not be overlooked. The industry was worried by the growing threat posed by enemy bombers, and the situation in the offices and factory sheds was marked by a grave shortage of skilled labor. In addition, shortages of materials and supplies were becoming more evident.

The onset of series production was delayed until March 1944.

At no time did the number of aircraft produced each month reach the totals specified in the production plans. The main reasons for this shortfall in the fifth and sixth years of the war are obvious:

- The previously mentioned shortage of personnel, materials and fuels. For example, in January 1945 a one day per week power interruption at the Leonberg factory resulted in a noticeable drop in the production of wings.
- The loss of production facilities and delivery systems as a result of enemy action.
- The imminent, almost total collapse of the transportation and communications systems.
- And not least, incompetence and confusion at the managerial level.

Decentralized Production

On August 17, 1943, the Messerschmitt AG was struck a hard blow, the first of many to come: an American daylight raid reduced large sections of the Regensburg-Prüfening works to rubble and ashes.

In the aftermath of this attack the now threatened aircraft manufacturers began an action which was without parallel in the history of the aviation industry: a sweeping decentralization through the evacuation of production and storage facilities was to protect the high-technology product Me 262. A devastating bombing raid on Augsburg and the Messerschmitt works on the night of February 25-26, 1944 confirmed and accelerated these measures.

Final assembly of the Me 262 pre-production series, which got under way only days later, was taken over by the Messerschmitt shops at Leipheim airfield. Forward fuselage sections and wings still came from Augsburg, while fuselages were already being delivered from an dispersed production facility of the Regensburg Messerschmitt works. Since the hangars at Leipheim were already partly occupied by maintenance and conversion work on the Me 323 "Gigant" transport aircraft, during March / April 1944 the assembly of the Me 262 took place in concealed revetments out of doors.

Meanwhile the increasingly dense net of dispersed facilities spread throughout the entire southern and southeastern areas of the Reich. Small manufacturing sites, assembly facilities and supply dumps extended right into Bohemia and Austria, installed in inconspicuous places, natural and artificial caves, in tunnels of the Reichsautobahn (RAB), and in forests and forest clearings.

One such facility was the "Kuno I" forest factory, whose construction in the "Justing" forest area near Leipheim air base began in March 1944. The first production aircraft left the provisional assembly line at the beginning of April and by the middle of the month production was in full swing. The major components, which were assembled into complete aircraft there, came from various dispersed facilities:

- the fully assembled wings came from a converted two-level Autobahn tunnel near Leonberg in the vicinity of Stuttgart,
- Messerschmitt Regensburg supplied the fuselages from the Oberzell dispersed facility near Passau and the Hagelstadt forest works,
- while the forward fuselage sections came down from nearby Günzburg;
- the production sites for other components were likewise not far away, with engine cowlings coming from Lauingen and rudders and landing flaps from the town of Wasserburg near Leipheim.

The major components themselves consisted of smaller components and parts, which were delivered by the scattered production facilities and small assembly operations.

The Kuno I forest factory consisted of an assembly line, firing range, engine test run stations, and several wood or metal barracks. The principal element of the assembly line was a concrete base, which is still visible today, over which extended a heated work tent. Camouflage nets hung among the trees protected the entire installation from being seen from the air.

Following bore-sighting and test firing of the guns, a trial run of the engines and compass adjustment, the complete aircraft was handed over at Kilometer 102 of the Autobahn. This part of the Munich-Stuttgart highway is very straight, and at that time it had a green-painted concrete center lane which extended two kilometers to Kilometer 100.

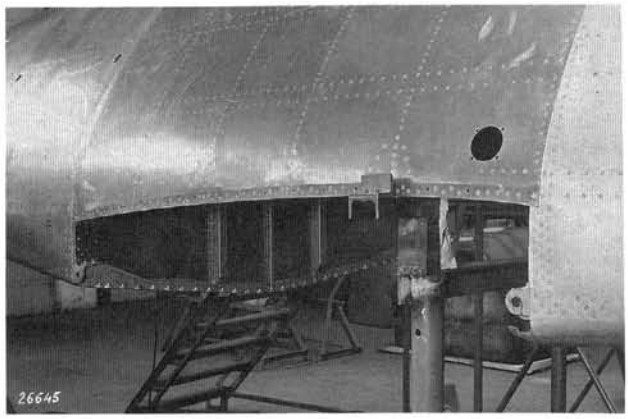
The factory fresh aircraft were able to make their maiden flights from this 2,000-kilometer stretch of highway without any problem. After landing at their destination airfields, Memmingen for example, the aircraft were test-flown and handed over to the Luftwaffe.

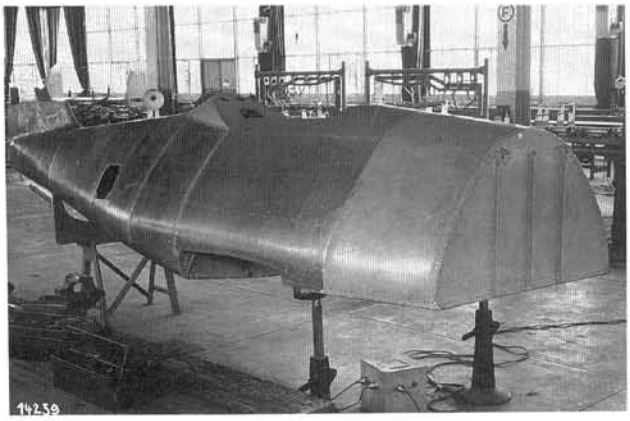
The Americans launched their first attack on Leipheim airbase on April 24, 1944. A large number of aircraft were destroyed, among them 53 Kuno-built Me 262s which were parked ready to fly on the airfield apron in front of the hangars.

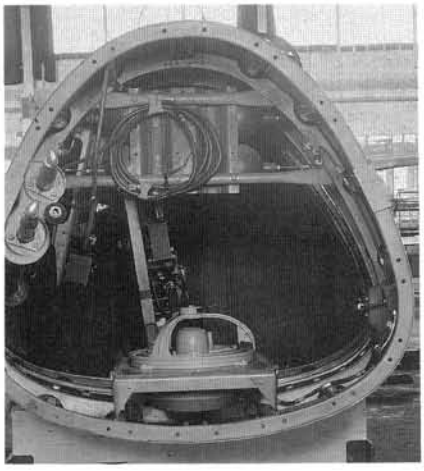
The nearby forest factory escaped damage; not until an attack on November 18, 1944 did it sustain minor damage.

In the summer and autumn of 1944 another forest factory was built east of Kuno I, near Kilometer 81 of the Autobahn. This facility, which was designated "Kuno II," operated in the same fashion as the "parent factory."

Additional facilities for the final assembly of the Me 262 "in the field" were:





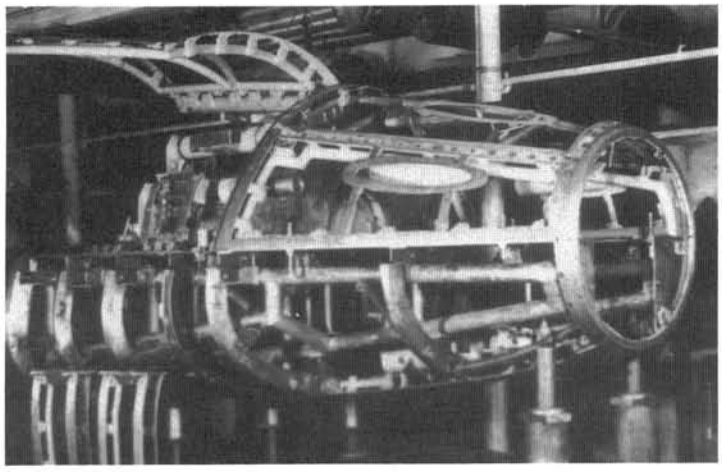


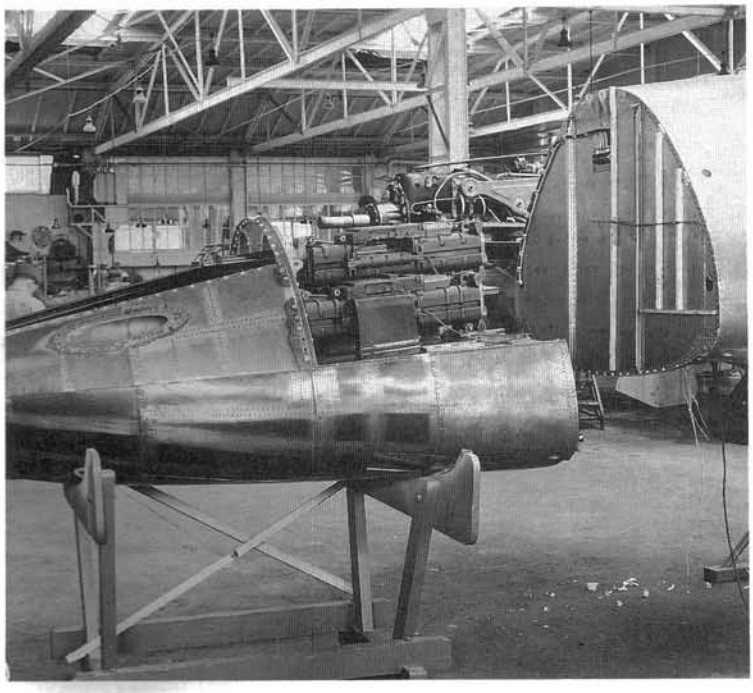
Construction of the Me 262 V8 in the Messerschmitt test shops in Augsburg-Haunstetten.

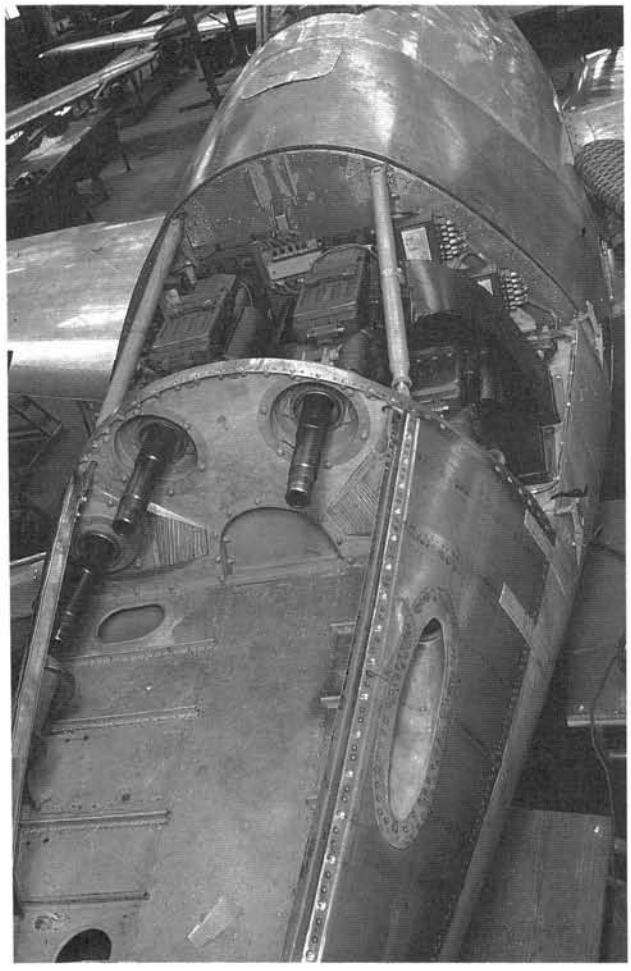
Fuselage center section.

Assembled components: fuselage center section, fuselage tail section and tail unit bearer.

Fuselage tail section; in front is the compass, behind it the radio equipment.

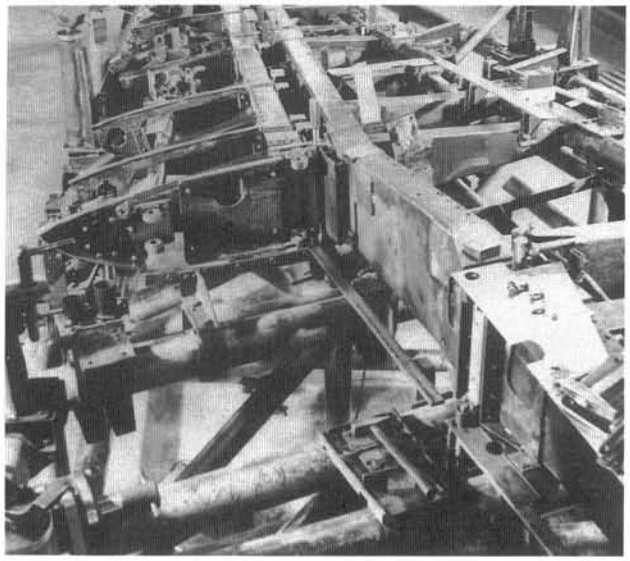






The fuselage nose in its assembly jig, prior to application of the external skin.

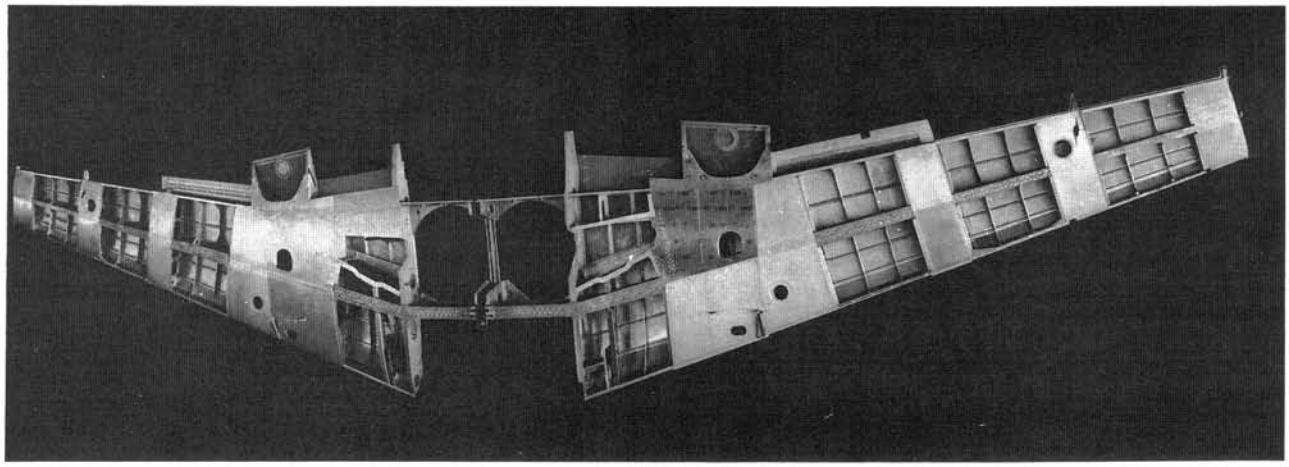
Fuselage nose with weapons installation before and after attachment to the fuselage.



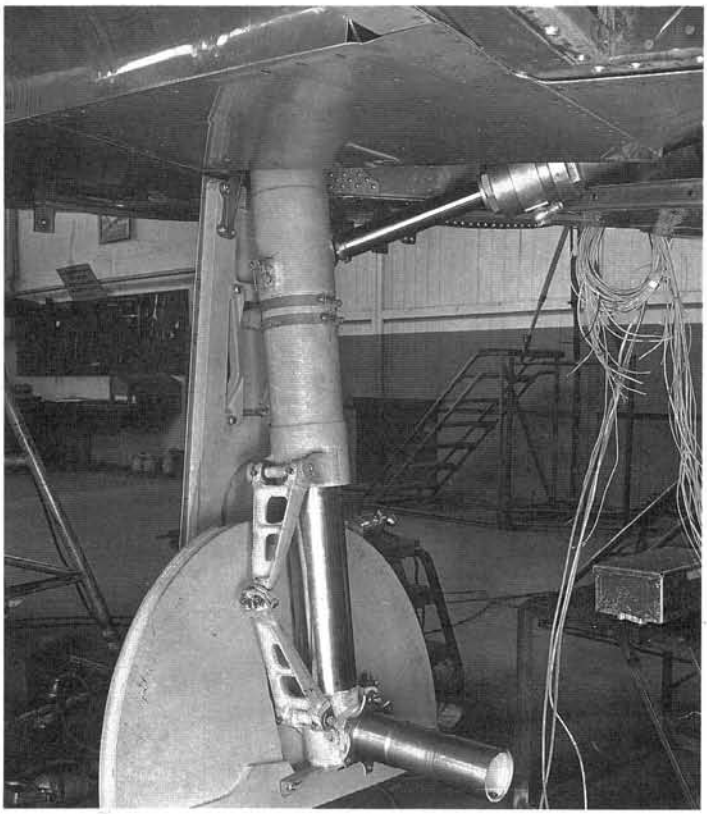
– the "Schwäbisch Hall" forest factory, which began delivering jet aircraft to the Luftwaffe in May 1944,
– the "Obertraubling" forest factory near Regensburg, which joined production in December 1944, and
– the Neuburg/Donau displaced operation, which began final assembly of aircraft on the airfield and in the immediate surroundings in late 1944/early 1945.

Test flying activities took place at the following airfields, some of which were located close to the final assembly sites: Leipheim airbase, Memmingen airbase, Schwäbisch Hall airbase, Neuburg/Donau airbase, Obertraubling factory airfield, Brandenburg-Briest factory airfield with assembly halls, the Eger Aircraft Factory company airfield, and finally, for a few days only, the Stuttgart-Munich Autobahn near the Augsburg-East exit.

Even as the dispersed facilities were being erected, it was clear that they were only an interim or temporary solution.



Me 262 wing in the assembly jig.



Me 262 wing built in the test shops; the typical Messerschmitt wing construction method, namely a single spar with half and full ribs, is clearly visible. (Photograph from Nov. 29, 1943)

Main undercarriage leg.

The traffic and transport system vital to this type of production was extremely vulnerable to air attack. Advancing American forces and attacks on the dispersed facilities (1) forced them to relocate repeatedly. Sometimes part of the production line was literally lying on the road. And the roads themselves had to a large degree been destroyed by enemy bombing, which led to a collapse of the transportation system in early 1945.

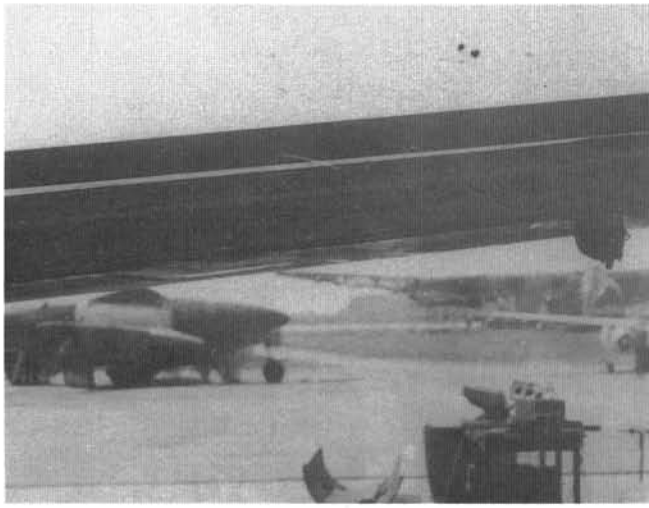
(1) Footnote:
The Americans were already aware of many of the production and storage sites in the autumn of 1944, primarily through reports from Allied agents, but also from air reconnaissance.

The solution to several of these problems was to have been found in the construction of a long-planned central production facility for the Me 262 jet aircraft.

Construction work on a centralized, bomb-proof aircraft factory for production of the Me 262 (code-name *Weingut II*) began in early March 1944 in the Iglinger Forest near Kaufering, not far from Landsberg am Lech. When completed, the installation, which was situated not far from Lager Lechfeld, directly in front of the "Alpine Redoubt," was to comprise three semi-underground bunkers each with

The beginning of series production in Leipheim.

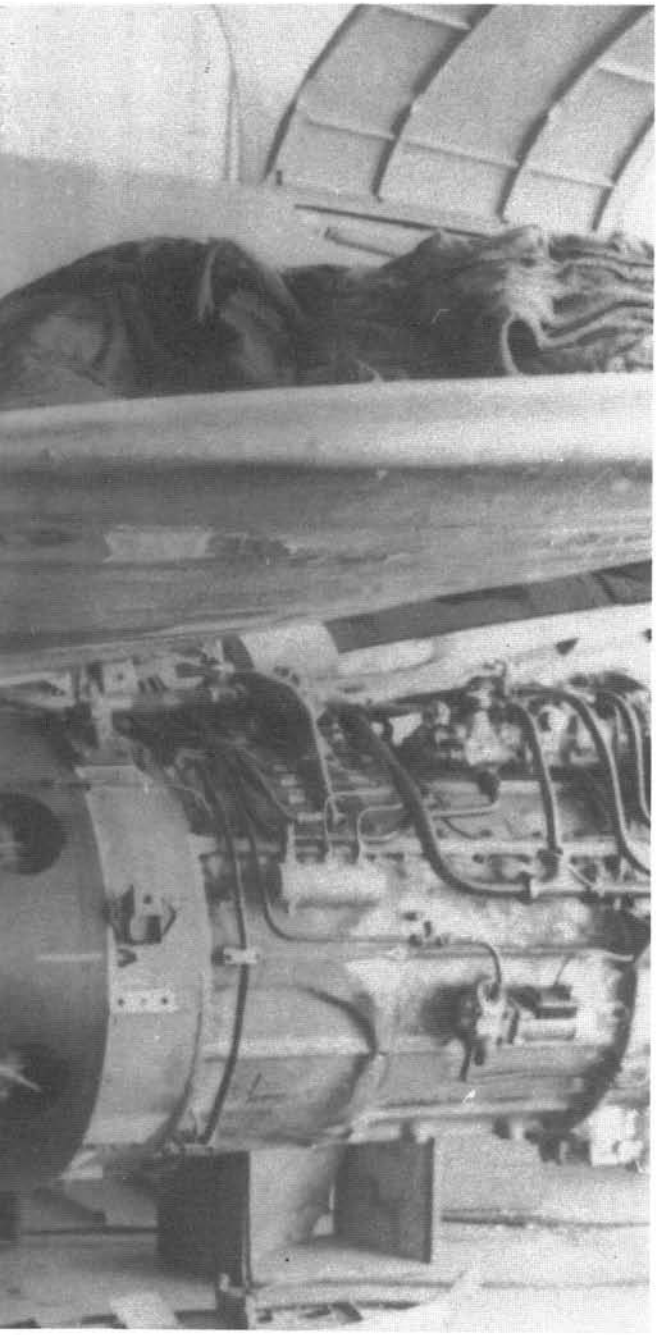
Final assembly in the open air at Leipheim airbase; in the background is an Me 321 "Gigant."

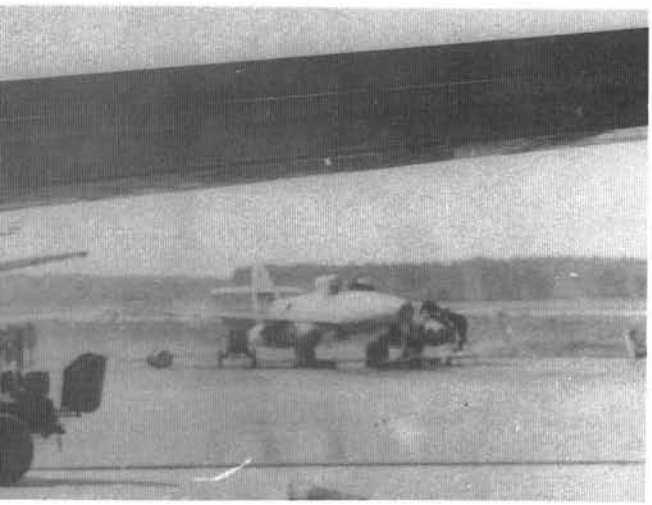


a surface area of 82 X 275 meters, on the grounds of a large munitions depot.

There were to be five floors beneath the huge concrete arch, which had a clear height of nearly 46 meters. An output of 1,000 to 1,200 Me 262s per month was planned at full capacity. By war's end the builders had succeeded in partially completing one of the huge bunkers.

The construction method was relatively simple: a semicircular filling of earth, crushed stone and gravel formed the "core" for the roof, which consisted of 5.5-meter-thick concrete. Once the concrete had set, the "core" could be removed and used for the next section. The huge, arched exterior of the





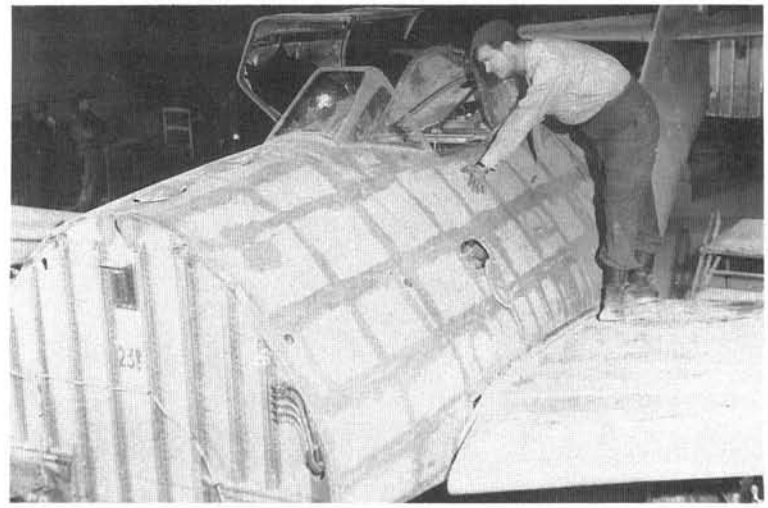
production facility was to be created in four sections using this method.

The construction site was protected from being spotted from the air by immense camouflage nets. The installation's weak point was probably the large hydraulic doors which closed off the front end of the hall. In order to guard the huge structure from enemy air reconnaissance, the roof of the building, which blended into the hilly countryside, received a massive layer of earth and humus, in which was planted vegetation similar to that growing in the surrounding area.

This design was capable of withstanding any bomb then in existence.

Occupation of the large bunker was planned as follows:

- the bottom floors were to be occupied by the mechanical and non-cutting processes,
- on the floors above this, hundreds of skilled and unskilled laborers were to assemble major components and assemblies into complete aircraft,
- the top floor was laid out as a runway. As unbelievable as it may sound, new aircraft from the production line were to make their first takeoff from this runway with the aid of RATO units. Carrying minimum fuel, the Me 262s were to leave their birthplace and fly to one of the airfields in the immediate vicinity (Lechfeld, Penzing or Memmingen).



Final assembly in the "work tent." Photo taken after the end of the war.

It is possible that an extension of this "internal" runway into the open was planned; authentic German planning documents are obviously no longer available. The information presented here is based on the American report F-IR-6-RE ("Woods Report") and on various American publications. Of course, like so much else, this fantastically desperate idea remained no more than theory. One can only imagine the organizational demands of such a facility!

Just prior to the arrival of the Americans machine tools and the wing assembly line from Leonberg were moved into the still far from complete bunker. Naturally any sort of orderly construction was out of the question in the days remaining.

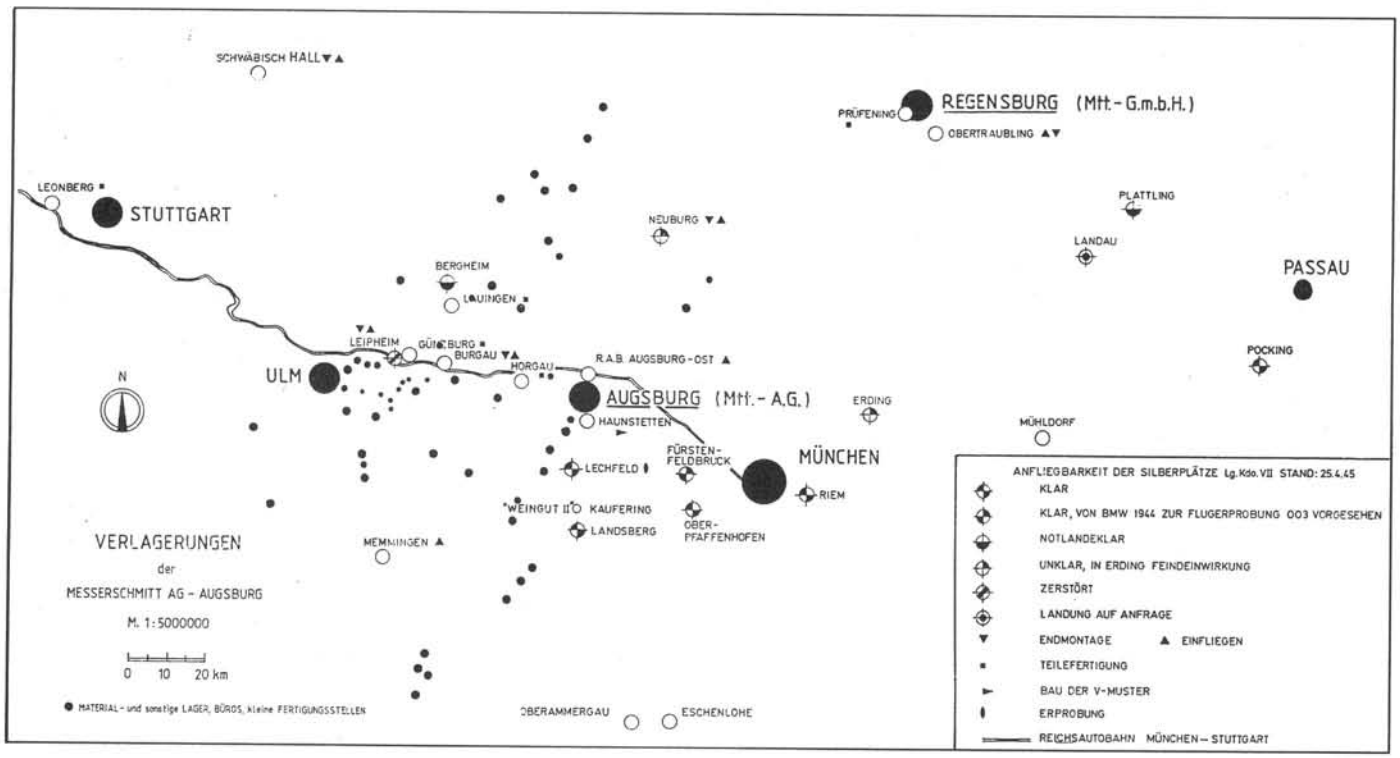
Production continued despite adverse conditions; Me 262 A-1a immediately before completion. (Photo taken after the end of the war.)

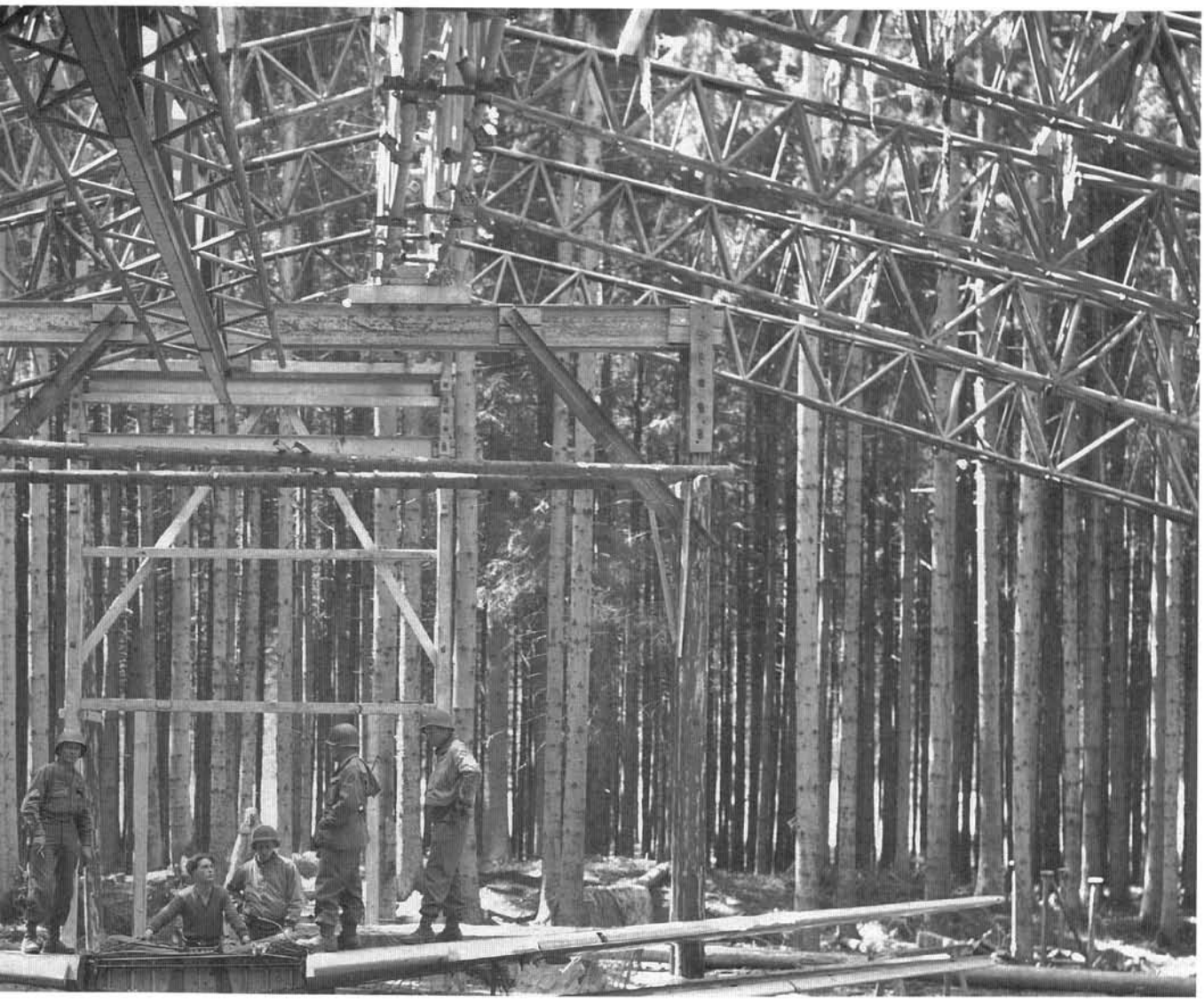
Extremely well camouflaged and almost invisible from the air: forest factory near Obertraubling. (Photo taken after the end of the war.)

Opposite – Top: Messerschmitt factory dispersed operations and suitable "Silver airfields" in southern Germany.

Bottom: Extraordinary situations demand unusual measures. Assembly of jet fighters in the middle of the forest. Wings and fuselages lie in the half-completed "work tent." (Photo taken after end of war.)

Just before the first flight of an Me 262 A-1a from the Stuttgart-Munich autobahn; from left: Ing. Jaudt, technical operations manager of the Kuno I forest factory, and Ing. Delang, construction supervisor.


SCHWÄBISCH HALL
REGENSBURG (Mtt.-G.m.b.H.)
PRÜFENING
OBERTRAUBLING
LEONBERG
STUTTGART
NEUBURG
PLATTLING
LANDAU
PASSAU
BERGHEIM
LAUINGEN
LEIPHEIM
GÜNZBURG
BURGAU
HORGAU
R.A.B. AUGSBURG-OST
POCKING
ULM
N
AUGSBURG (Mtt.-A.G.)
ERDING
HAUNSTETTEN
MÜHLDORF
FÜRSTENFELDBRUCK
MÜNCHEN
LECHFELD
RIEM
WEINGUT II
KAUFERING
LANDSBERG
OBERPFAFFENHOFEN
MEMMINGEN
VERLAGERUNGEN
der
MESSERSCHMITT AG - AUGSBURG
M. 1:5000000
0 10 20 km
MATERIAL- und sonstige LAGER, BÜROS, kleine FERTIGUNGSSTELLEN
OBERAMMERGAU
ESCHENLOHE
ANFLIEGBARKEIT DER SILBERPLÄTZE Lg.Kdo.VII STAND: 25.4.45
KLAR
KLAR, VON BMW 1944 ZUR FLUGERPROBUNG 003 VORGESEHEN
NOTLANDEKLAR
UNKLAR, IN ERDING FEINDEINWIRKUNG
ZERSTÖRT
LANDUNG AUF ANFRAGE
ENDMONTAGE
EINFLIEGEN
TEILEFERTIGUNG
BAU DER V-MUSTER
ERPROBUNG
REICHSAUTOBAHN MÜNCHEN – STUTTGART



On April 20, 1945 American infantry reached the construction site. The Americans continued construction and finally put the bunker to use for their own purposes.

At the end of the war a bunker installation similar to the one at Kaufering was under construction near Wasserburg am Inn.

One central, underground production site did begin construction of Me 262s however: it was Factory "A" of the "Reichsmarschall Hermann Göring Factory," called "Reimahg" for short, located near Kahla in Thuringia. Construction of the factory, which was under the administration of the AGO-Flugzeugwerke GmbH of Oschersleben, began in April 1944. Underground galleries at Walpersburg near Kahla/Grossetersdorf left over from the days of china clay retrieval were used in order to speed up construction, the galleries being linked by tunnels. The installation's main gallery opened into a large, bomb-proof assembly hall with a connecting taxiway over which the completed aircraft were rolled to firing ranges–also underground–for test firing of their guns.

At the end of the taxiway an inclined lift took the aircraft to an approximately 1.2-kilometer-long runway on a mountain ridge. Here were located dispersals for fuelling the aircraft and for engine test runs, as well as a compass-swinging platform.

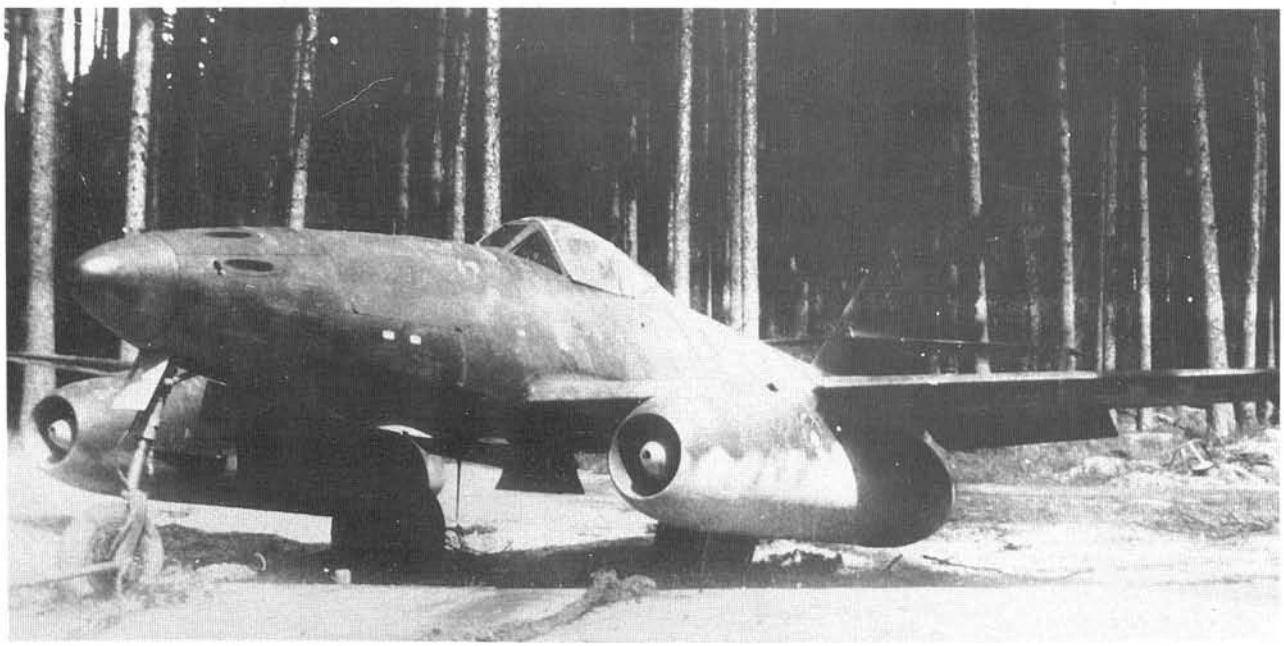
The runway fell away about 5 meters at both ends; the Me 262s could therefore only take off from their birthplace with the help of takeoff assistance rockets.

As landing was impossible, the acceptance pilots, most of whom came from AGO and learned to fly the jet at Burg, flew to the airfield at Zerbst, about 130 km to the northeast. It was there that the actual acceptance flights were carried out and the aircraft handed over to the Luftwaffe.

Twenty-seven Me 262s were completed before the Americans occupied the area. The Americans assembled another five aircraft from the large stock of parts and components they found there.

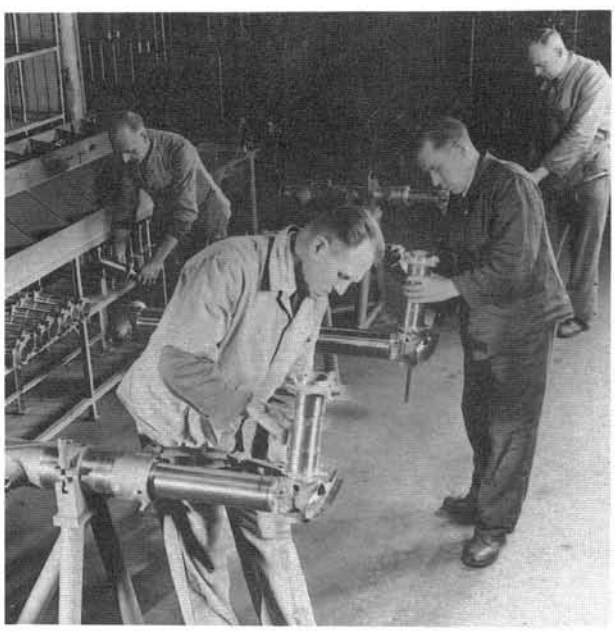
Construction of a huge bunker for quantity production of jet aircraft in the Iglinger Forest near Kaufering, not far from Landsberg/Lech.

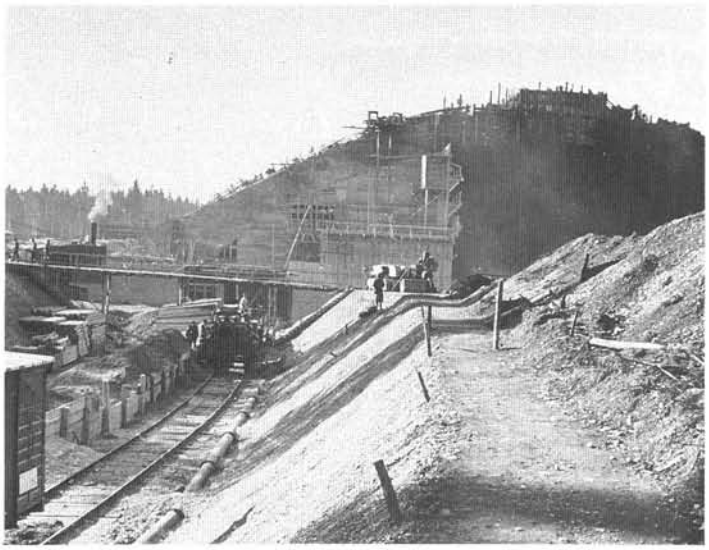
The first phase of construction is complete.

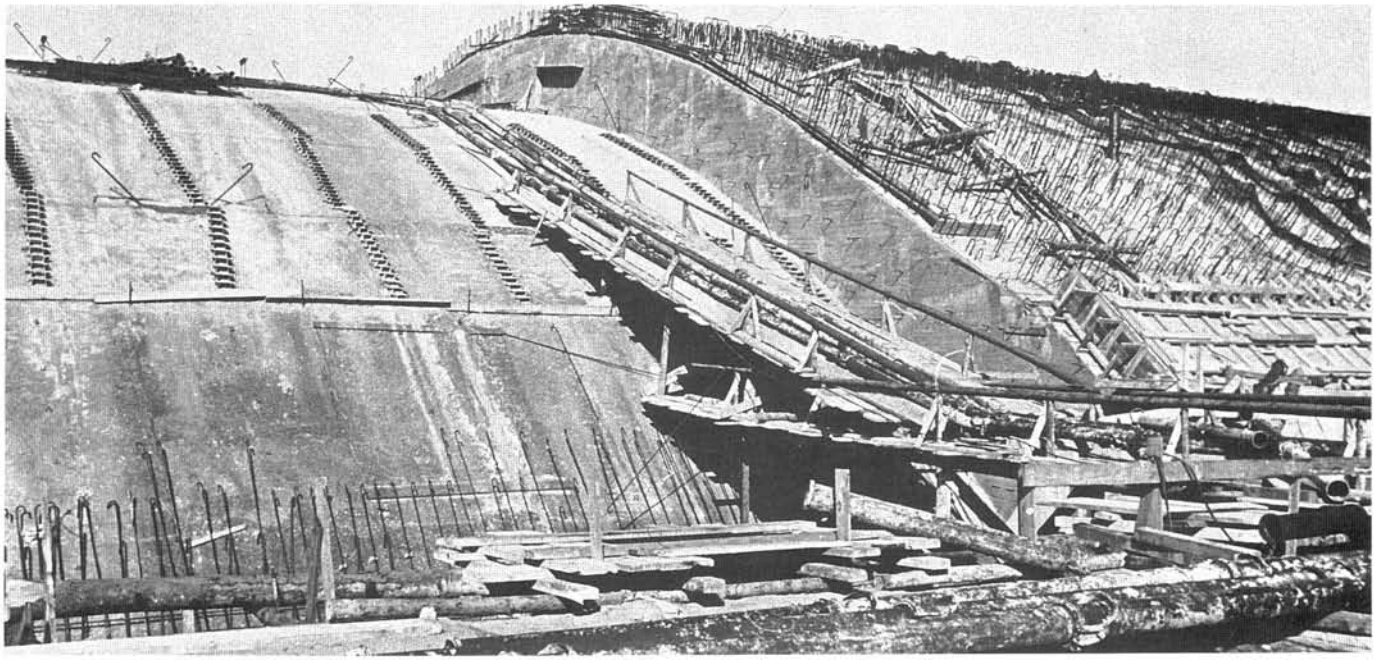


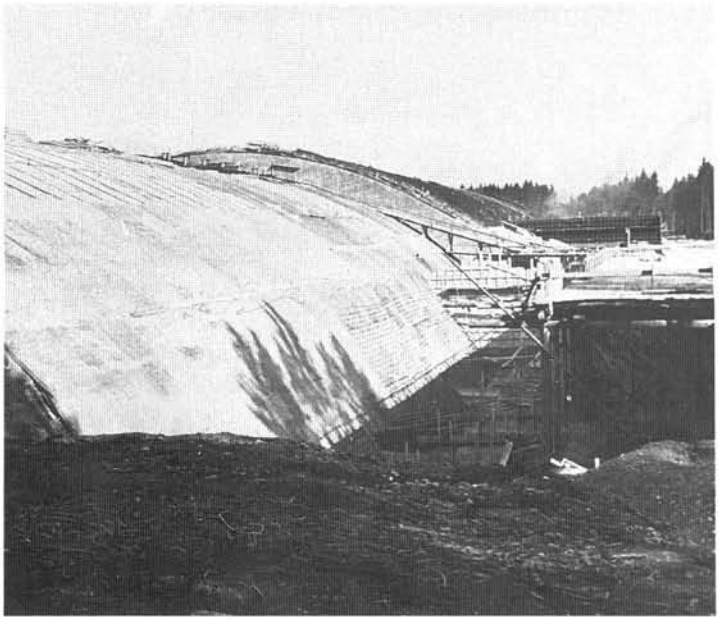
Ready for takeoff from the autobahn, Leipheim 1945.

A further unusual measure was dispersal of production to industries not normally associated with aviation. The illustration depicts the production of main undercarriage units by Opel in Rüsselheim.

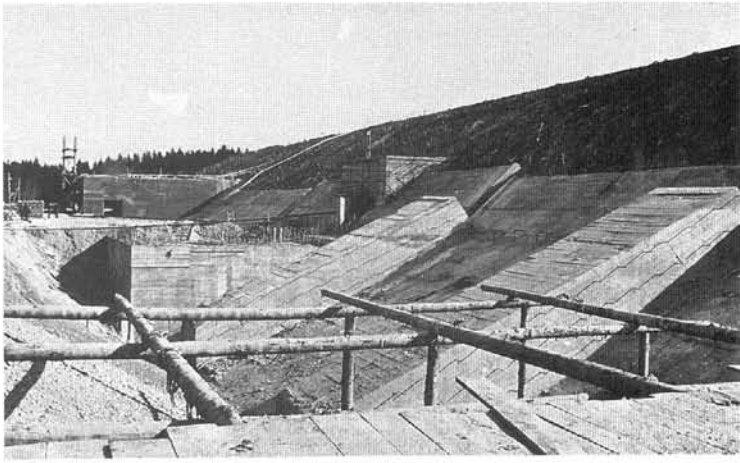








The completed core for the second phase.



This foundation was intended to absorb lateral forces for the gigantic, cantilever concrete hangar.

The concrete has set, the "core" of the first phase can be removed.

Production Figures

In a period of 14 months the Messerschmitt AG delivered more than 1,400 Me 262s. In view of the conditions already described and the company's dispersed operations and branch plants, this must surely rank as one of the great industrial accomplishments of the war.

Monthly Deliveries

Messerschmitt AG Augsburg (A) with the Leipheim, Kuno and Schwäbisch Hall assembly plants.

Messerschmitt GmbH Regensburg (R) with the Obertraubling and Neuburg/Donau assembly plants.

	1944		1945	
	A	R	A	R
J	–	–	163	65
F	–	–	166	130
M	1	–	165	75
A	15	–	64	37
M	7	–	–	–
J	28	–	–	–
J	58	–	–	–
A	15	–	–	–
S	92	2	–	–
O	108	10	–	–
N	87	14	–	–
D	108	23	–	–
	519	49	558	307 = total of 1,433 aircraft

These figures are taken from a Messerschmitt report produced for the Americans in June 1945. They indicate a total production of 1,433 Me 262 aircraft in the period to April 19, 1945.

611 aircraft were damaged or lost completely through Allied bombing attacks on individual production sites and strafing attacks on transport during the dispersal of production and within the dispersed operations themselves. However as a result of special measures by the firm's management it was possible to completely repair 114 machines, so that effective production losses totalled 497 Me 262s.

Comparatively few Me 262s are to be seen in the world's aviation museums, but they are always among the prize exhibits of such collections.

Appendix

Aircraft Design Layout

A. General

Aircraft of the Me 262 A-1 type are employed as fighters.

B. Structural Shape

1. General
Cantilever low-wing monoplane with twin engines. All-metal structure (stressed skin construction). Retractable tricycle undercarriage, central vertical fin, enclosed cockpit (pressurized version is planned). Single-spar, one-piece wing attached to the fuselage from below. Leading edge slat over leading edge of wing, landing flaps between aileron and wing root.

Dimensions

(Aircraft type sheet in three-view see Attachment 2)

Wingspan 12.65 m
Length 10.60 m
Height 2.80 m
Track width 2.32 m
Wing area 21.70 m^2

2. Fuselage
Fuselage is of stressed skin construction and has an almost triangular cross section with rounded corners. Smooth exterior as a result of flush riveting. Stiffening through flanged frames and longitudinal members.

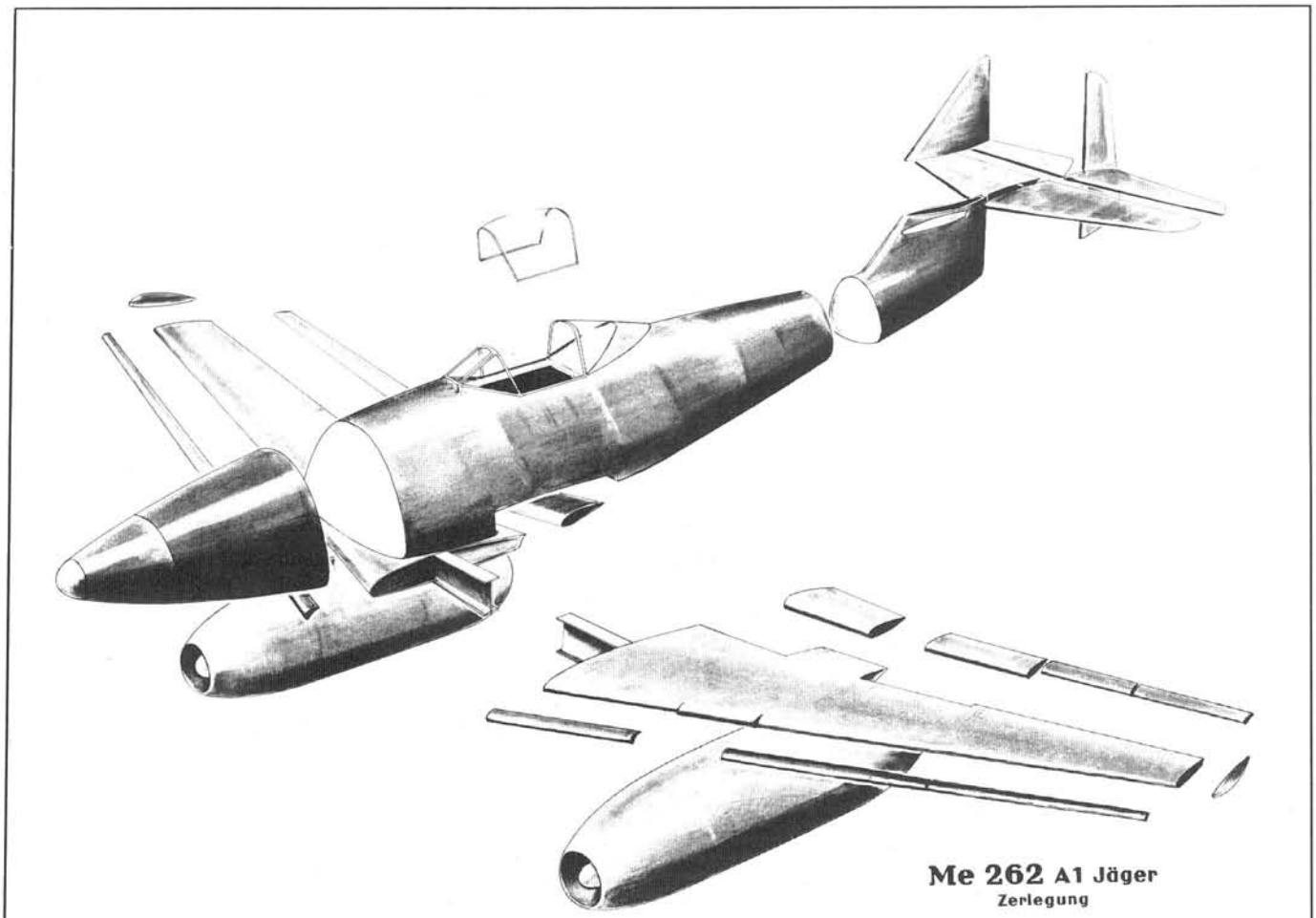
The fuselage is made up of the nose section, center section, and tail section with tail unit bearer. The fuselage nose is attached to the center section at four points. The tail section ends in the vertical fin and together with this forms a single unit.

The fuselage nose section serves as carrier of weapons and ammunition. The gun armament is accessible by means of a two-part folding panel which is hinged in the center. Extending the length of the underside of the fuselage nose in the center, and covered by a hinged door, is a bay for the retracted nosewheel.

The fuselage center section accommodates the barrel-shaped cockpit (tub) and fuel tanks. A cutaway beneath the cockpit serves to accommodate the wing.

The rear fuselage and vertical fin make up one component consisting of two semi-monocoque sections. The tail unit bearer ends in the vertical fin.

Drawing showing component breakdown of the Me 262 A-1 fighter; the single-spar construction method adopted for the wing is clearly visible.



Fuselage Arrangement: Since the cockpit is planned as a pressure chamber, the tub and all passages for control linkages, flight controls and electrical lines are designed to be pressure-tight.

The pilot's seat (unarmored standard seat) is arranged against the rear wall of the cockpit tub. The seat is adjustable in height only; the seat tub serves to accommodate a seat-type parachute. In front of the seat is the instrument panel; instrument consoles are arranged to the left and right beside the seat. The storage battery is mounted behind the seat.

The cockpit is enclosed by a three-piece canopy. The forward section is fixed, the center and rear sections are jettisonable; the left pane of the fixed windscreen is hinged. The center section is hinged to the right and provides access to the cockpit.

The pilot, ammunition and important equipment are protected by armored plate; the front panel of the windscreen is an armor-glass plate.

3. Undercarriage
Tricycle undercarriage.
Wide-track main undercarriage.
Single-leg main undercarriage units retract inward; nosewheel unit retracts into forward fuselage. In retracted position all undercarriage elements are covered by doors.

Extension and retraction by means of hydraulic fluid; monitoring of undercarriage position by way of six visual indicators. Emergency lowering of nosewheel and nosewheel doors by compressed air; main undercarriage is released by compressed air and drops down through its own weight and limited side-slip.

All three wheels are equipped with brakes; mainwheel brakes operated by brake pedals, nosewheel by a pump with hand lever on left side of cockpit.

4. Tail Unit
Cantilever tail unit, central vertical fin.
Vertical fin and horizontal stabilizer attached to tail unit bearer. Ailerons left and right on the wing, hinged at three points; aileron consists of two parts which are screwed together at the actuator shaft.

Elevators and rudder mass balanced and aerodynamically balanced by means of Flettner servo tabs; ailerons balanced forward of hinge point.

Horizontal stabilizer is electrically-adjustable for trimming purposes; rudder trimmable from cockpit.

5. Controls
Elevator and aileron control by control stick with KG 13 b grip. Activation of rudder by rudder pedals mounted in parallel (standard equipment).

Transmission of control forces by way of push-rods. Operation of rudder trimmer by means of hand wheel (standard equipment) on left instrument console; transmission of control force via segmented torsion bar. Adjustment of horizontal stabilizer (from +3 deg. to -6 deg.) by means of electric drive in aft fuselage. Operation by adjusting lever on left console; position indication by electrical position indicator.

Hydraulically-actuated landing flaps (0 to 60 deg.); operated by push-button switch on left instrument console. Position indication by scale on left flap.

Emergency operation by compressed air.

6. Wing
Cantilever, single-spar design of stressed-skin construction. Spar is continuous and consists of two parts bolted together in the flat center section.

The wing components are mounted to the fuselage from below and are attached by 42 8-mm toggle bolts at four attachment points.

Wells for retracted undercarriage in underwing skinning. Engine attachment fittings on underside of wing; undercarriage leg attachment points on undercarriage well wall. Automatic slat over entire wing leading edge (interrupted by engines). Landing flaps between ailerons and wing root in two sections (inner and outer flaps).

7. Power Plant
a. Turbo-airflow Devices
Two "Jumo 109004 B" special engines suspended beneath the wing at three points; suspension points are standard fittings.
For performance ratings and capacities see handbook.

b. Engine Cowlings
Removable cowlings; good accessibility to engines is assured. Two step openings are located in forward left cowling to ease entry into the aircraft.

c. Fuel System
Fuel capacities
Main tank in front of cockpit 1 X 900 liters
Main tank behind cockpit 1 X 900 liters
Supplementary tank beneath cockpit 1 X 200 liters
Total fuel capacity 2,000 liters

Selective delivery of fuel from the front or rear tank to the left or right engine; tank select lever on left instrument console. Emptying of supplementary tank into main tanks.

Fuel supplied to engines by two electric fuel pumps per tank. Electrical monitoring of fuel level and fuel remaining alert; devices are arranged on instrument panel. Fuel remaining alert occurs at 250 liters per main tank.

d. Fuel System for Servo Motor

Separate installation for each engine with tank on engine; contents of tank 15 liters.

e. Engine Control

Control of engines by only one lever per engine (single lever control); lever on left console is connected to engine by rods.

f. Starting and Ignition System

Starting by "Riedel" starter; power source is an air-cooled, two-cylinder, two-stroke motor. Fuel tank for starter motor (1.5 liters) is located in engine nose-ring.

To initiate combustion in the engine, starter fuel (tank with a capacity of 20 liters is arranged on engine) is injected into the combustion chamber by an electric starter fuel pump and ignited.

Two double-spark ignition coils per engine. Ignition system necessary only during starting; engines run independently from about 2,000 rpm.

g. Takeoff Assistance

Additional takeoff thrust is provided by two "RI 502" rockets mounted on the rear tank cover panel, each providing 500 kg of thrust. Ignition by means of push-button on switch box on left console. Release of expended rockets by jettison handle on left console.

8. Equipment
a. General Equipment

Special engine monitoring instruments, flight and navigation instruments arranged on instrument panel.
Airframe instruments on left console. Master compass mounted in rear fuselage.
Pilot's seat equipped with belly and shoulder belts.
High-altitude oxygen equipment in left console; two storage bottles in aft section of fuselage.
First-aid kit on PT access cover and small first-aid kit on pilot's person are planned.
Seat-type parachute in pilot's seat tub.

b. Electrical Equipment

1,000 Watt, 24 Volt generator on each engine.

Storage battery (7.5 Amp.hours) behind pilot's seat.
Electrically activated are:
Special engine starting devices
Fuel tank pumps
Horizontal stabilizer adjustment mechanism
Indicator systems
Navigation lights
Radio equipment
Armament installation
RATO equipment
Signal flare firing gear

c. Hydraulic Fluid System

Hydraulic fluid pump (18 l/min) on left engine.
Hydraulic fluid reservoir between cockpit and left fuselage side wall.

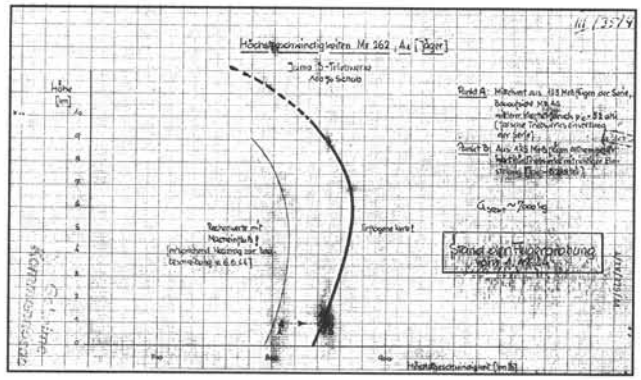
Hydraulically activated are:
Main undercarriage and main undercarriage doors
Nosewheel unit
Landing flaps

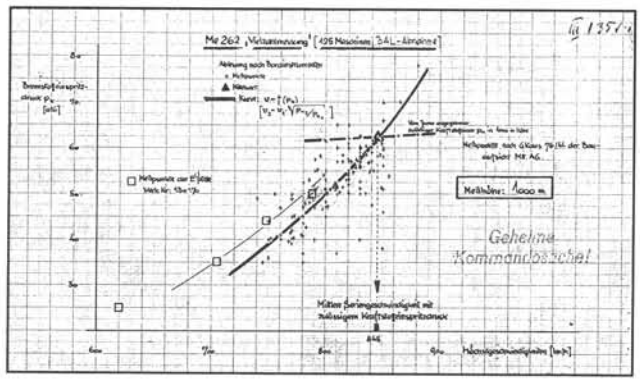
Emergency operation by compressed air in event of loss of hydraulics. Storage bottle in fuselage center-section on left side wall.

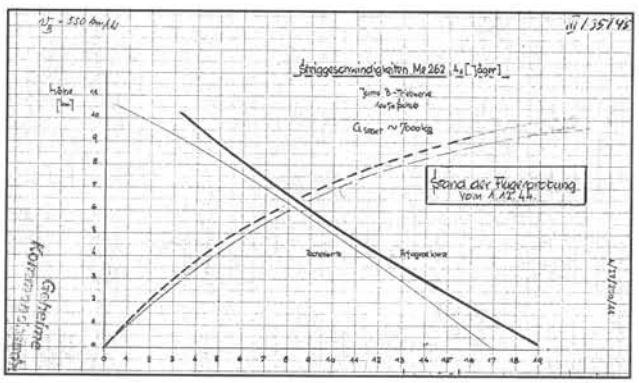
d. Radio Equipment

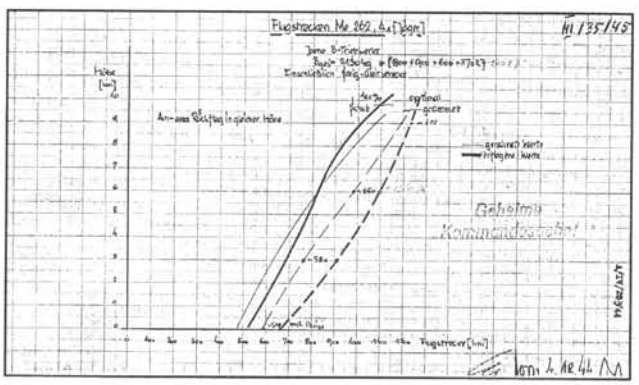
The radio equipment consists of the following radio sets:
FuG 16 ZY
FuG 25 a

Me 262 A-1a performance graphs
From top to bottom
Maximum speed,
Maximum speed, averaged
Rate of climb,
Cruising range.









e. Armament

Installed are two MK 108 each with 100 rounds and two MK 108 each with 85 rounds.

Performance

In general, performance specifications merely indicate the limits of performance; only a performance diagram created during the course of flight testing can provide a complete picture of the capabilities hidden within an aircraft.

The graphs presented here are based on original Messerschmitt drawings.

Structural Strength and Flight Limits

With a load factor of n = 7 the aircraft has been placed in structural strength group H5 at the maximum allowable flying weight of 5,600.

Maximum allowable speeds:

in horizontal flight (at zero altitude) 900 kph
with landing flaps fully extended 300 kph
for lowering of undercarriage 300 kph
in diving flight 1,000 kph

Weights

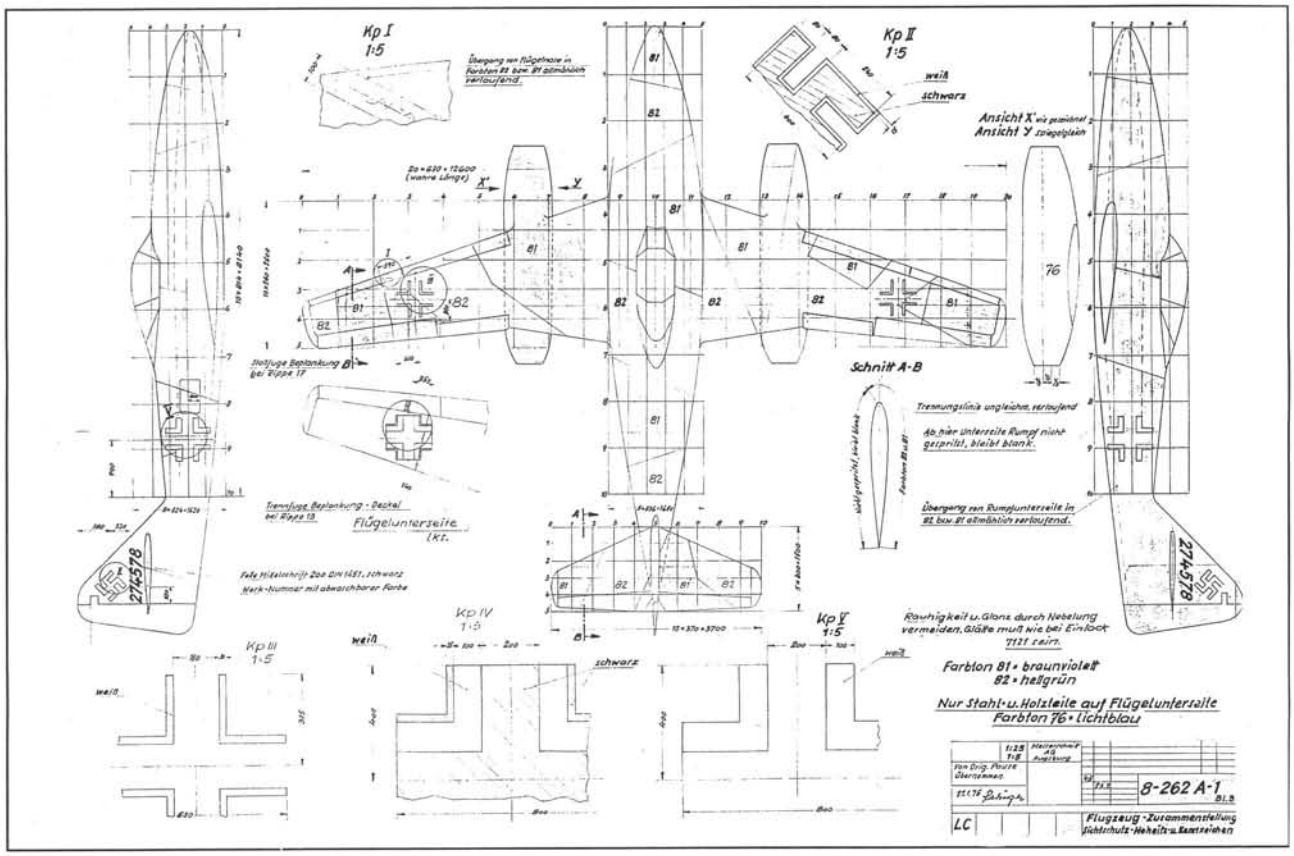
Aircraft weights of the Me 262 A-1a production aircraft by Dipl. Ing. W. Degel

Aircraft in equipped and loaded condition:
4 X MK 108 with a total of 360 rounds of ammunition, 2,570 liters of fuel, with additional back armor and airframe reinforcements.

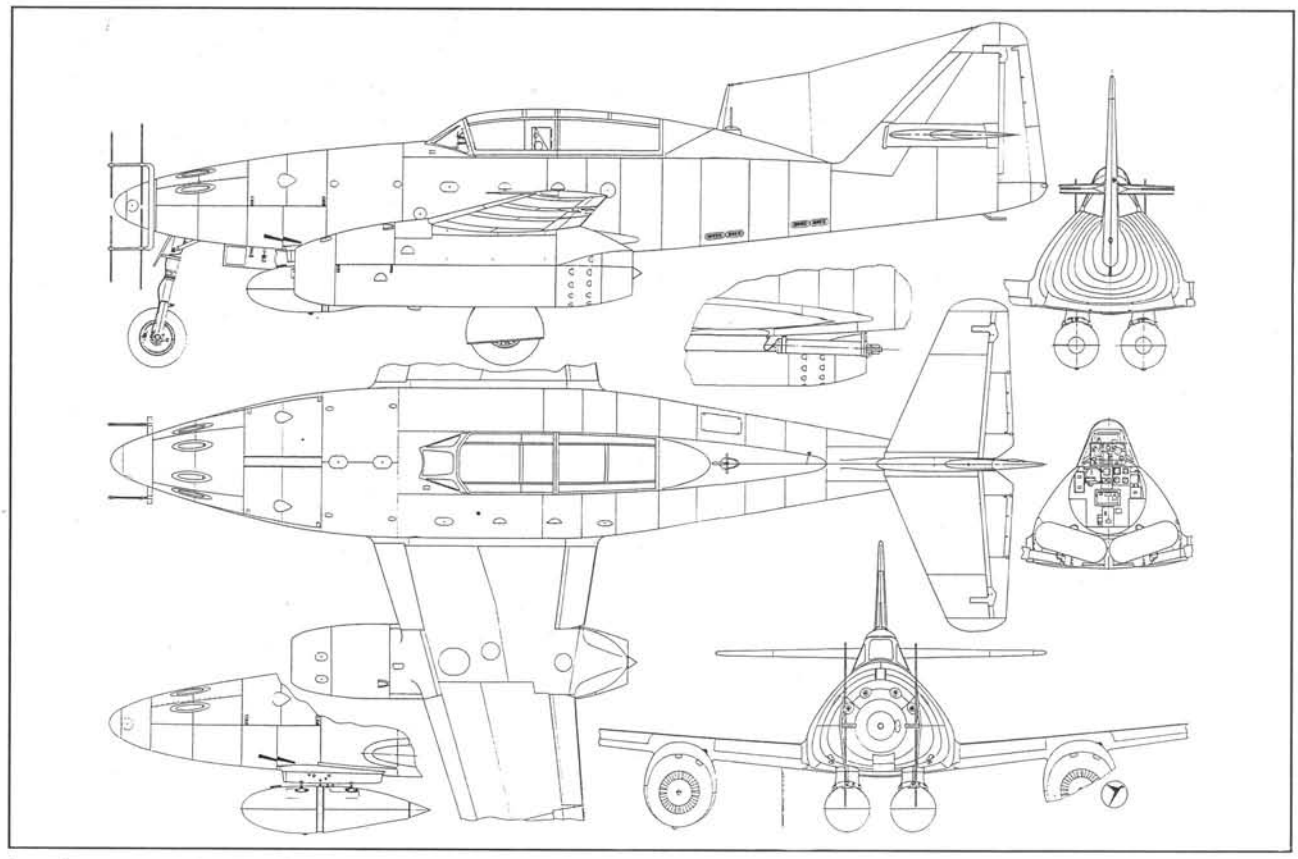
Airframe with flight controls and undercarriage, with paint for airframe and engines	1,676 kg
Engines and tank system	1,959 kg
Installations and equipment	239 kg
Armament	334 kg
Armor	196 kg
Equipped weight	4,404 kg
Additional load Pilot, lubricants and fuel, ammunition	2,573 kg
Takeoff weight without takeoff assistance rockets, without external tanks	6,977 kg
with 2 X 500 kg thrust takeoff assistance rockets, without external tanks	7,072 kg

Protective Finish

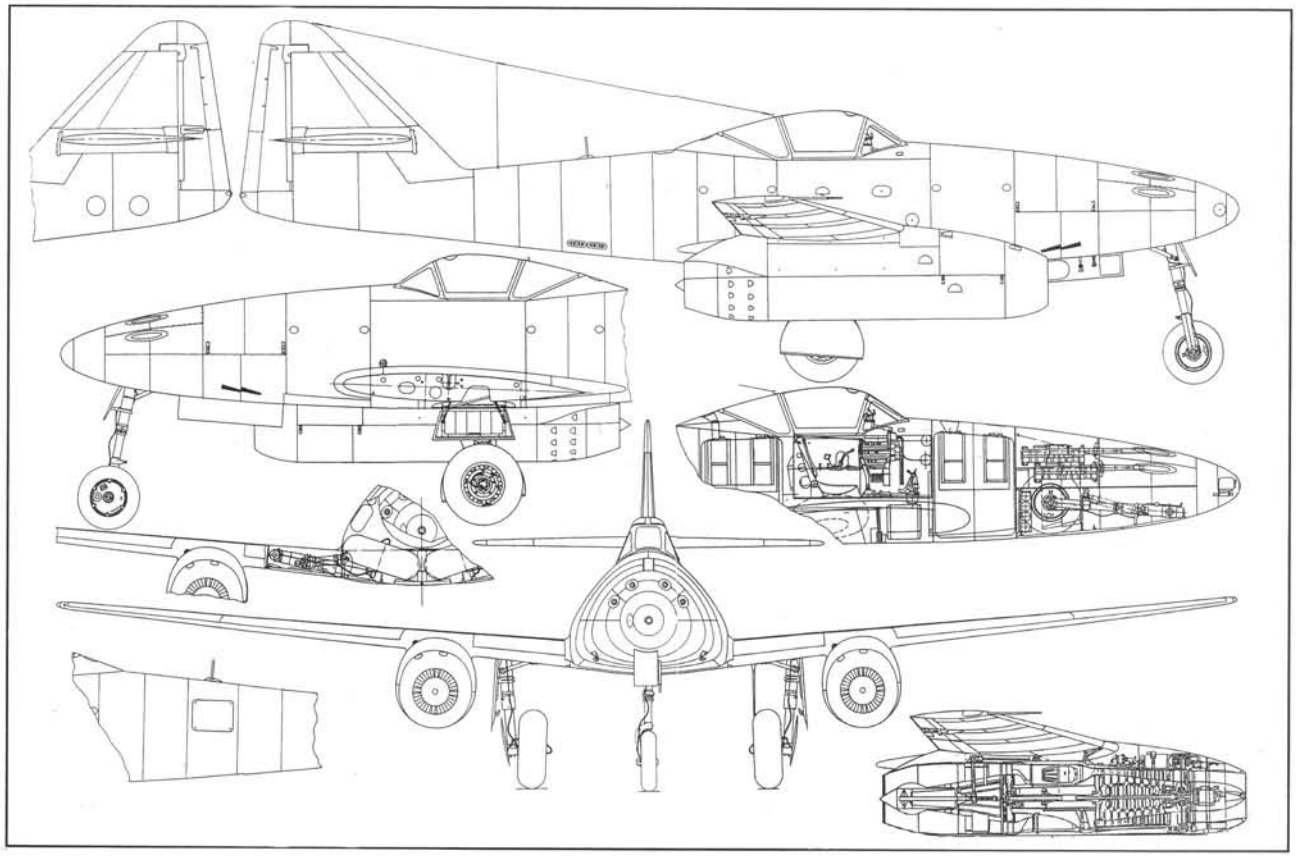
Camouflage finish with improved surface finish as per Oberflächenschutzliste (Surface Protection List) 8-Os-262 using the paints specified in L.Dv.521/1.



Me 262 camouflage scheme from original sources.

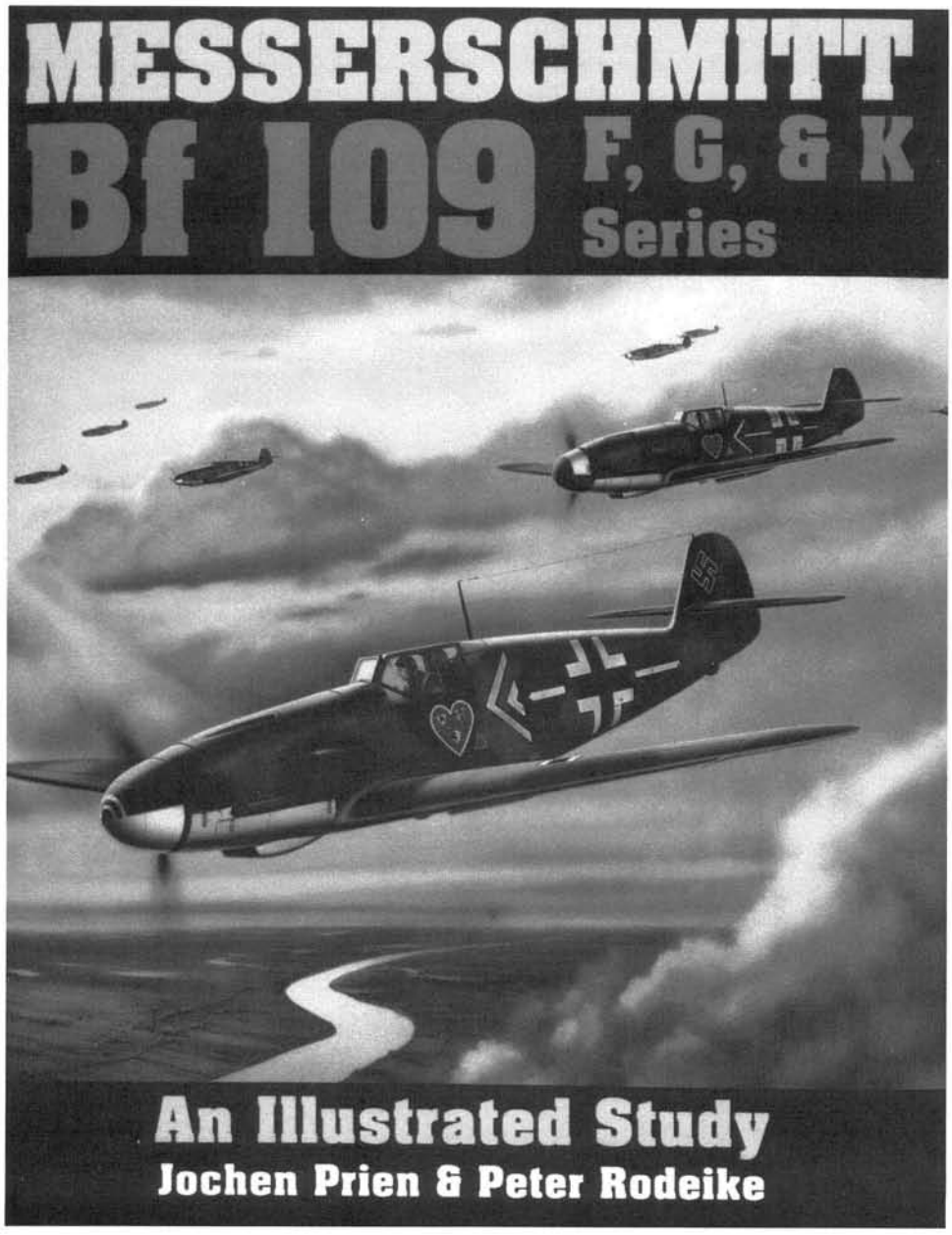


General-arrangement drawing of the Me 262 B-1a/U1 (Drawing by Sengfelder)



General-arrangement drawing of the Me 262 A-1a (Drawing by Sengfelder)

Also from the publisher



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