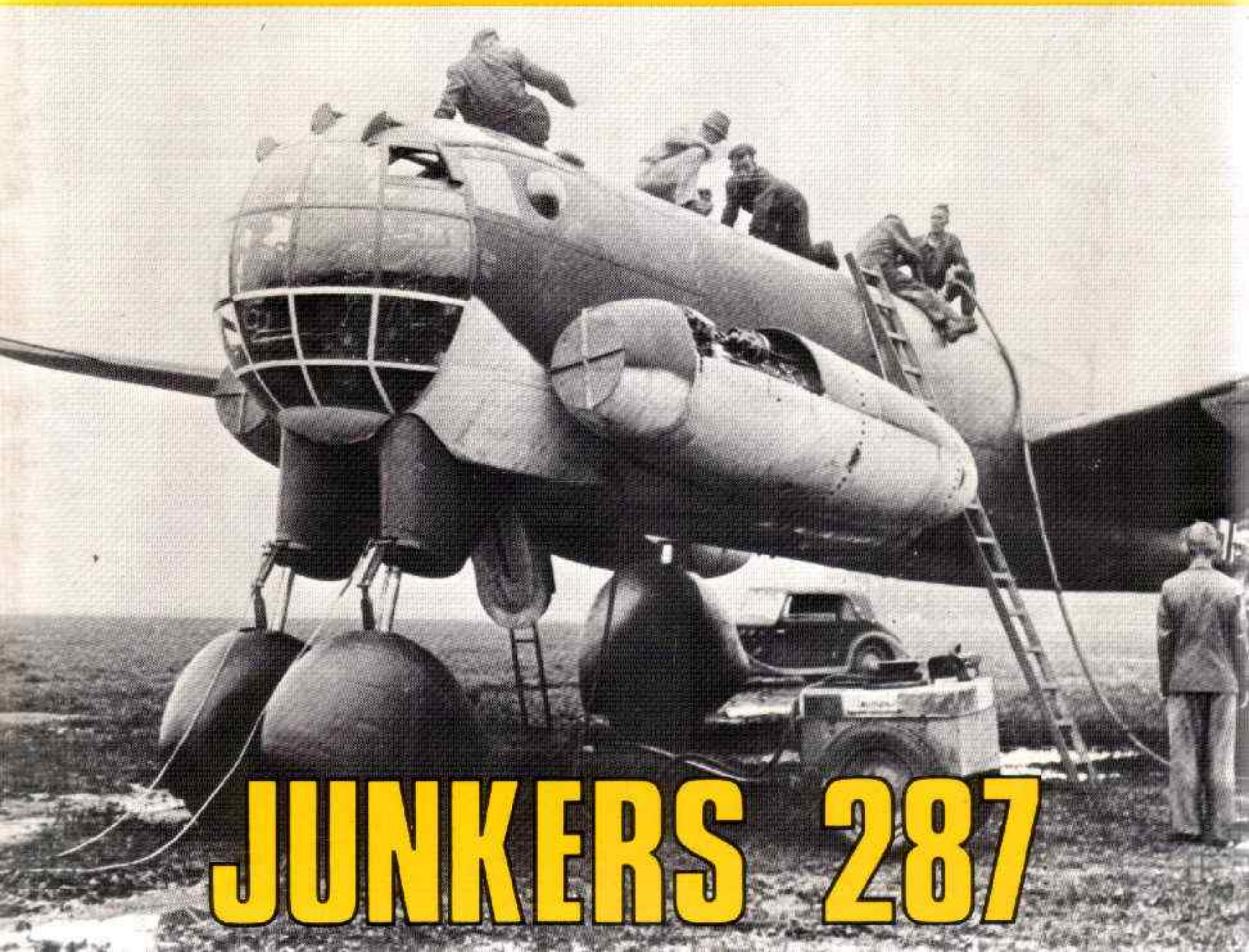
MONOGRAM

Close-Up 1



JUNKERS 287

Ju 287 V1 being readied for flight.

With this issue a new series of aviation monographs has been launched. The Ju 287 story presented here is perhaps the most thorough yet published of this remarkable airplane. Nevertheless the story is not complete. Records held by agencies in Eastern Europe regrettably are not available to the West at this time. Similarly many individuals who participated in the Ju 287 program are now dispersed or retired from the active aviation scene. Official records which are available are often fragmentary or of little historical consequence. On the plus side, Dipl. Ing. Hans Wocke, currently with Messerschmitt-Bölkow-Blohm/Hamburger Flugzeugbau, was exemplary in his assistance without which this report would have perpetuated inaccuracies and misconceptions. Photographs of the Ju 287 are among the *rarae aves* particularly photographs of the second prototype. Partly for this reason, the reader is cautioned with regard to the quality of our photographs. Although many are of such high contrast as to normally restrict their reproduction, it was felt that their content warranted inclusion.

Certainly a word of lasting thanks must go to Herr Jürgen Rosenstock who provided an enormous service by his tireless translation and candid comments. Herr Fleischmann, archivest for Bayerische Motoren Werke AG, assisted with information relating to that company's turbojets while personnel from the National Air and Space Museum provided access to valuable microfilm records.

Finally, it is our expectation to publish additional titles of this limited series at intervals over the next year and a half. We have endeavored to select titles not in conflict with our hardcover projects and which we feel our readers will find both interesting and inspirational. Inspirational, since we are always interested to hear from our readers and, it goes without saying, that darkness shall prevail until a lamp is lighted.

Photograph credits:
- All photographs are the author's except:

U.S.A.F.: cover, 1, 6TL, 8
BMW: 18 top
Herr Rainer Haufschild: 12M,B, 31L
UPI: 30
U.S. Army: 5 top
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- All drawings by the author are based on official drawings.
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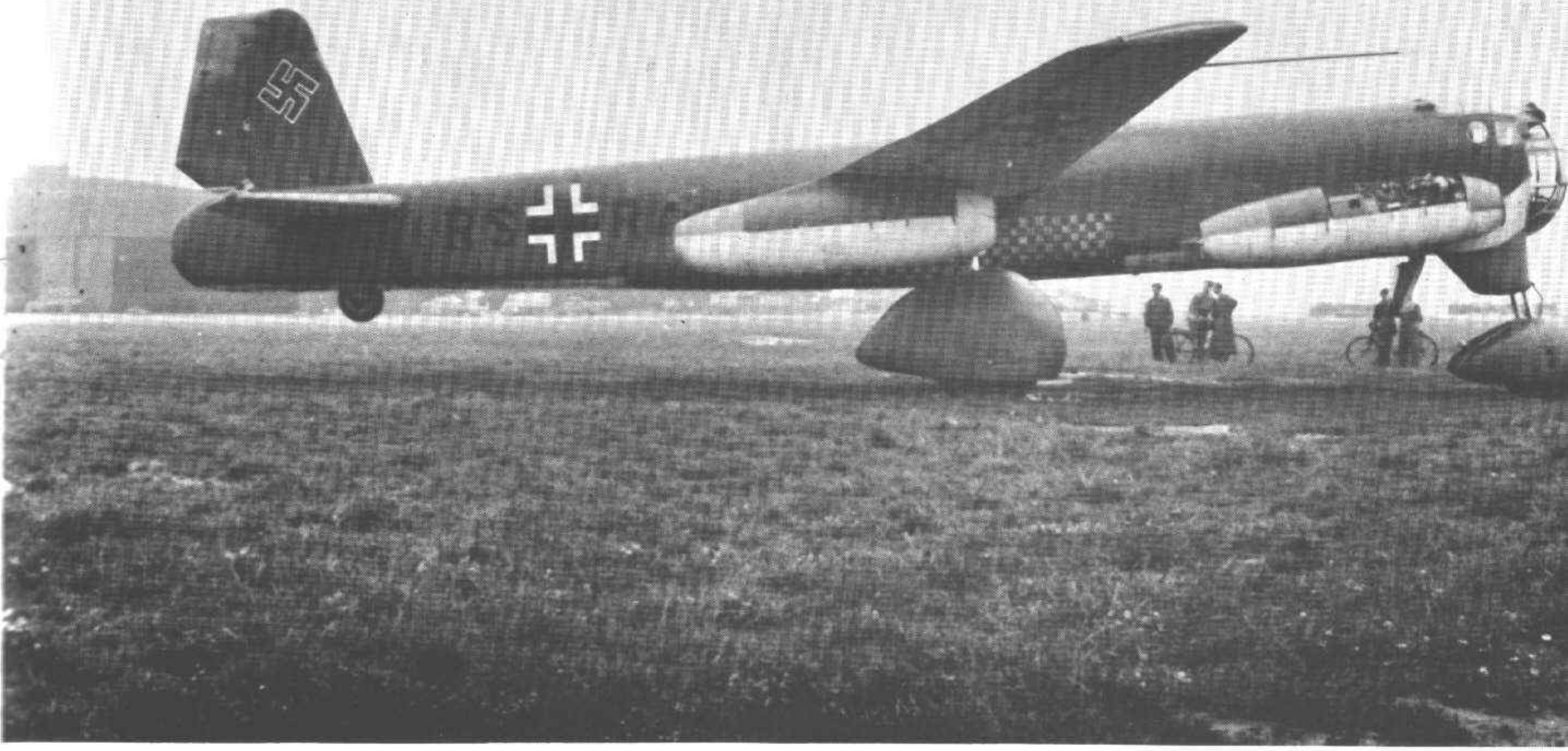
Ju 287 Camouflage Notes

The first Ju 287 prototype was camouflaged in accordance with Luftwaffe Directive, L.Dv. 521/1. Most of the upper surfaces were painted RLM 71 (Dunkelgrün) with isolated areas of the fuselage receiving RLM 70 (Schwarzgrün). Noteworthy are the areas of RLM 02 (anti-corrosion paint) found over the turbojets in addition to the small area of RLM 76 (Hellgrau) near the top of the rudder. Wheel spats and nose leg trousers were Dunkelgrün. Undersurfaces were sprayed RLM 65 (Hellblau). Underwing inboard surfaces were given a special protective coat of RLM 22 (Schwarz) treated to withstand exhaust heat from fuselage turbojets. The resulting overall finish applied to the Ju 287 V1 was lusterless. However, quality of the finish came under severe criticism since a speed loss resulted from the dull finish. Recommendations were made to overcome this objection and it was intended that all subsequent Ju 287's would receive a semigloss low-drag finish.

Production Ju 287's undoubtedly would have been camouflaged in RLM colors 81 and 82 uppersurfaces with RLM 65 on all undersurfaces as shown in the illustration on pages 16-17. The Ju 287 V2 was apparently completed in dark green over all upper surfaces with sky blue undersurfaces.

Special Note

Readers desiring accurate paint samples of the colors mentioned above are advised to secure a copy of MESSERSCHMITT 'O-NINE' GALLERY. (See inside back cover for details.) A full page of paint chips is presented which encompasses all the known German aircraft colors. All chips were professionally matched for complete color control which surpass even the best four-color ink process.



JUNKERS 287

By Thomas H. Hitchcock

It can be stated categorically that the German aviation industry won the research war under less than ideal circumstances. During the latter half of the conflict Germany was the recipient of round-the-clock bombardment of above ground factories, disruption of logistics, and strategic attacks against fuel reserves and fuel producing refineries. Yet in spite of such obstacles, unique aeronautical research and development programs bore fruit. No doubt the Allies took satisfaction in the realization that many of these programs did not progress farther than they did.

WHY THE FORWARD SWEEP?

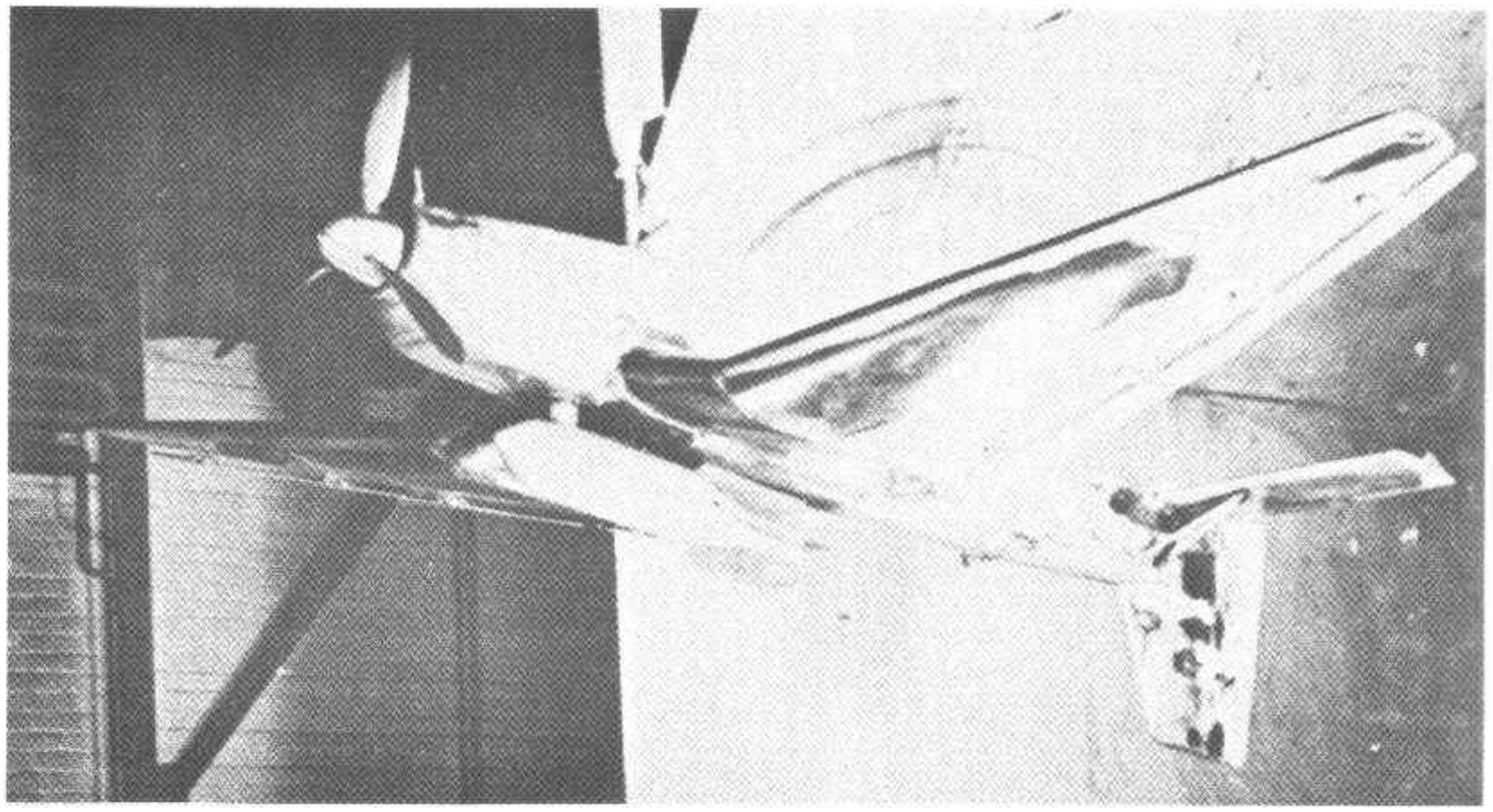
Back in 1942 little was known of transonic aerodynamics with respect to the forward sweep. However it was recognized that the sweptback configuration would delay aerodynamic compressibility. Additionally, in the forward swept wing, wing drag could be delayed by employing relatively thin airfoil sections which, although structurally thick for stiffness and strength, would house internal fuel cells, armament and landing gear.

On the deficit side, as the angle of sweep increases past 15°, lateral stability becomes less. Consequently, high subsonic and transonic speeds require countermeasures to maintain lateral directional stability. Of course, low speed operations with a marked sweep back are affected also by lack of lateral directional stability presenting serious takeoff and landing hazards.

Junkers engineer Philipp von Doepp had performed numerous experiments which indicated that by sweeping the wings forward, the low speed liabilities experienced by the sweptback wing would require an inordinately high approach to landing speeds while the swept forward plan would alleviate the problem by positioning the greatest lift at the root, then spreading out until the wingtips would be last to stall. Obviously, aileron control at low speed would be exceptional since center section flow break-away would be to no effect. Additionally, aileron control at high angles of attack and the impossibility of wing-root shock waves reaching the wingtips were other favorable characteristics. Moreover, since the ailerons did not require modification to offset wingtip washout, it was found that they could be drooped to augment flaps for low speed flight.

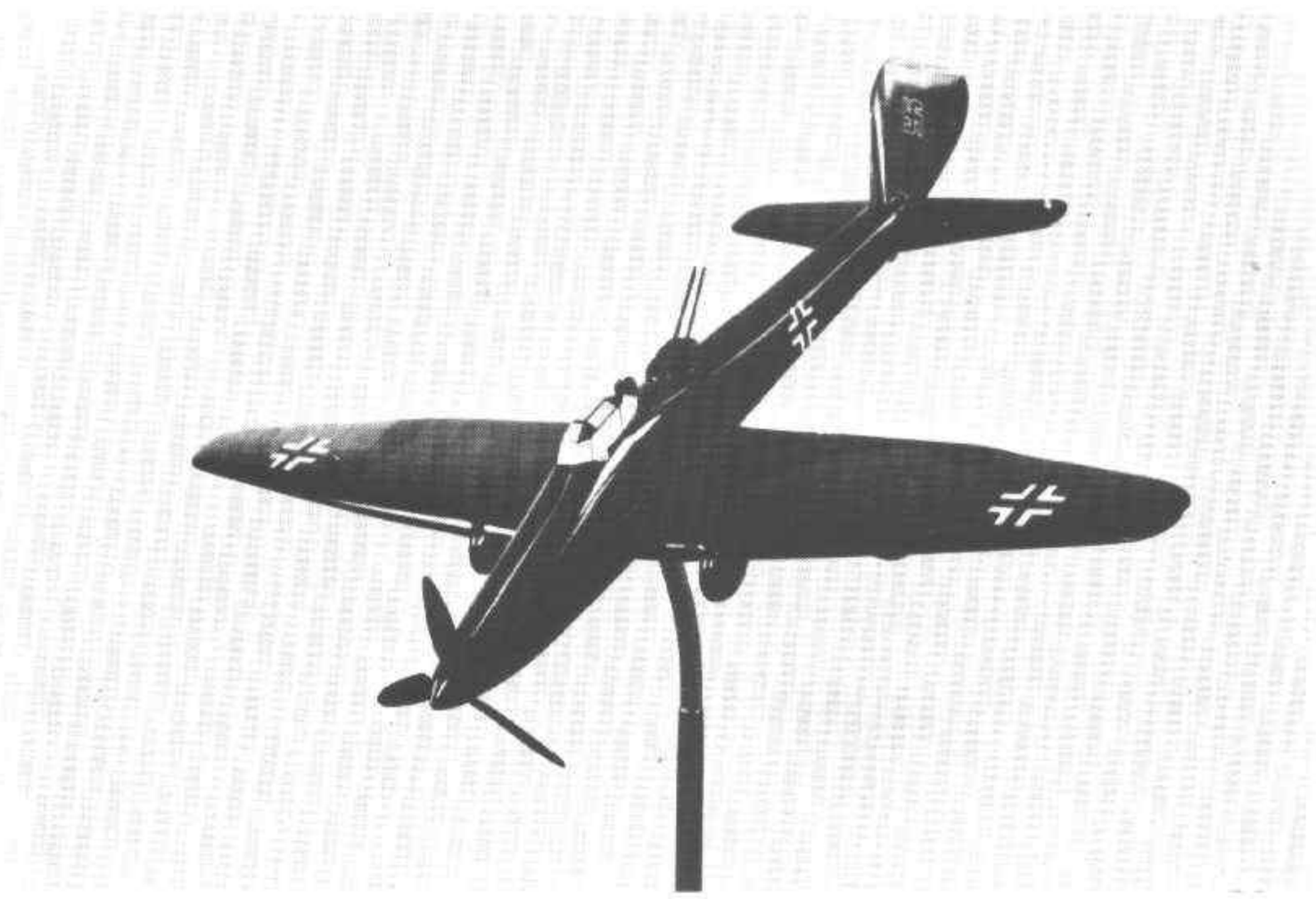
Ju 287 V1, RS+RA, *Brandis airfield where airflow tufts were installed immediately aft the fuselage turbojet.*

In the course of wind tunnel experiments von Doepp's findings also revealed a serious disadvantage to the forward swept layout, that of aeroelasticity. Flexing action upon the sweptback wing may be dissipated more easily at the wingtips, but in the case of the forward sweep, the forces work in reverse with the wingtips transmitting flexing to the wingroot. There are mechanical means of minimizing wing flexing: make the wing as rigid as possible, omit disruption of all wing spars, and/or locate counterbalance weights (i.e., by engine placement). Nevertheless, these measures are only partly corrective for the fact is that the forward swept wing is unsuited for supersonic flight and must be confined to subsonic or transonic applications.



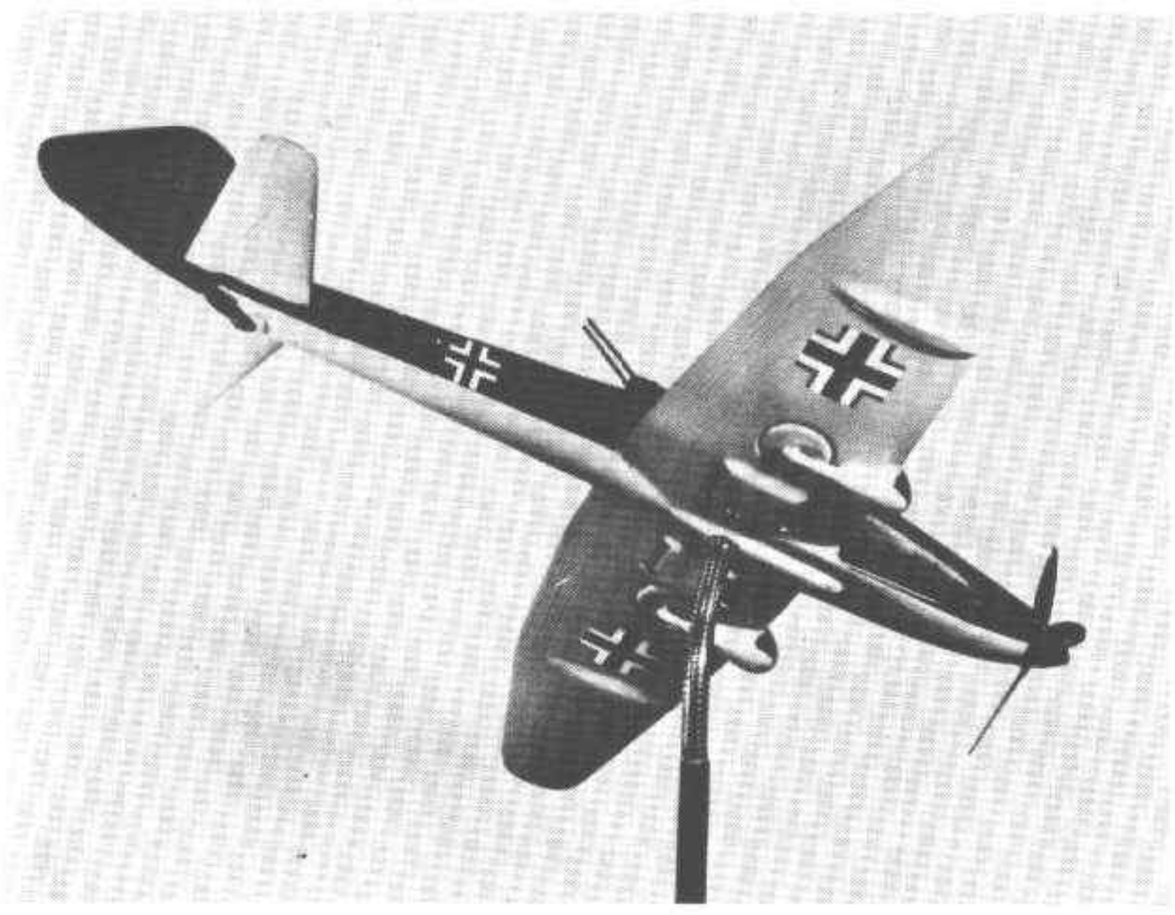
Junkers' models depict the short-lived **Ju 187** *project (above) and the equally unsuccessful* **Ju 287** *Stuka. Note the reversible vertical tailplane designed to improve rearward field of fire.*

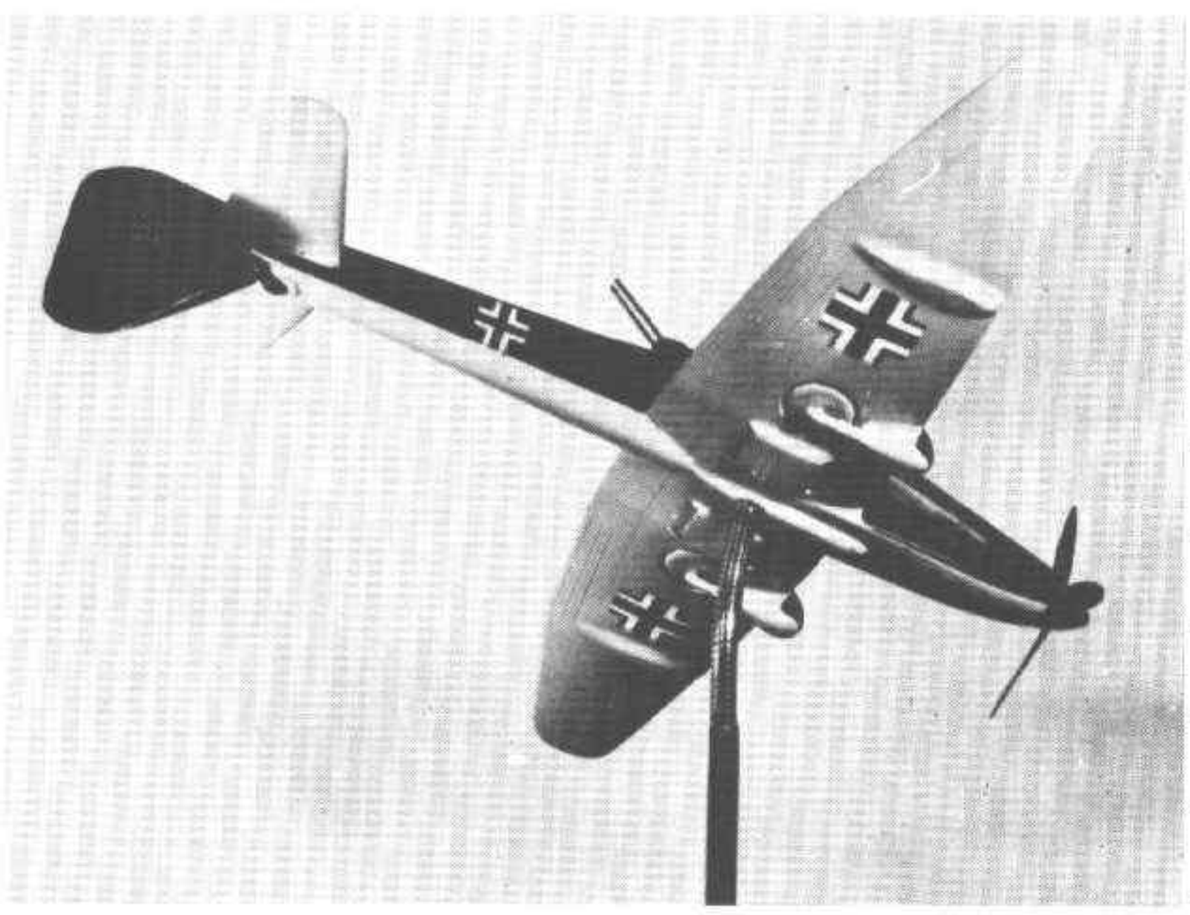
Throughout the Second World War aircraft produced by the Junkers Aircraft and Engine Works of Dessau were noted for their angular appearance and functional design. Few would rate these aircraft high marks purely for aesthetic appeal. Nevertheless, most Junkers aircraft performed yeoman tasks endearing them to their crews. One must acknowledge that the Junker's design office had been endowed with a pragmatic attitude toward research and development and with leadership in resourceful application and efficiency. They were noted for rugged construction, simplicity of design and dependability. The design studies which evolved into the Ju 287 were no exception. They embodied a high degree of resourcefulness in expediting prototype construction through incorporation of numerous features to prove concept efficiency.



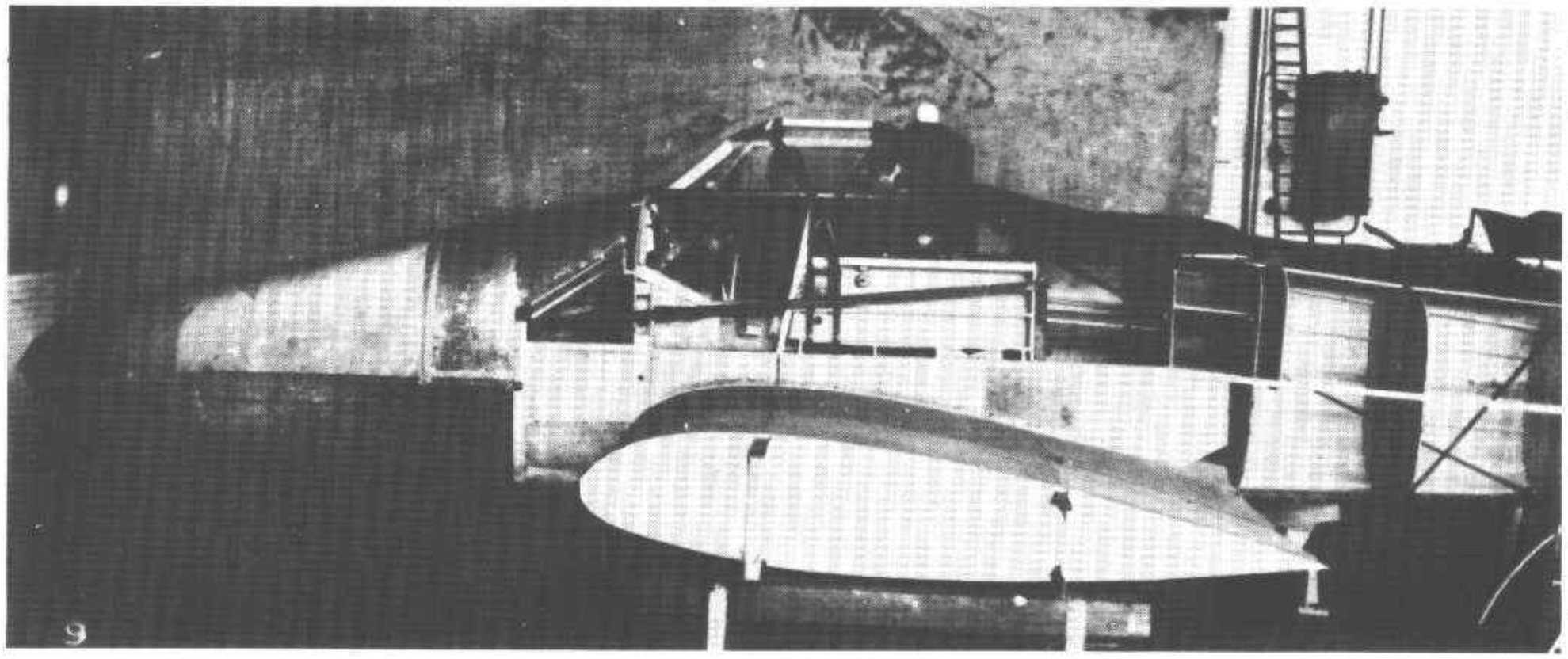
Another attribute of the Junkers concern was the ability to think big. Some Junkers designs reached gigantic proportions, e.g., Ju 332, Ju 390, EF 100. With the exception of several interesting projects, Junkers failed to create a single-engine fighter, much less a pure jet type. Therefore, it is even more interesting that the Ju 287 was not only its first jet type, but that it was also multiengined and aerodynamically unorthodox.

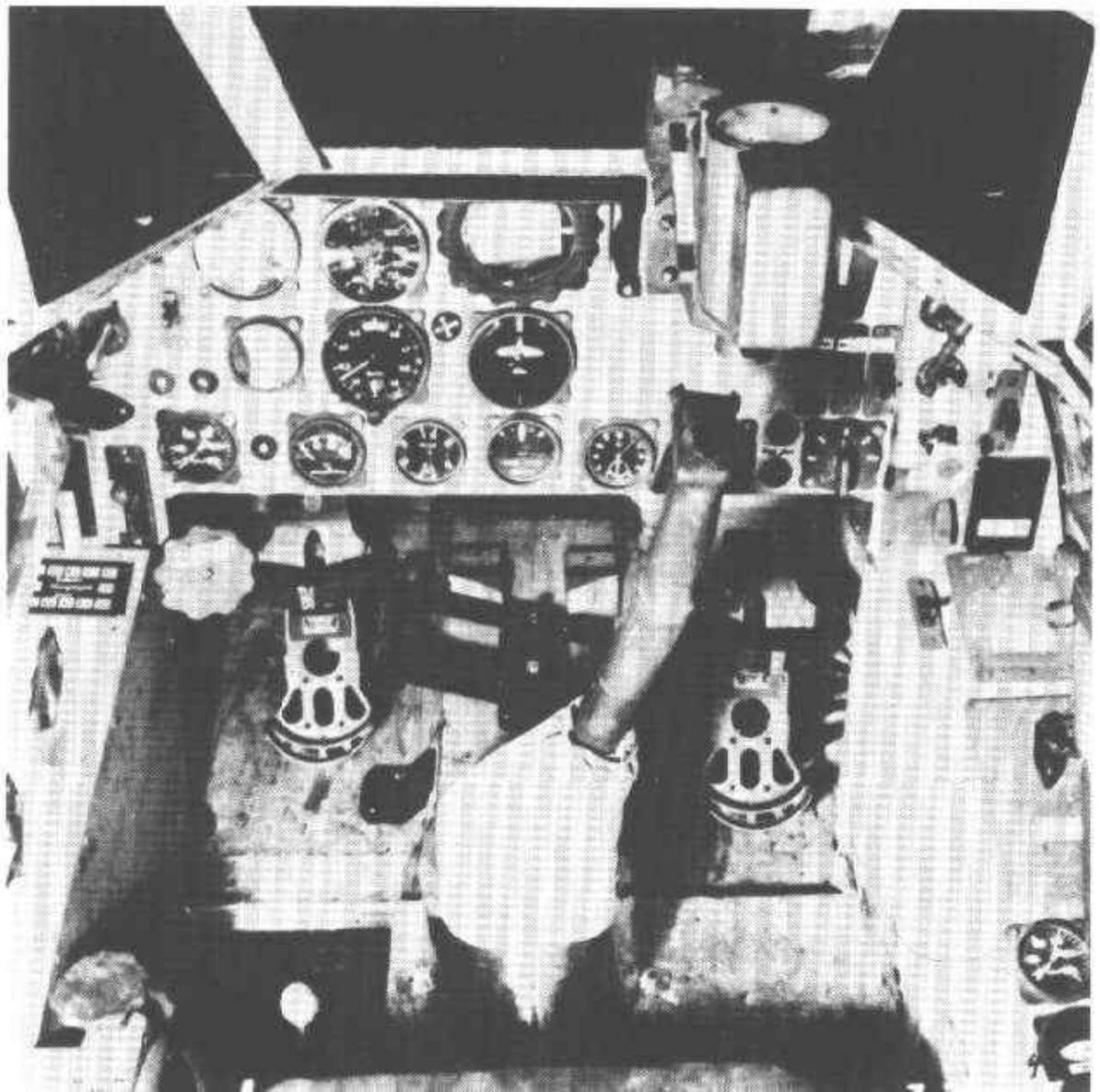
Before sketching the story of the jet designs which were to evolve into the Ju 287, mention must be made of the first "287." It will be remembered that the German Air Ministry (RLM) usually assigned a group of numbers to a particular company for its exclusive use. On this occasion numbers 286, 287, 288, 289 and 290 were allocated to Junkers. In several instances development studies were assigned progressive

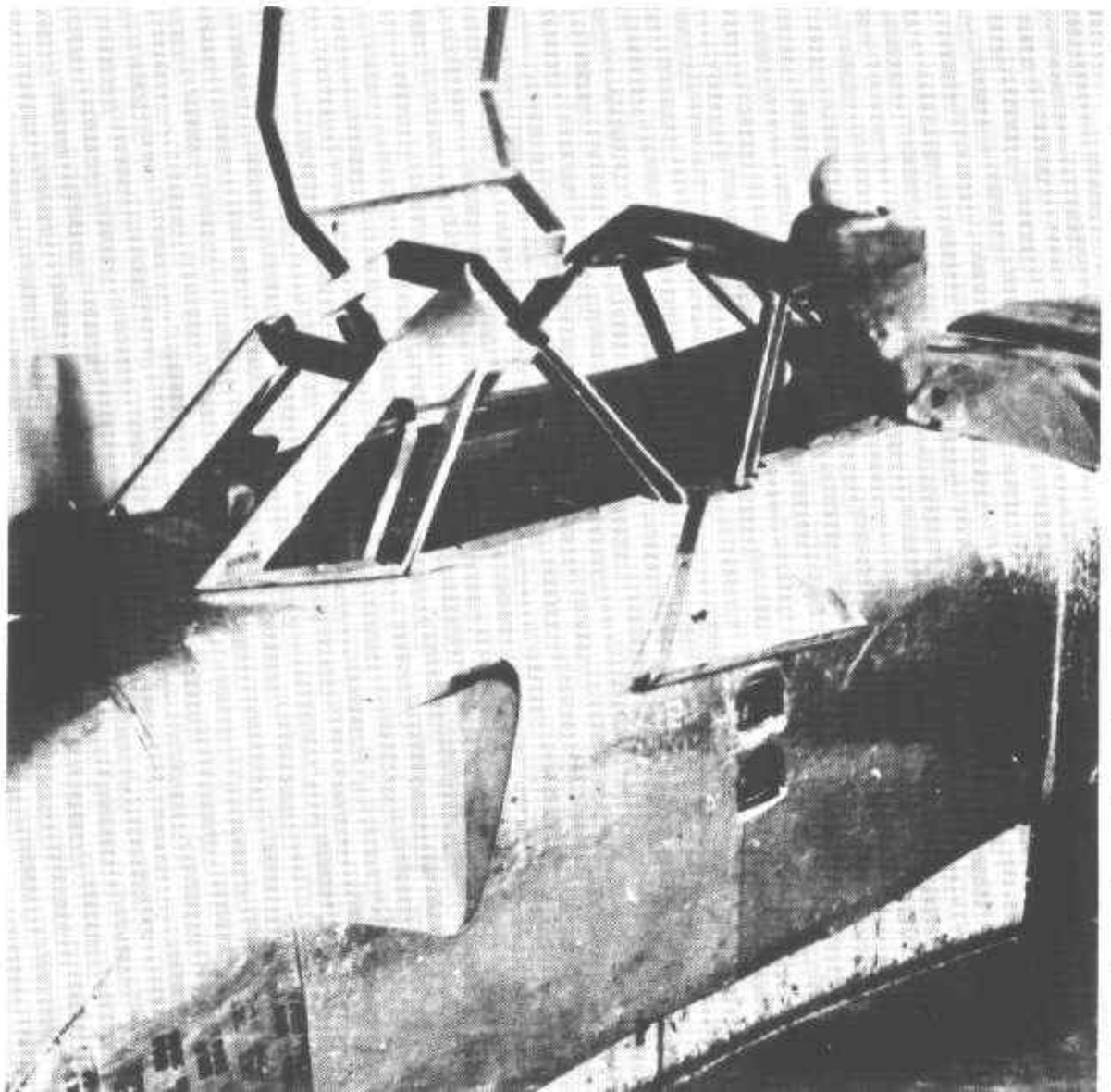




The Ju 287 Stuka incorporated several features distinct from the Ju 87. Besides the fully retractable gear, improved crew armor and a reversible vertical tailplane, a remotely operated dorsal turret was envisoned mounting two MG 151 cannon. Dive brakes of the slatted variety were relocated in the trailing edge flap area. Provision was made for external stores to be carried under each wing. The full scale mockup (below), displayed the heavily reinforced and armored canopy. Projected powerplant was the Jumo 213 developing 1,176 hp for takeoff.





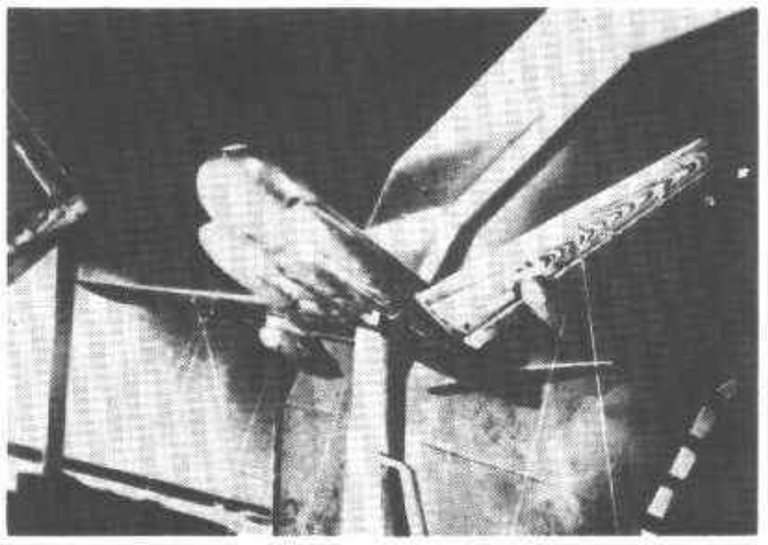


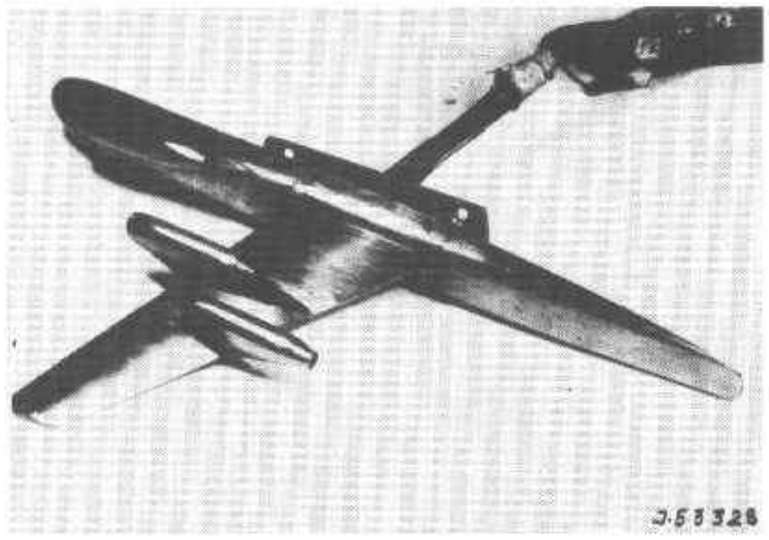
numbers. The Ju 186 was a projected development of the Ju 86, while the Ju 286 was a project based on the Ju 186. In the case of the Ju 87, the logical development line would have resulted in the Ju 187 and possibly a Ju 287. Originally, however, the number 187 was allocated to Junkers for its development study of a refined Ju 87 "Stuka." This project was known originally as the Ju 87F but due to numerous design changes, it was decided to allocate a new designation, Ju 187. However, the Ju 187 was short lived, for an even more refined Stuka was then being advanced. This "second generation" Stuka was allocated the designation Ju 287 since it was markedly dissimilar from the Ju 187 and certainly the older Ju 87 series. Nevertheless, this project also met with skepticism from the RLM. The feeling that to disrupt the supply of a relatively successful production aircraft for one having only a marginal performance increase was deemed impractical, thus the Ju 287 Stuka was rejected also. After cancellation of the Ju 287 Stuka program in October 1943, the RLM "8-number"[1] 287 was reassigned to encompass the jet bomber project.

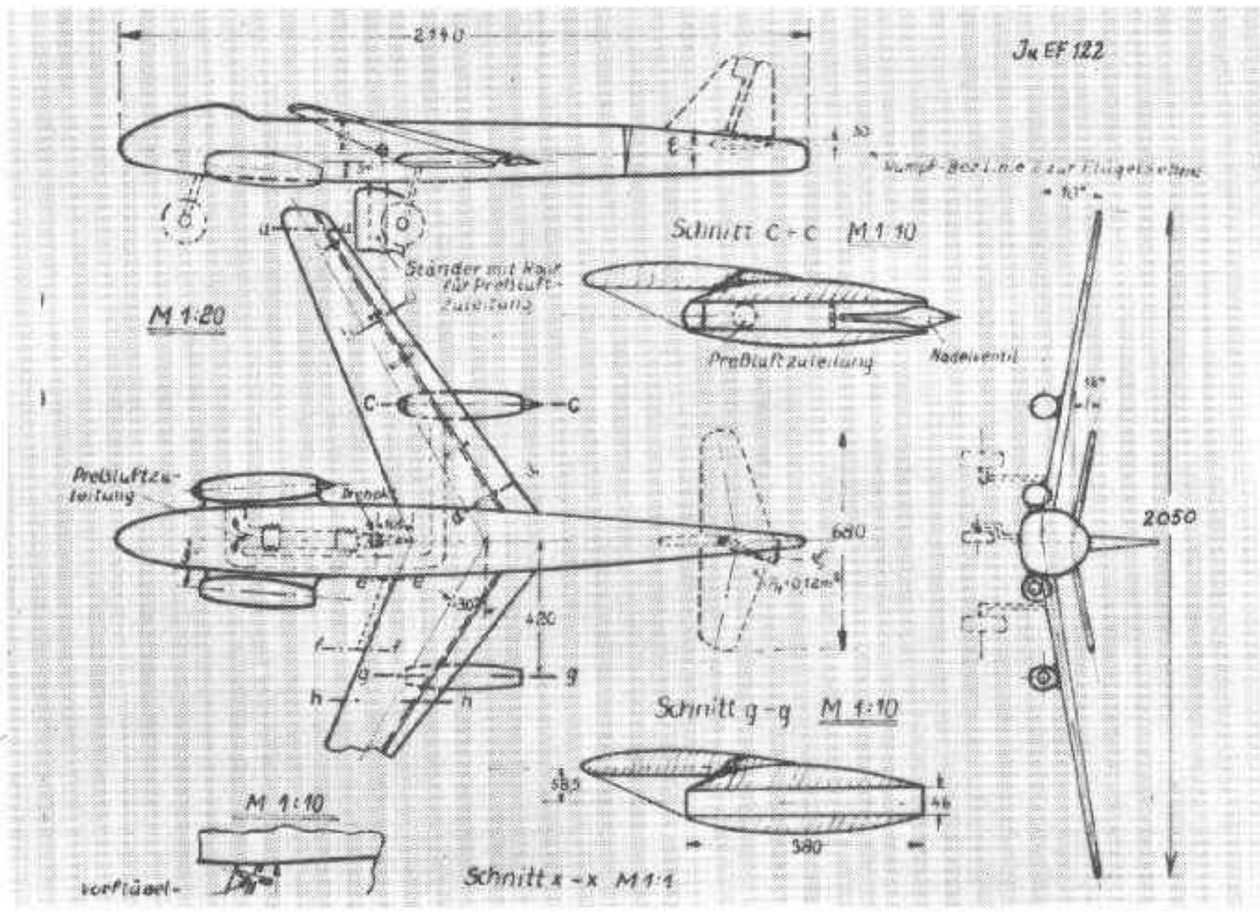
Prior to the shelving of the "Stuka 287," influential members of the RLM evinced interest in the development of a multi-engined jet bomber which was hoped would provide the basis for a tactical bombing force. At least initially, participation in this program was given exclusively to the Junkers concern since their experience with multiengined aircraft was deemed more than sufficient. A research and development project was set up late in 1942 under the aegis of Prof. Heinrich Hertel who enlisted Dipl. Ing. Hans Wocke as project engineer. Initially it was thought that the design configuration for this high speed bomber would take the form of a sweptback wing layout of some 25 degrees which would allow speeds up to MACH 0.8. Wind tunnel preliminary research disclosed the liability of the sweptback configuration, namely that of poor directional stability at the wingtip during low speed operations. Of course, latter day technology has solved this problem, but in 1942 it was a significant engineering challenge.

After conducting numerous experiments, the Junkers team suggested that the problems they faced might be resolved by sweeping the wings forward. Such a radical solution was proven feasible by a number of scale wind tunnel models, each with a variation of engine placement. These included the

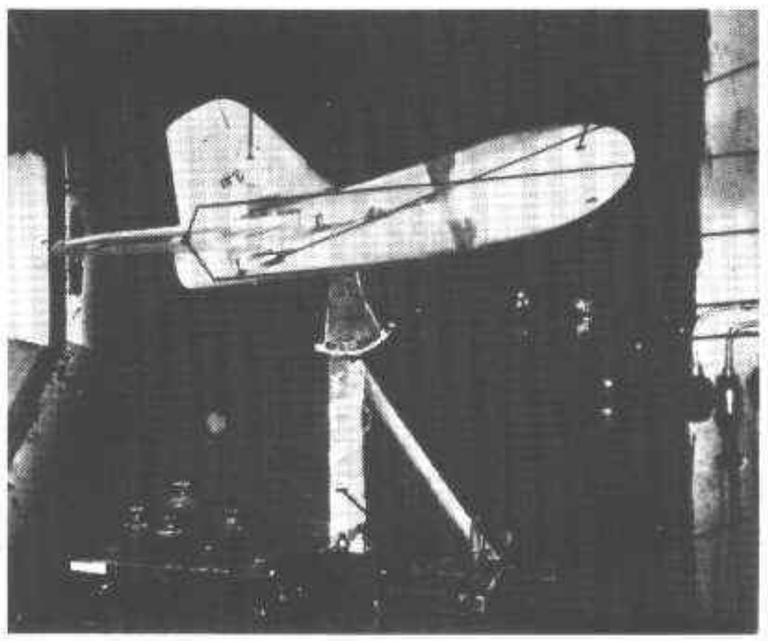
[1]Aircraft were assigned the numeric code number 8 while engines received code number 9.

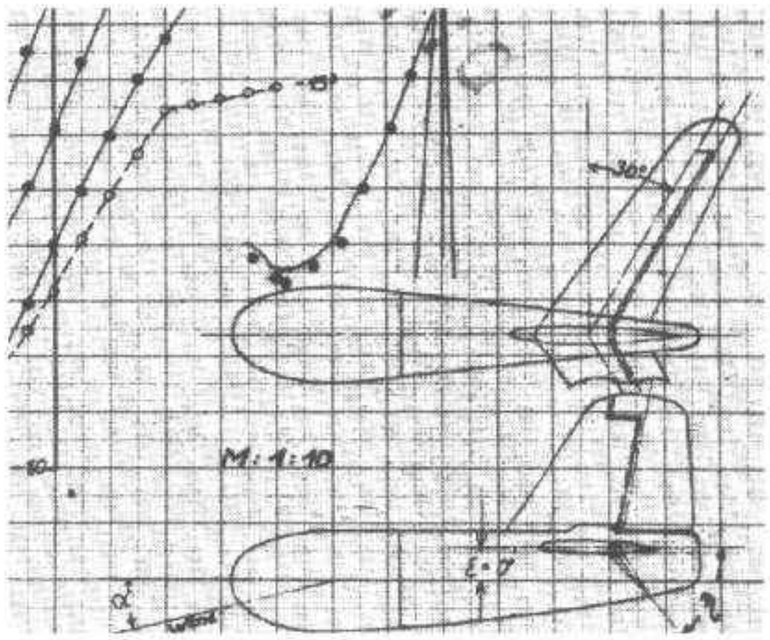


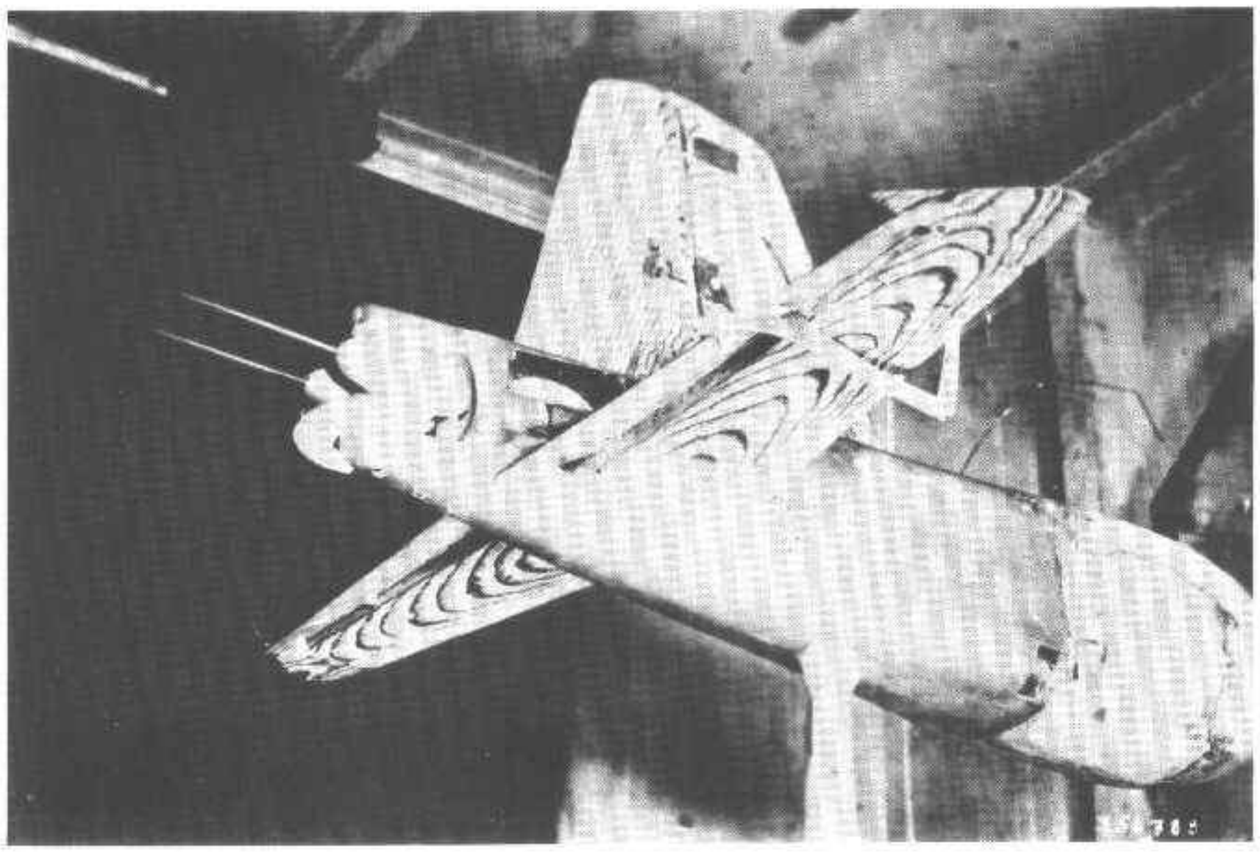




Ju EF 122 Factory drawing indicating method of airflow measurement with simulated exhaust flow built into test model.





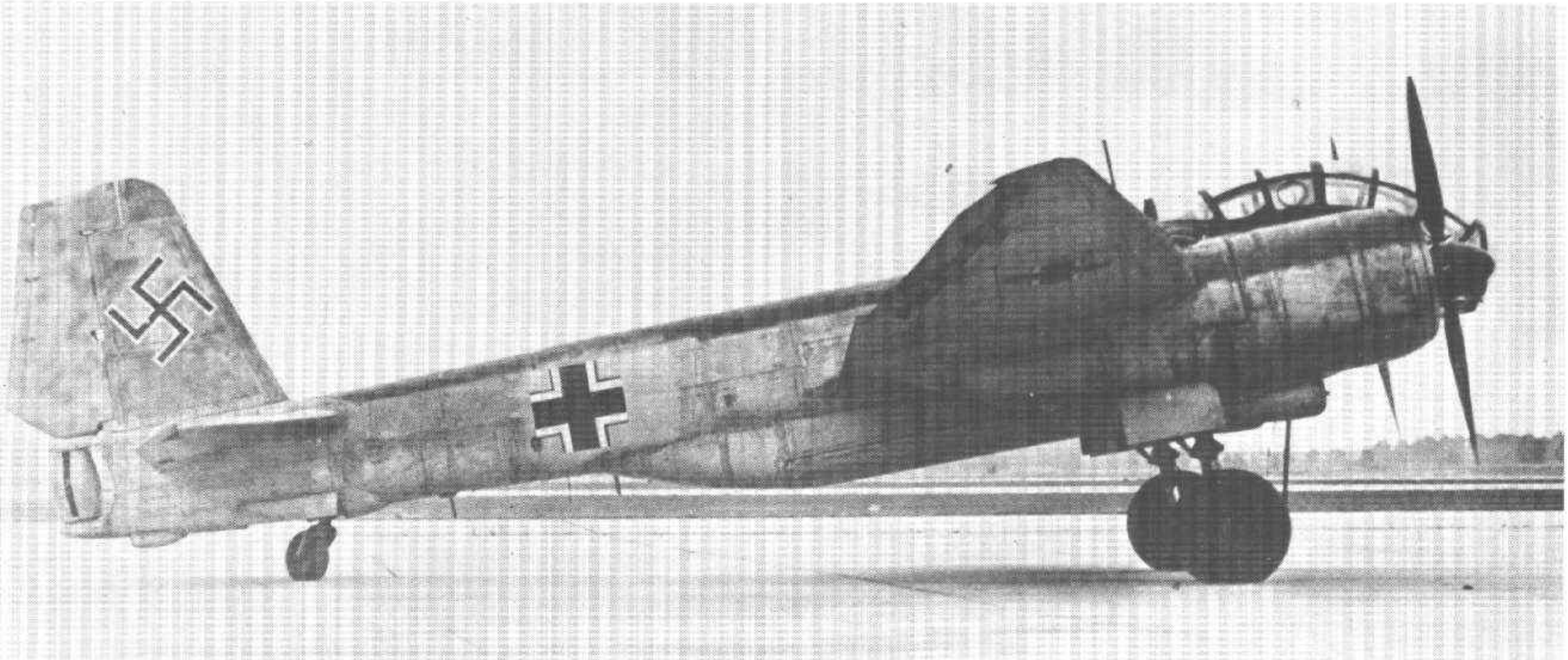


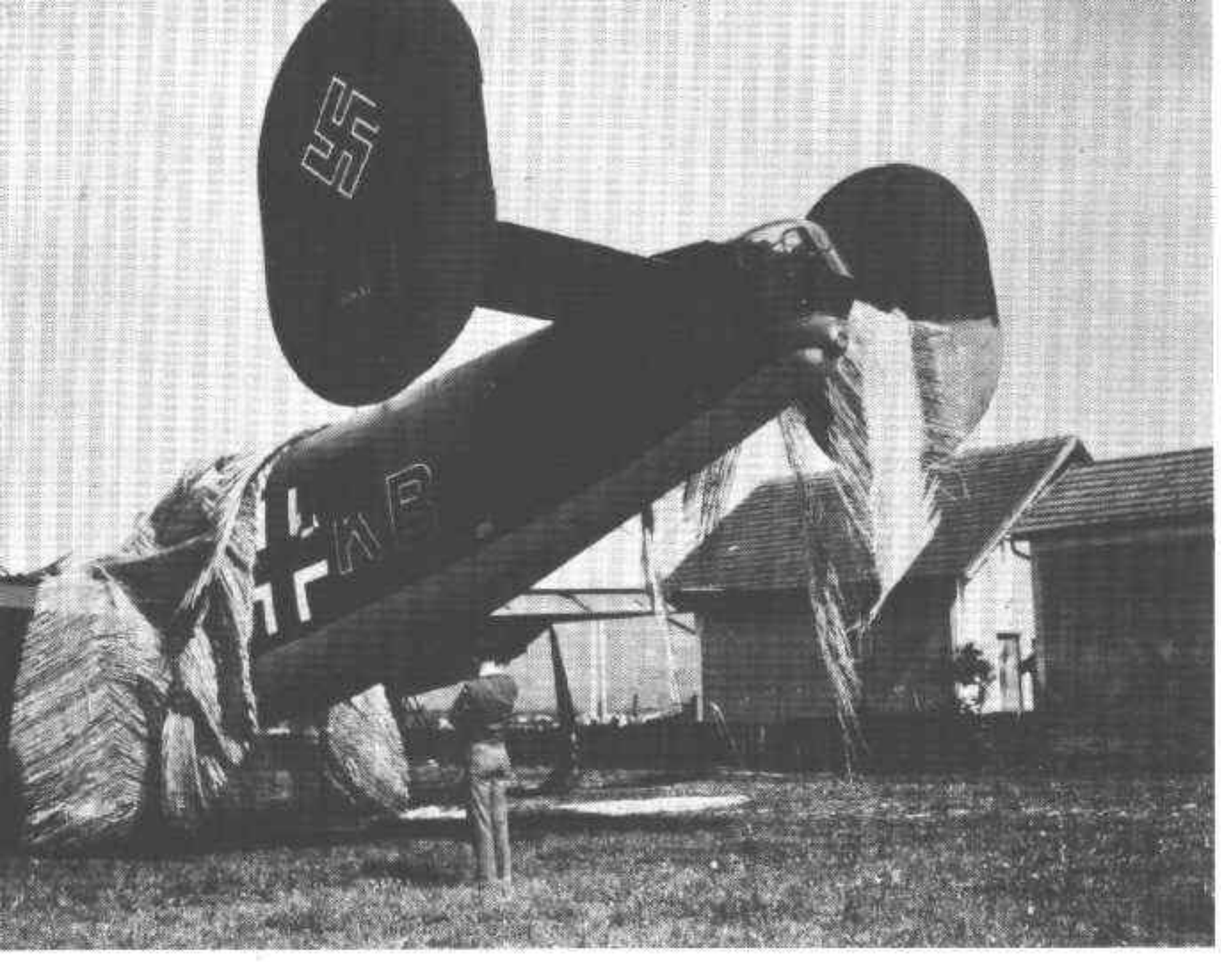
Top: Two scale models of the **Ju EF 122** *employed in wind tunnel tests during January and February 1944. Above: Swept tail surfaces intended for the EF 122 also were investigated for their advantages. Left: Wind tunnel model of the tail barbette FHL 151Z, (Ferngerichtete Hecklafete/Remotely-sighted tail mounting, Z=Zwilling/Twin).*

project study Ju EF 122 (EF = Entwicklungsflugzeug/Development aircraft). The Ju EF 122 assumed the use of the Junkers Jumo 004 axiflow turbojet with a defensive armament consisting solely of twin weapons, remotely controlled in a tail turret. During March 1944 the RLM Technical Office issued instructions for Junkers to proceed with prototype construction as rapidly as possible while at the same time reassigning the "8-number" 287 to the project.

To expedite prototype construction and development trials, Dipl. Ing. Ernst Zindel, prototype director, chose to construct a hybrid aircraft using as many available parts as possible. Fortunately for Zindel and his group, their search was not difficult. The fuselage would be adapted from a standard He 177 A-3 bomber since its overall length closely approximated the actual dimensions of the proposed Ju 287. The tail group were adapted from a Ju 388 L-1, the main-wheels from a Ju 352 A-1 and the two nose wheels were adapted from a captured American Consolidated B-24 Liberator. By April 1944 the newly built wings were attached and during early summer final construction proceeded unhindered. Although it was intended

Above: **Heinkel He 177 A-3/R2** *abandoned at Chateaudun, France during August 1944 was similar to the one assigned to the Ju 287 program. Note the unit emblem next to the pilot's window which remains unidentified. Below:* **Junkers Ju 388 L-1**; *Werk Nr. 560 049; now in storage for the National Air & Space Museum is similar to the example allotted to the Ju 287 program. Assigned USAF Foreign Equipment number FE-4010 and adorned with improvised national markings, this aircraft was tested extensively in the U.S.A. following WW II.*

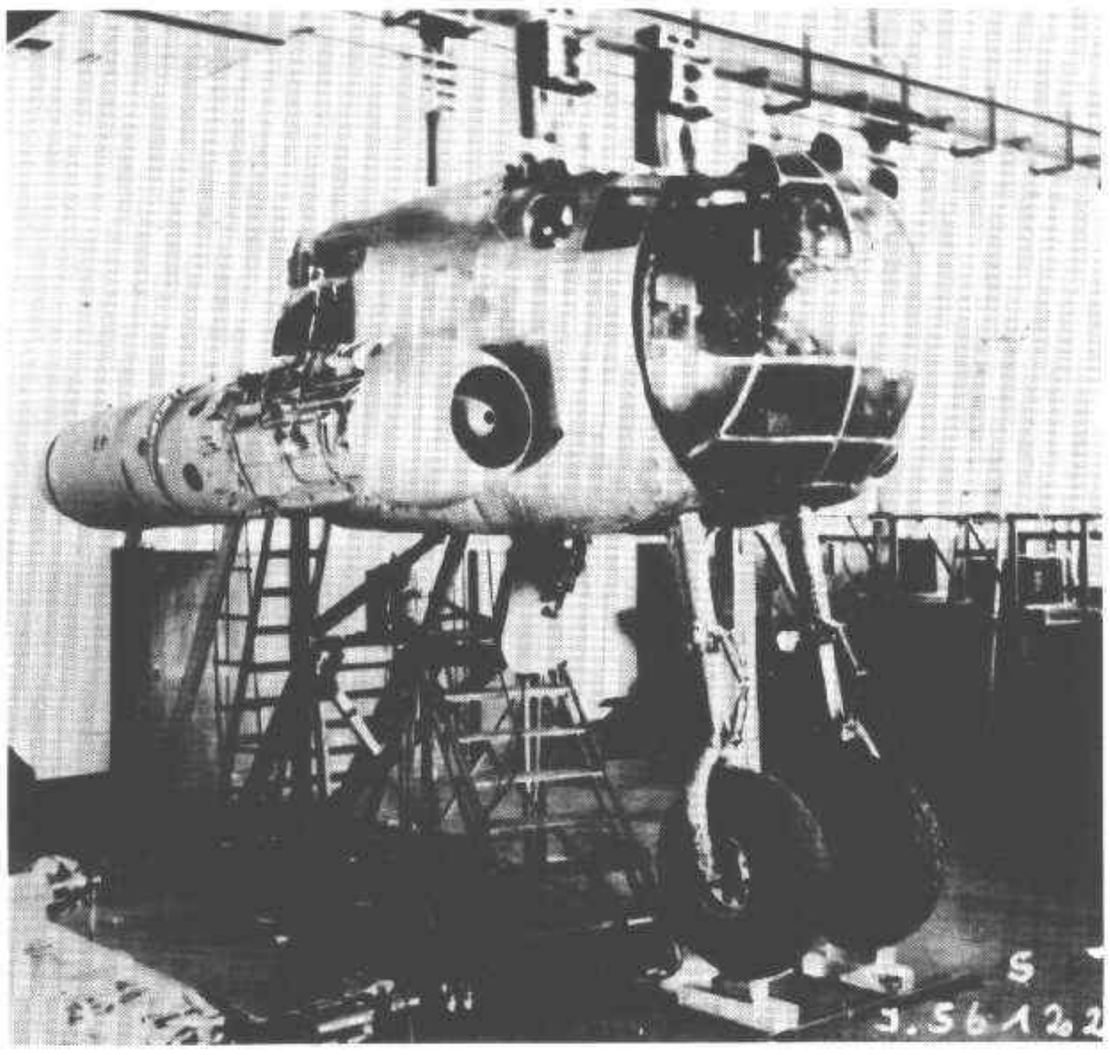


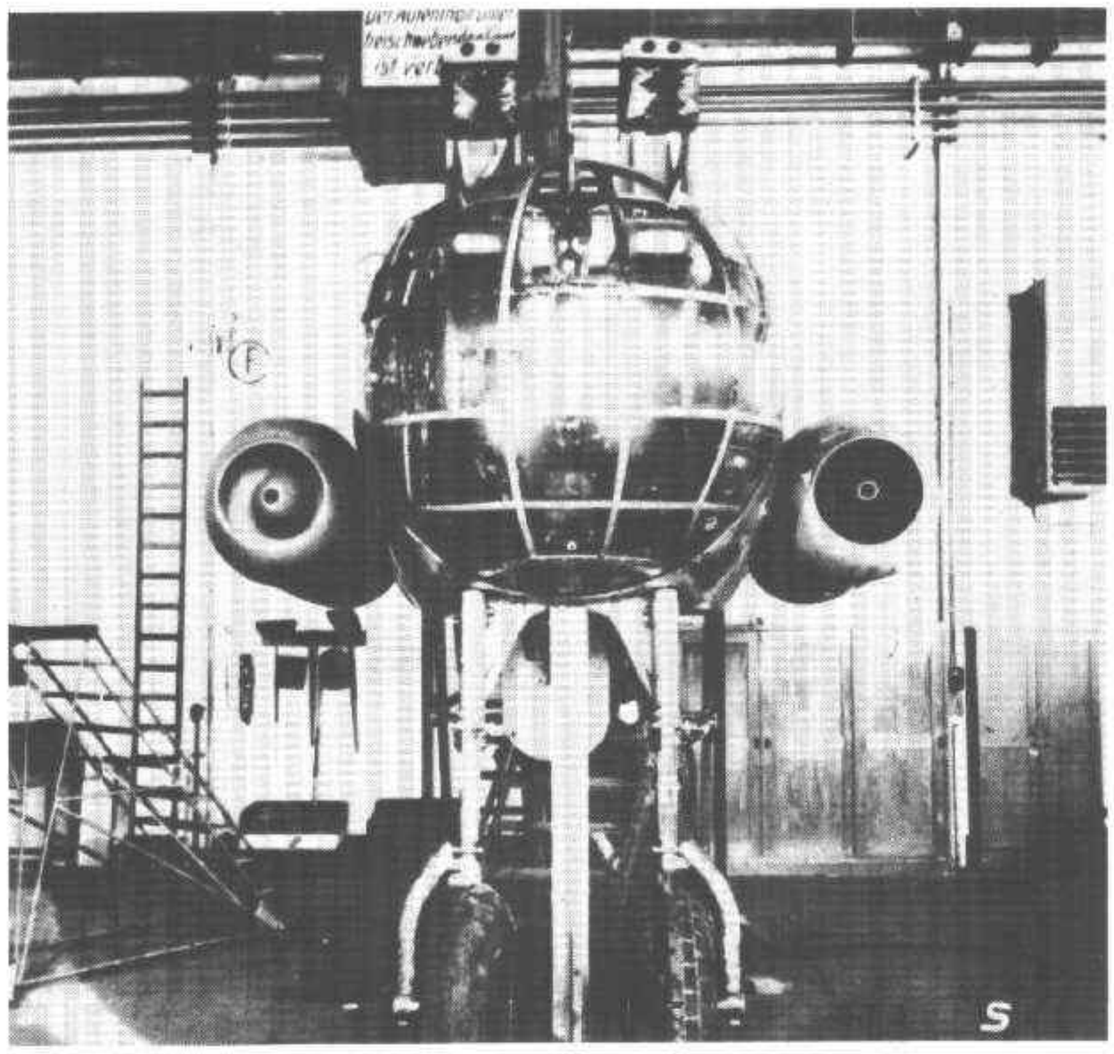


that the production model would feature fully retractable undercarriage, as an engineering expedient the gear of the first prototype was fitted in the fixed position enclosed in gigantic wheel spats.

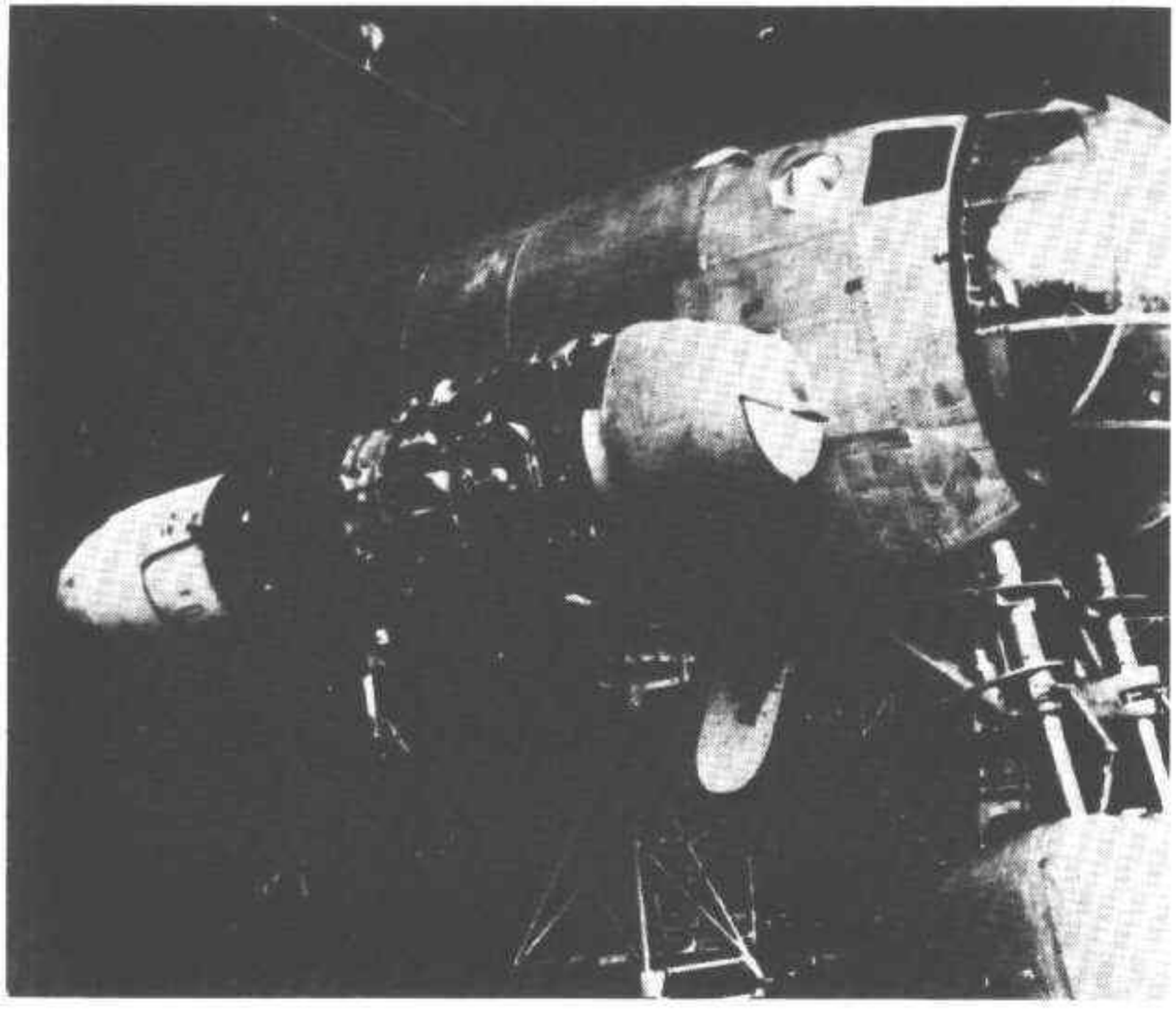
During August Ernst Zindel's group had completed its work and the newly finished Ju 287 V1 (V = Versuch/Experimental) was rolled out at Dessau. After final inspection it was broken down and made ready for shipment from Junkers' Dessau facility to the Luftwaffe test center at Brandis near Leipzig where it was reassembled and flown for the first time on August 16, 1944, by Chief Junkers test pilot Flugkapitän Siegfried Holzbauer. The Ju 287 V1 required only 1/3 of Brandis' longer runway with the additional thrust of three Walter 109-501 "hot" RATO units. Mounted beneath three of the four engines, these rockets provided 2,640 lb (1200 kg) thrust for

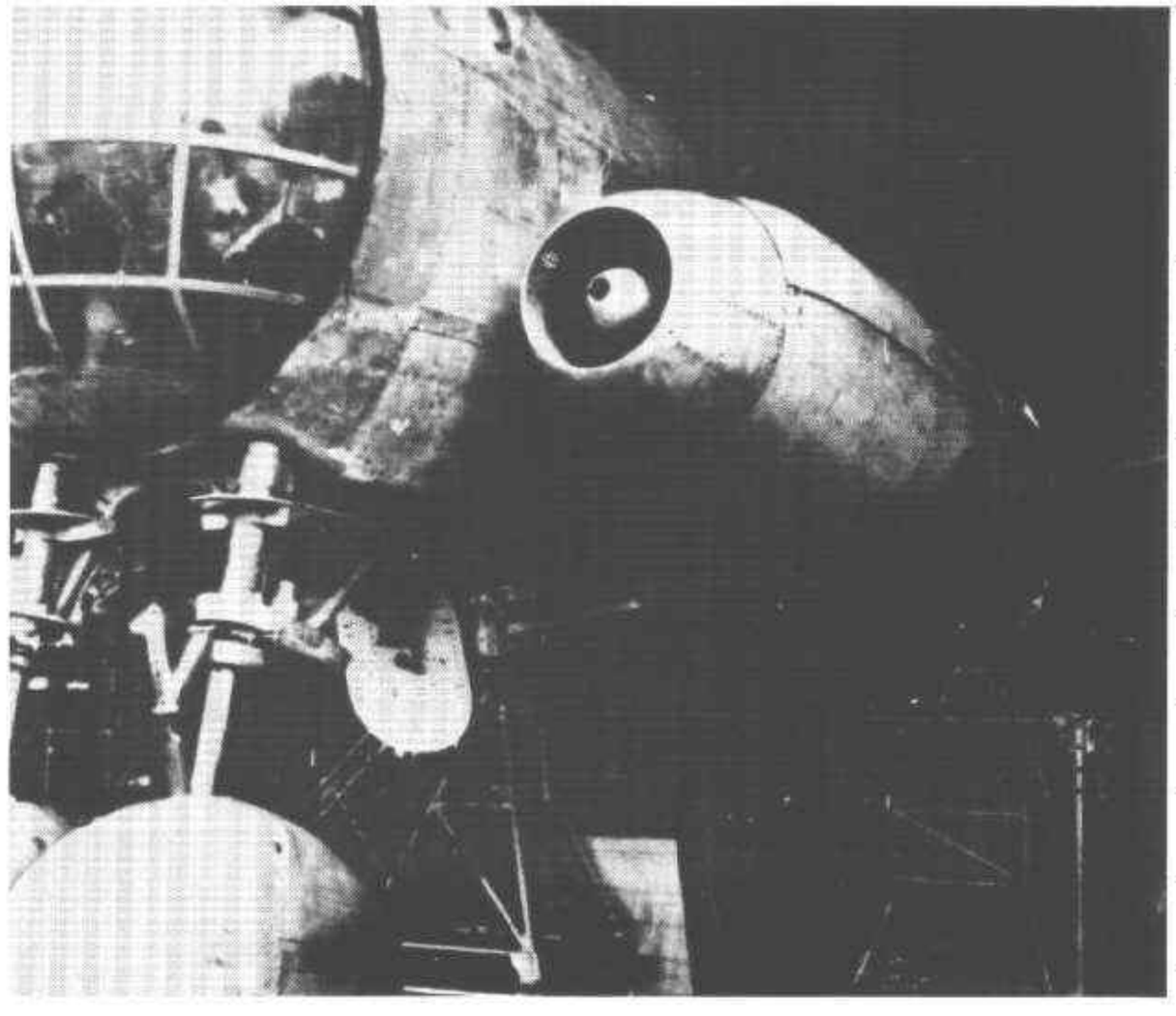
Above left: Captured Allied aircraft like this **B-24** *served the Germans in a variety of roles. One such aircraft's main gear was adapted directly to the Ju 287 V1. This B-24 camouflaged dark green (similar to RLM 81) topside with yellow (similar to RLM 04) undersurfaces was found by U.S. Forces at Salsburg, Austria. German serial number 2864 on the lower fin is noteworthy. Above right: The main gear for the Ju 287 was borrowed directly from the* **Ju 352 A-1** *as in the example shown above.*

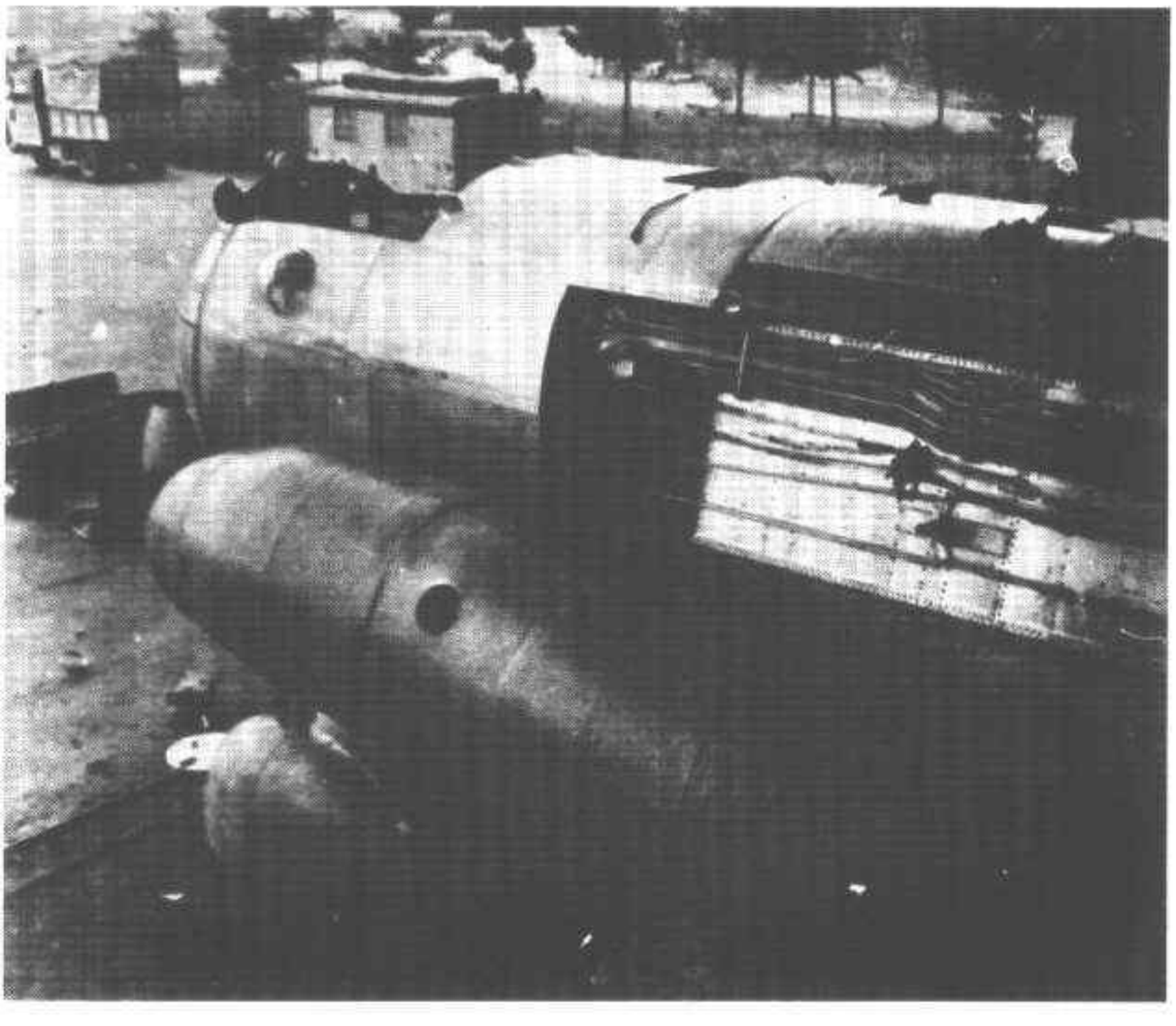


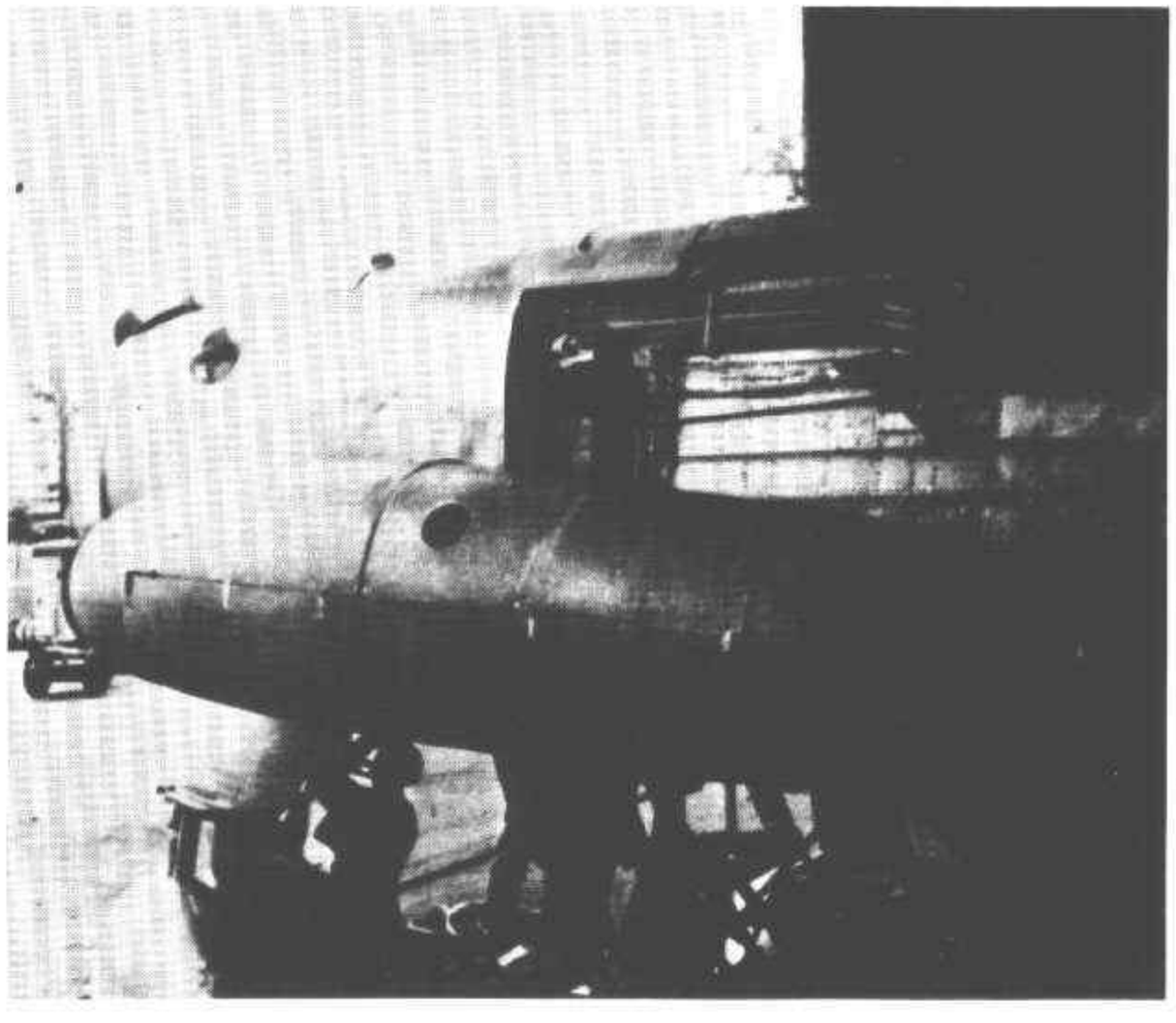


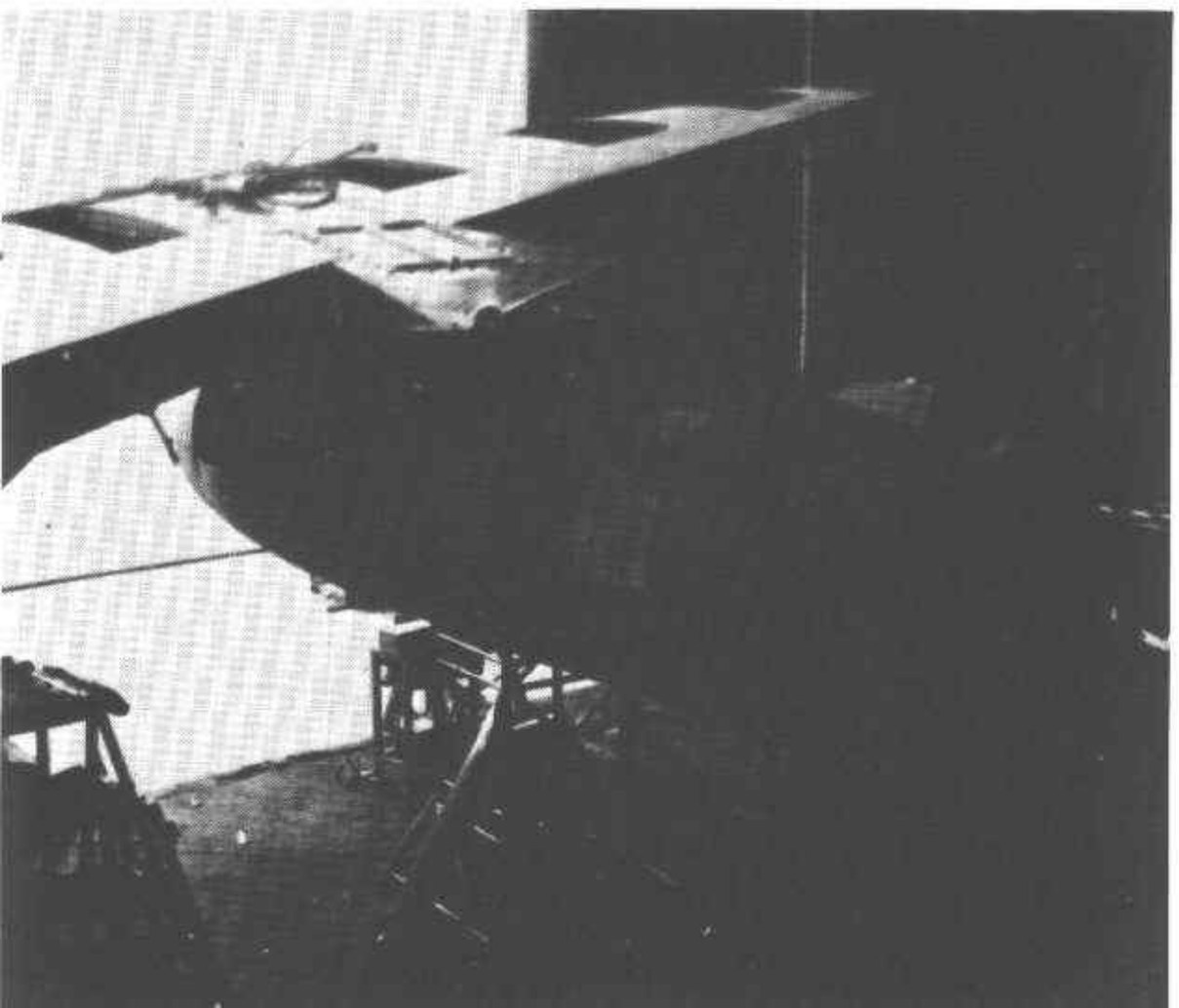
Above: Construction photos of the Ju 287 V1 nose assembly together with two Jumo 004's in position reveal the pilot and copilot seats being lowered in position. Right: Various views of the first 287 prototype reaching final assembly during the summer of 1944. Although of poor quality, they do give an indication of the overall size of the aircraft.

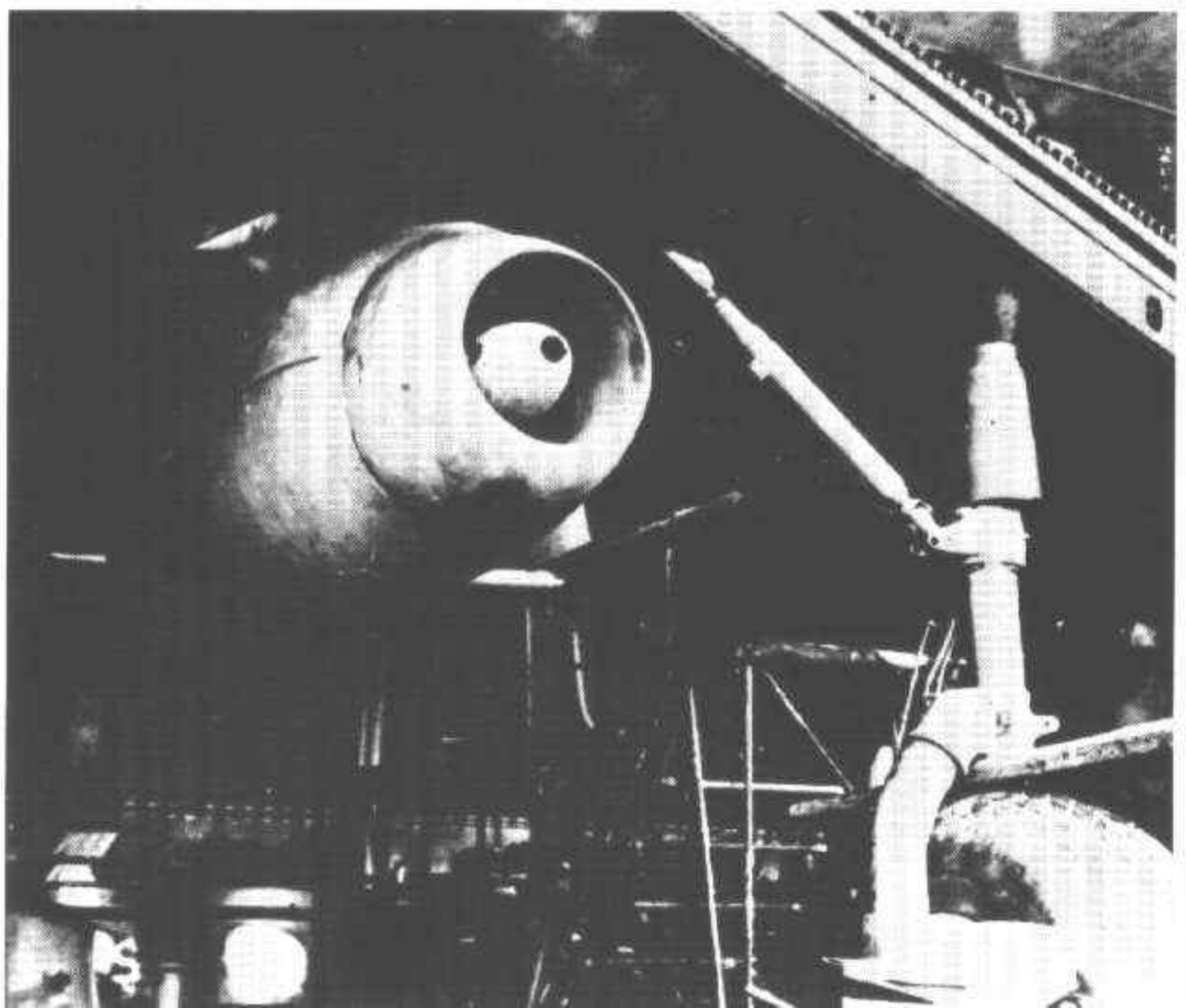


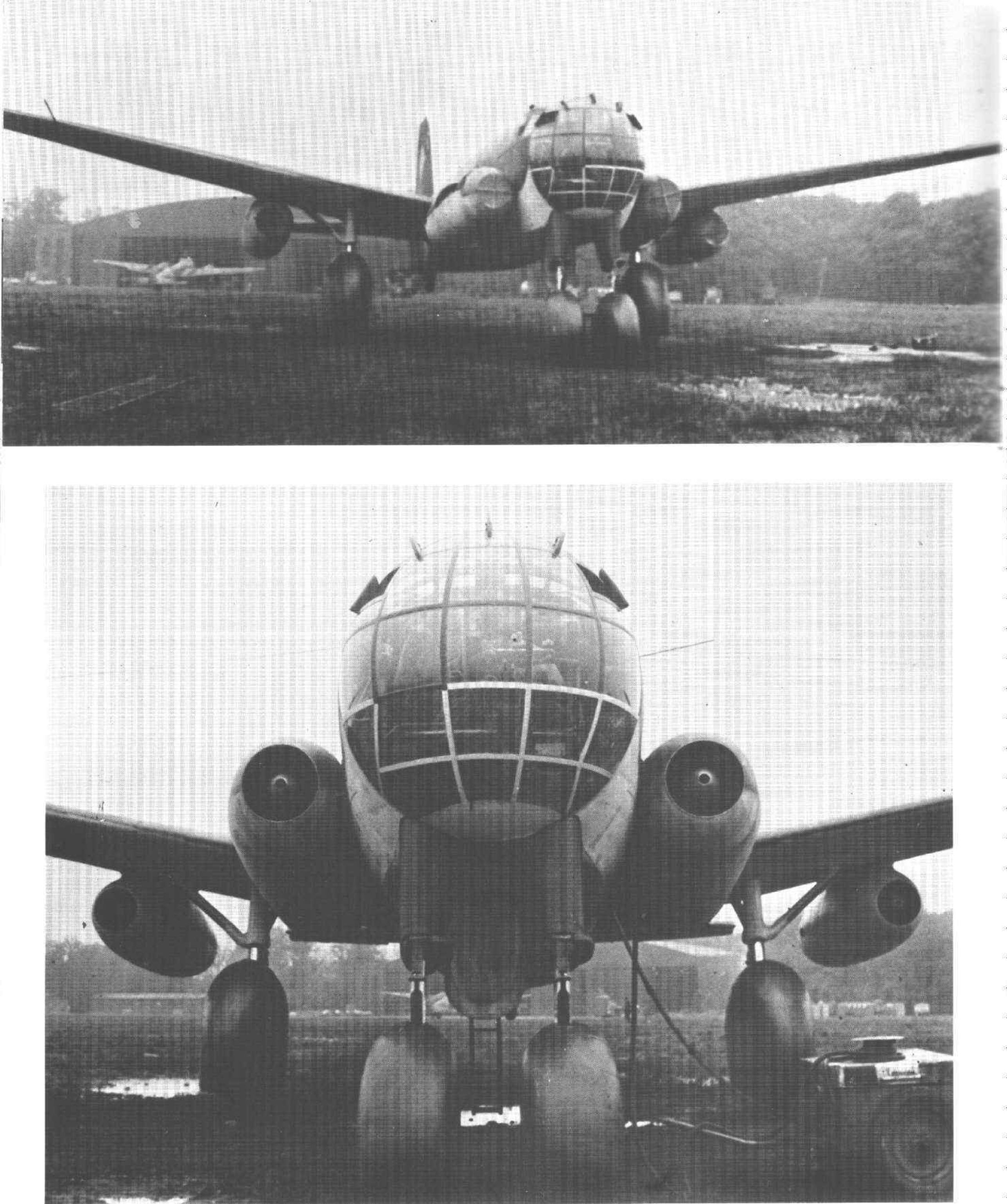


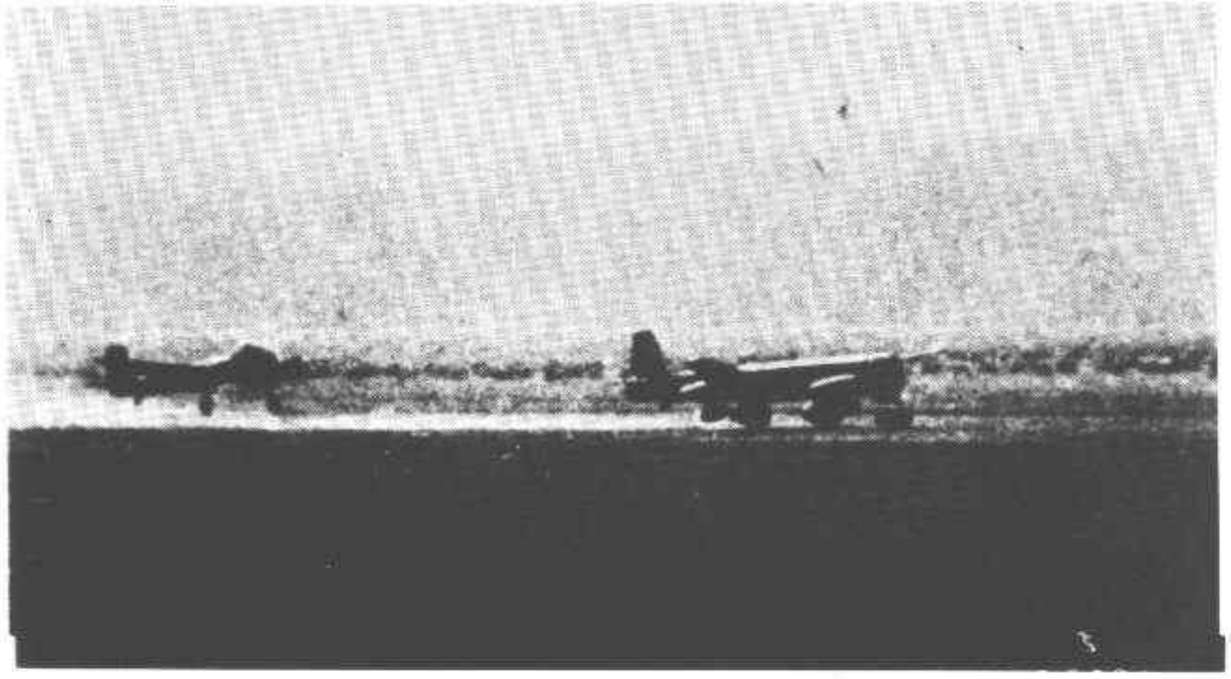


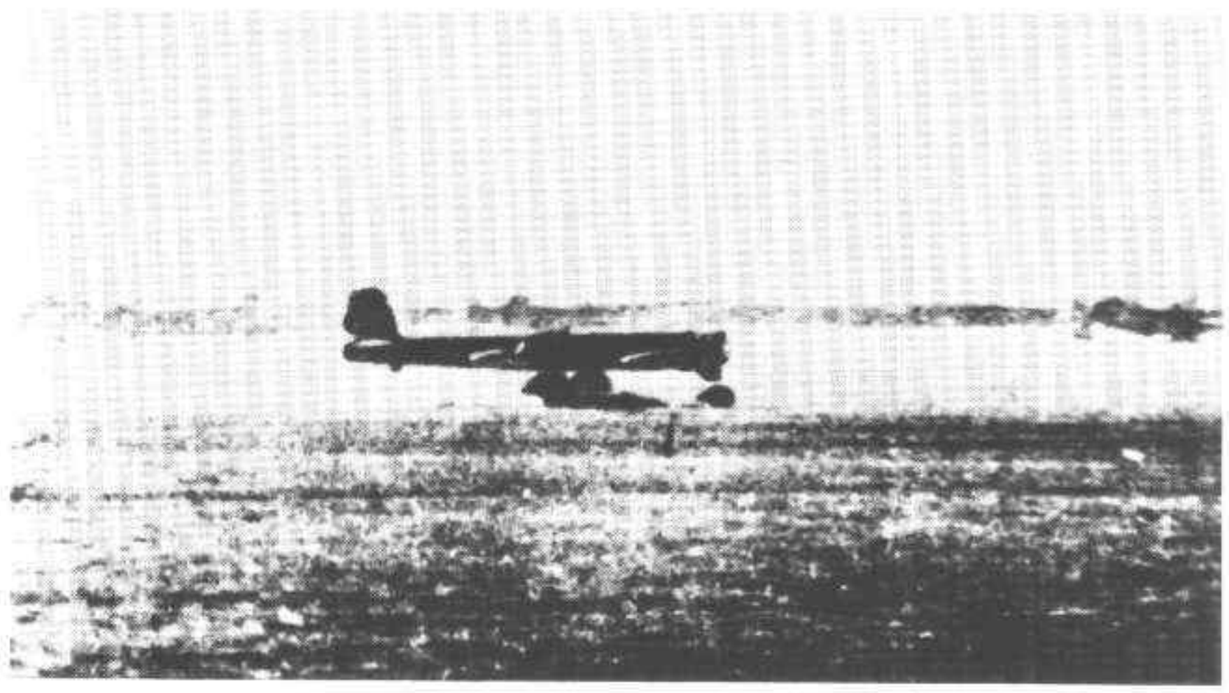


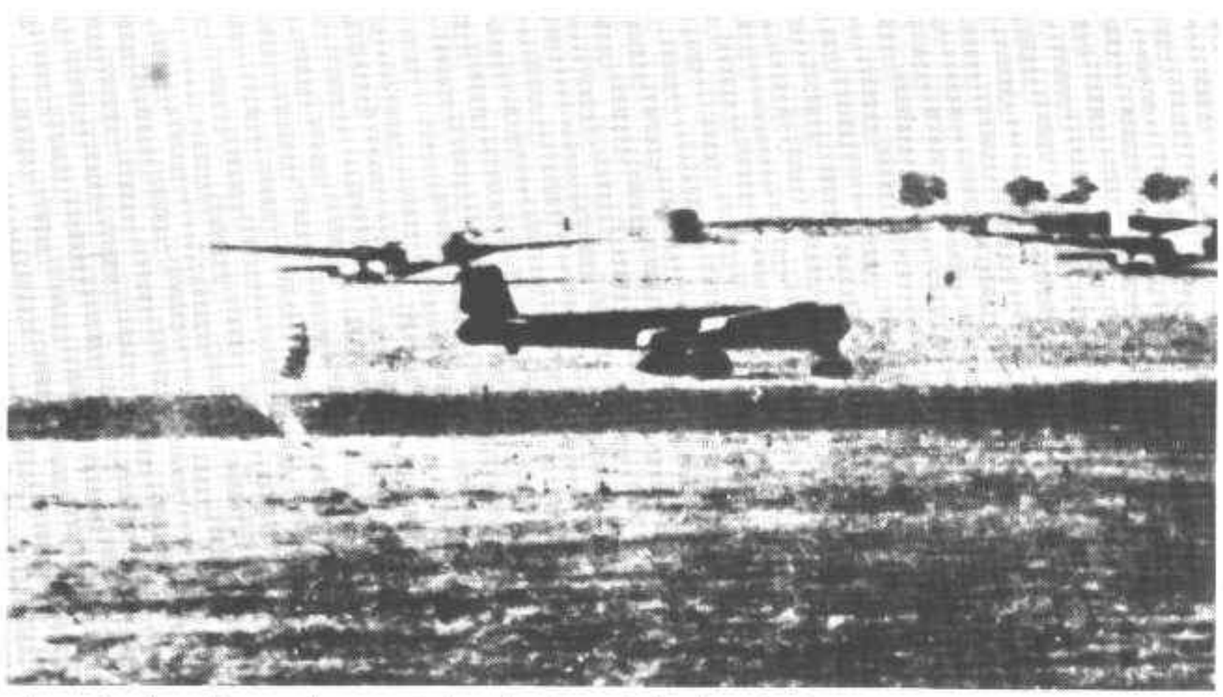












A series of stills of the Ju 287 V1's first flight clearly show the three Walter 501 RATO units in action. The two bottom photos taken as the prototype completes its landing roll reveal the deployed brake chute.

the length of the takeoff, whereupon they were jettisoned and returned by parachute for reuse.

The first flight was smooth and uneventful. However, it is interesting that extreme security measures resulted in the avoidance of the city of Leipzig. Pilot Holzbauer was reluctant to overfly heavily populated areas. All controls functioned properly and the Jumo 004 B-2 jet engines performed well. However, because of the placement of the two fuselage-mounted jets, cockpit noise was substantial! Appearing over the airfield boundary of final approach at 150 mph (240 km/h), the dark green and light blue prototype, coded RS+RA, most surely would have elicited a second look by field personnel. Soon after touchdown at 118 mph (90 km/h) a brake chute was deployed, considerably reducing the landing run.

During the course of 17 test flights, a pitot tube was added to the port wing, wood tufts were placed at key areas to investigate airflow and a movie camera was attached immediately ahead of the fin for recording airflow data. Of principal concern were the low speed characteristics of the new wing, although the prototype was dived at full power to a speed of 404 mph (650 km/h).

Early in 1945 the Ju 287 V1 was transferred to the Luftwaffe test center at Rechlin and it was there that the Allies first learned of its existence. A high flying RAF PR Mosquito clicked its image on highly sensitive photographic film.

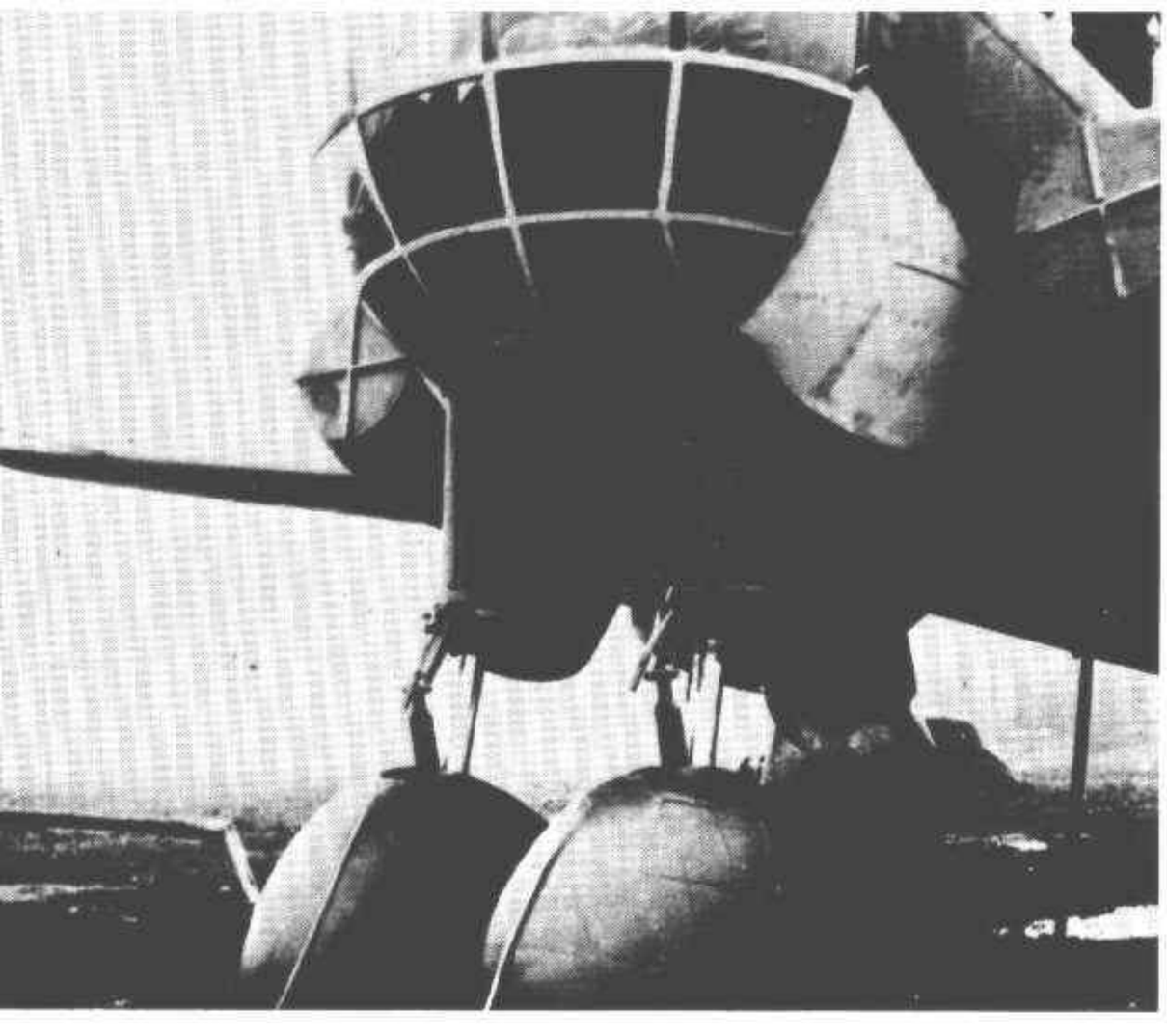
Puzzled, photo intelligence provisionally conferred the designation "Rechlin 66" to the Ju 287 V1 until its true identity could be established. It was the practice to record such unknowns by listing the location (in this case Rechlin) and the approximate wing span in feet (66). No doubt the Germans would have been impressed by the British estimate since the true wing span was 65 ft, 11¾ in!

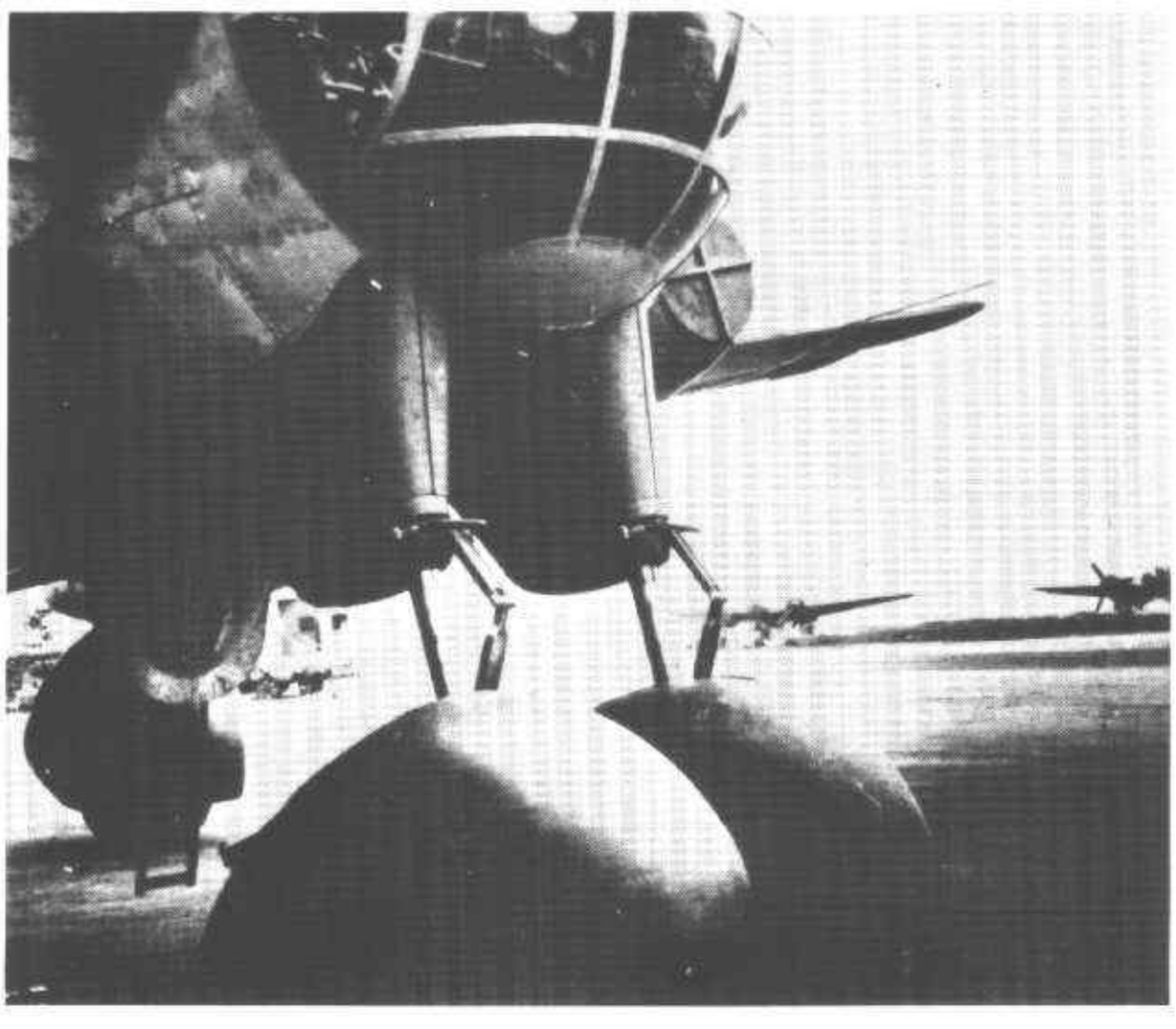
Soon after the Mosquito's photographic reconnaissance equipment revealed the existence of the Ju 287, an Allied bombing mission was mounted at Rechlin during which the first prototype of the Ju 287 was damaged seriously. After repairs had been completed, the aircraft was moved to the wooded edge of the field where it remained until overrun by Soviet forces in April 1945. It is doubtful if any additional flights were made prior to the arrival of the Soviets, although it is entirely possible that continued flying was carried out in the Soviet Union after V-E Day.

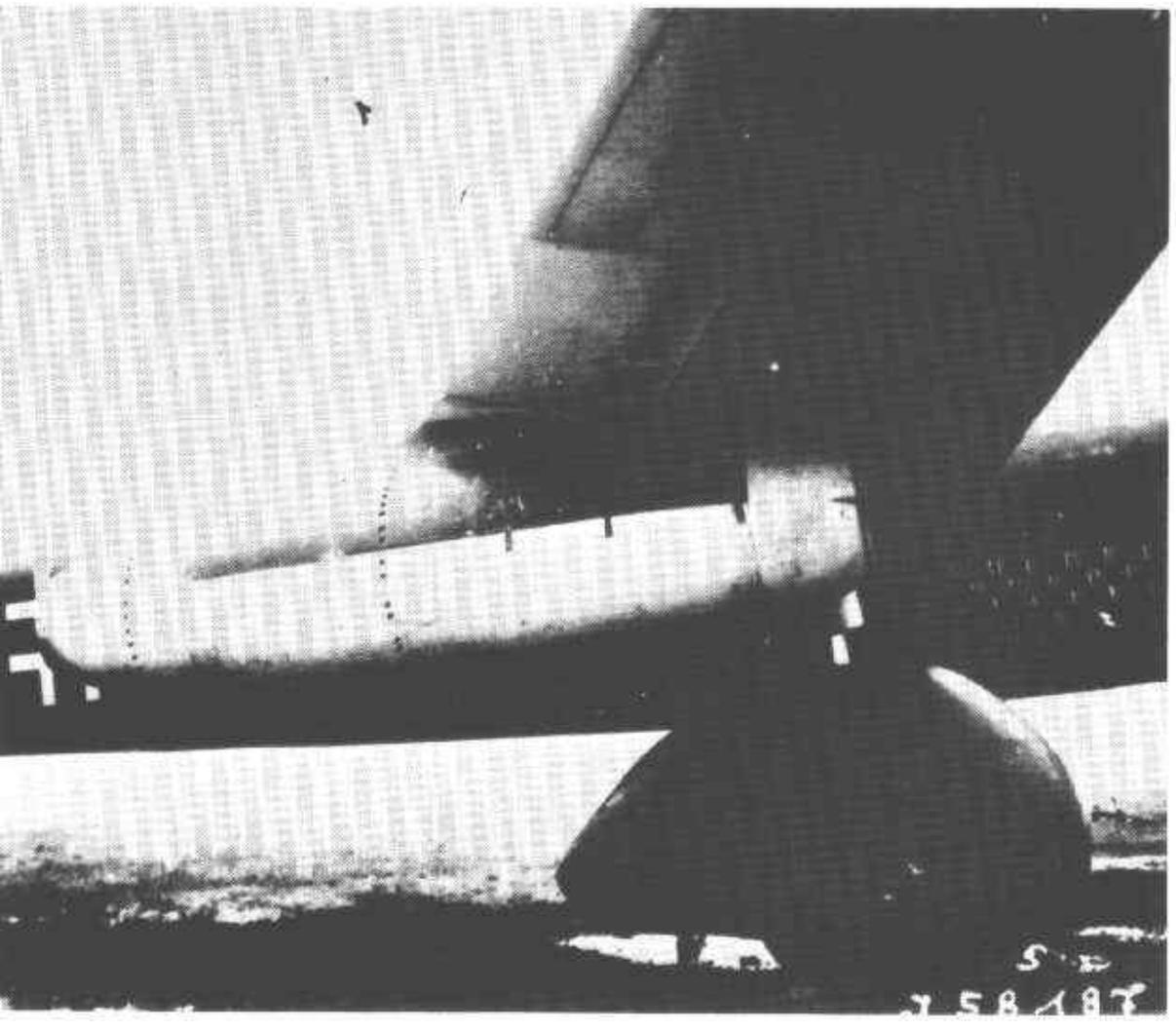
FURTHER PROTOTYPES PLANNED

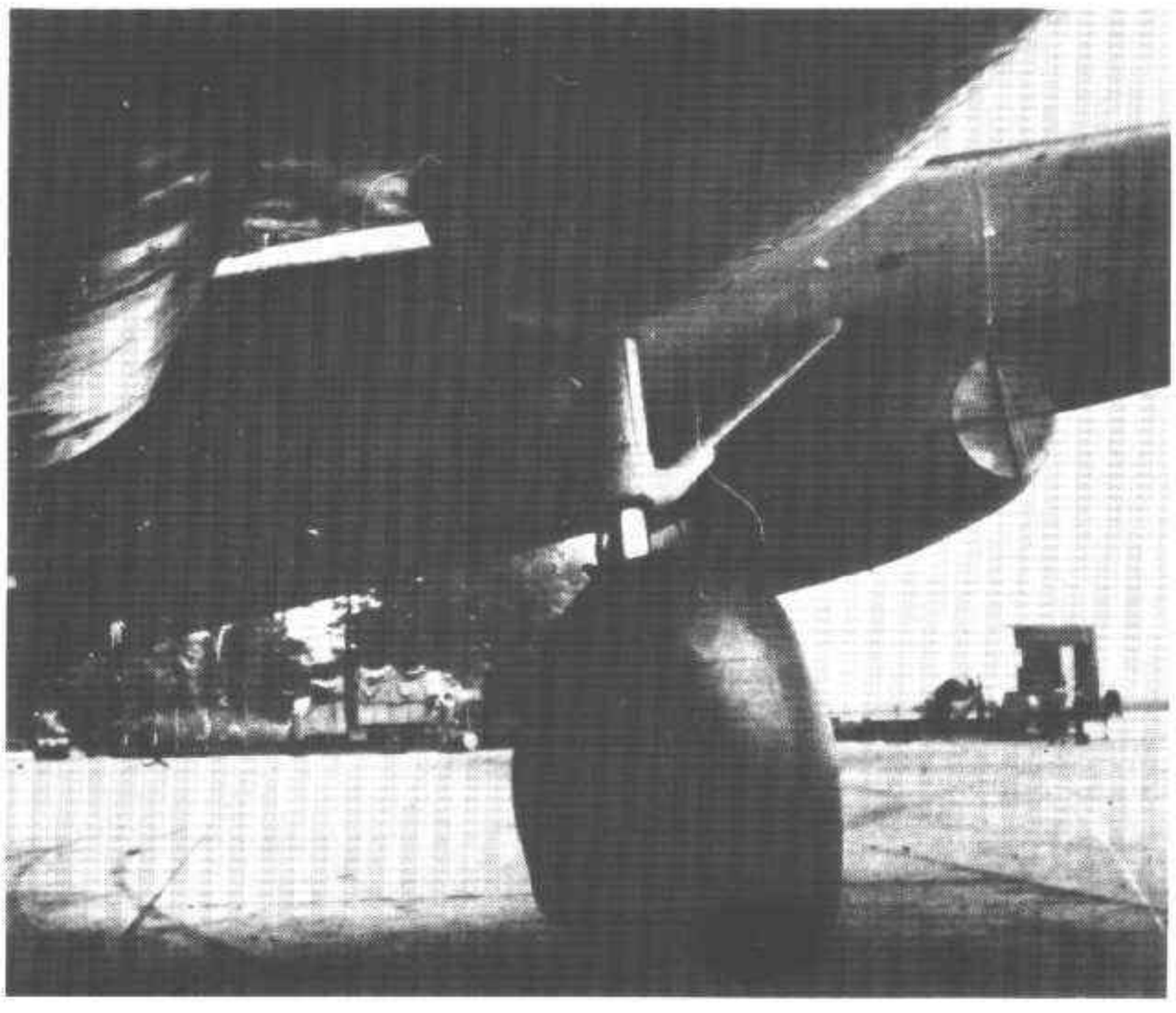
Whereas the first prototype was solely a low speed test vehicle, the second machine was intended primarily for high speed trials. During 1944 construction of the second prototype progressed slowly at a dispersed Junkers factory near Brandis with limited official backing from the RLM. Apart from the wings, the Ju 287 V2 was distinct from the first prototype. The fuselage was completely new although it bore a strong resemblance to those adopted by the Ju 288. (See Monogram Close-Up No. 2.) All defensive armament was intended for the production version, none was scheduled for the second prototype.

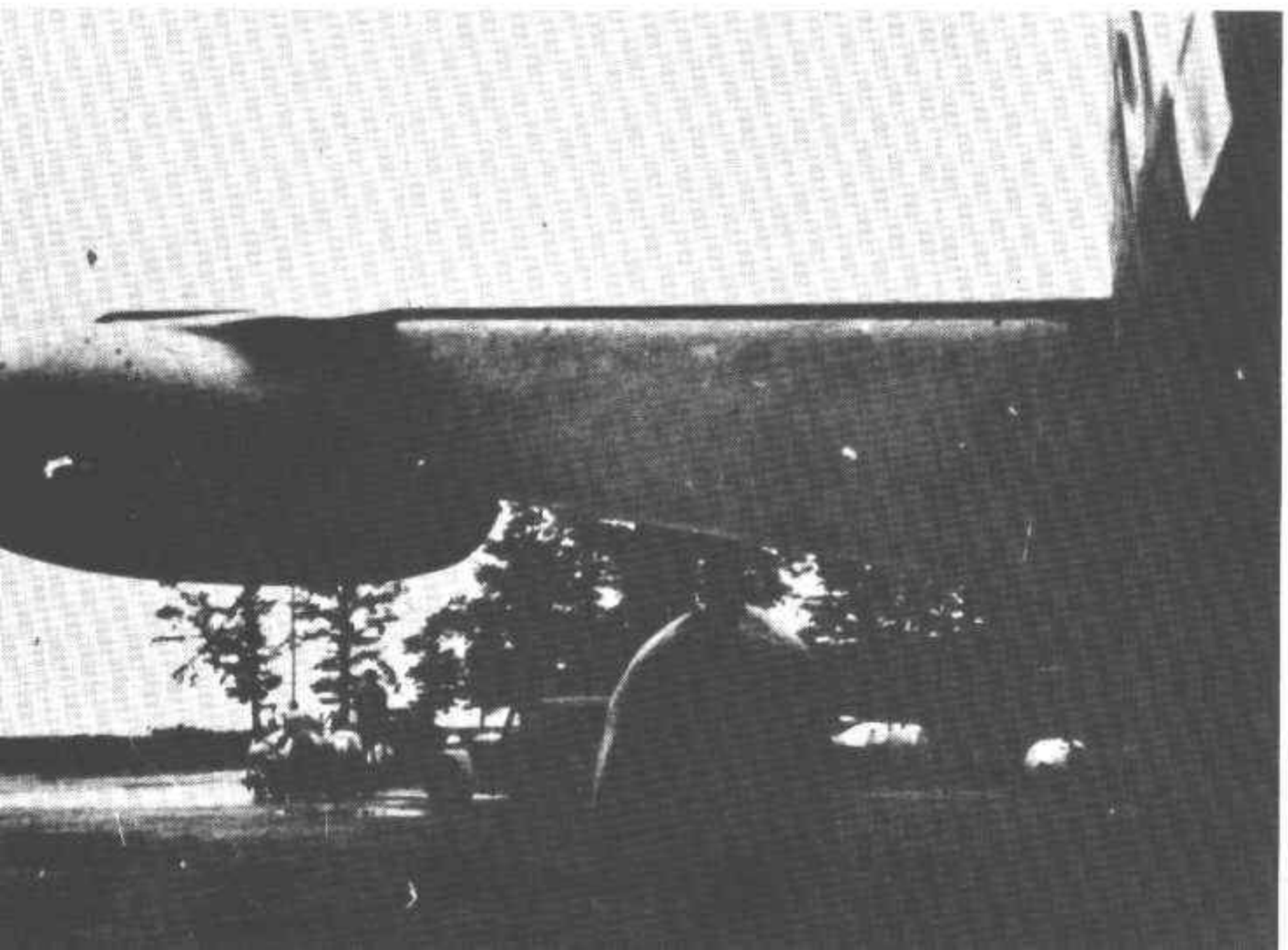
By July 1944 in view of the pressing need for fighters, when the decision was made to halt construction of all bomber aircraft, all official work on the Ju 287 came to a standstill. Nevertheless limited design work continued and eight months later, in March 1945 when the life of the Third Reich was measured in weeks, the RLM incongruously issued instructions to resume full production of the Ju 287! The Ju 287 V2 was nearing final assembly when the Soviets took control.

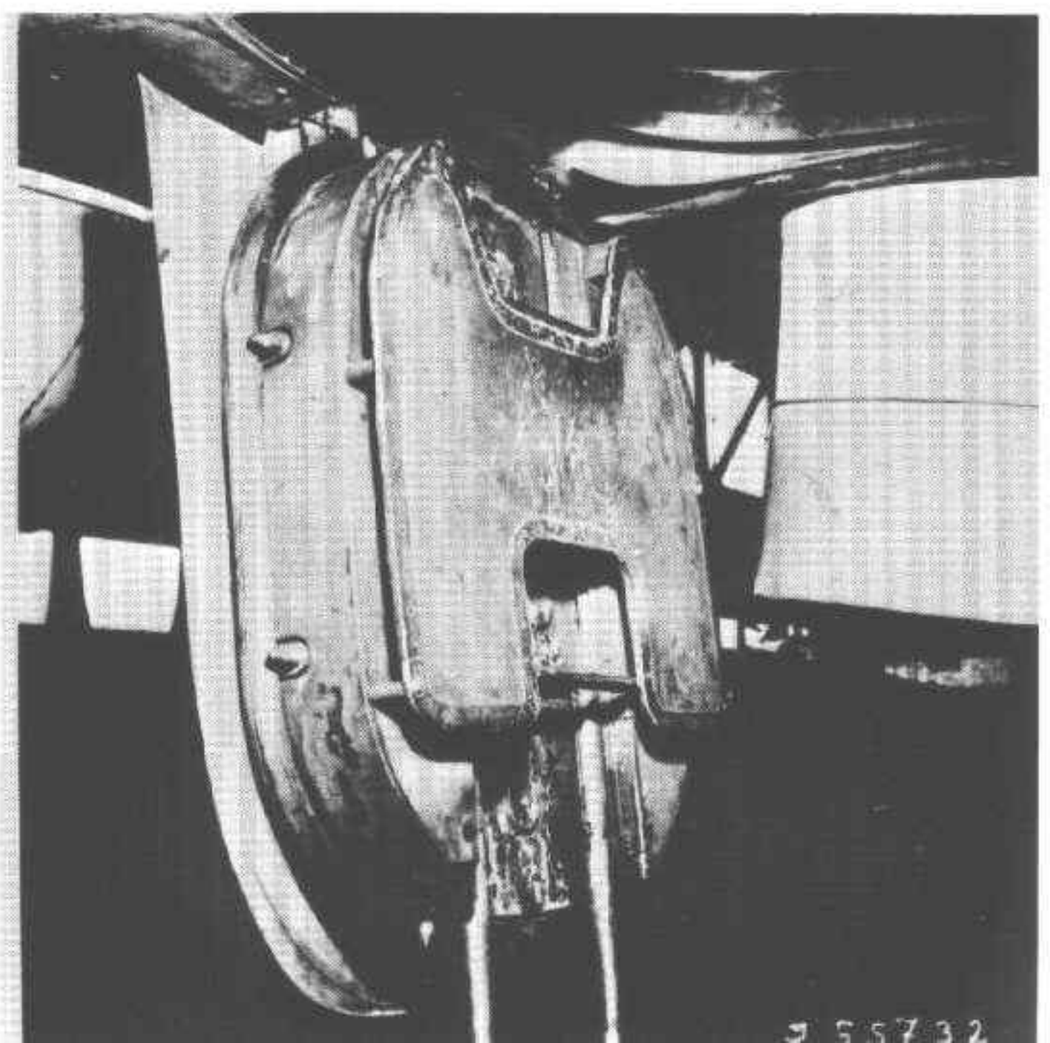


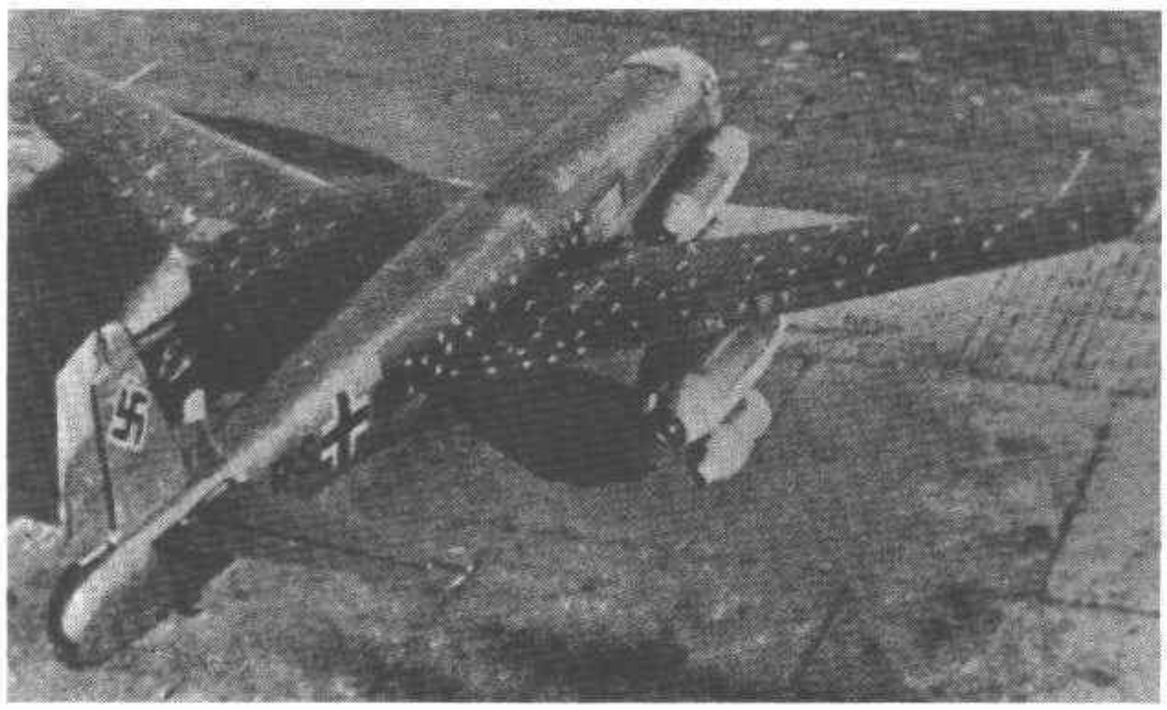


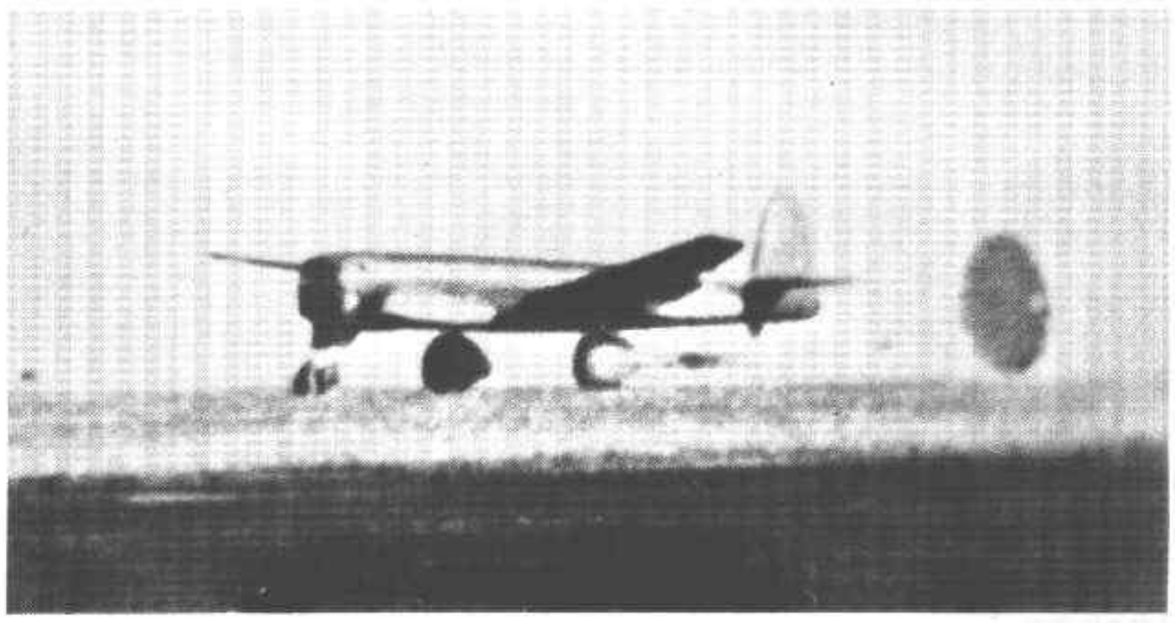


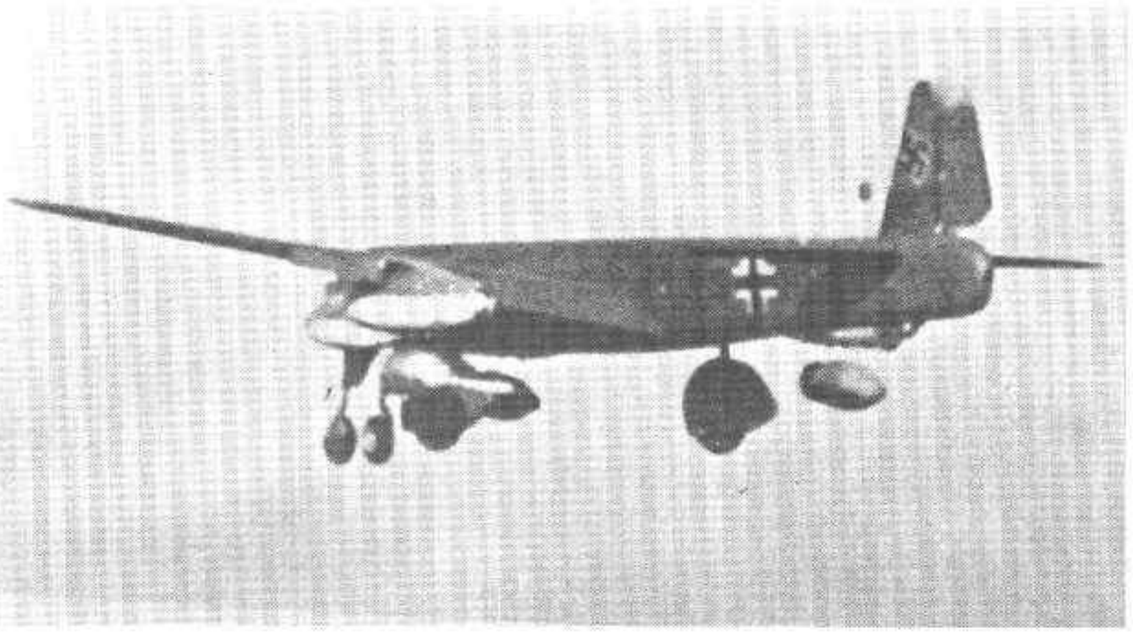




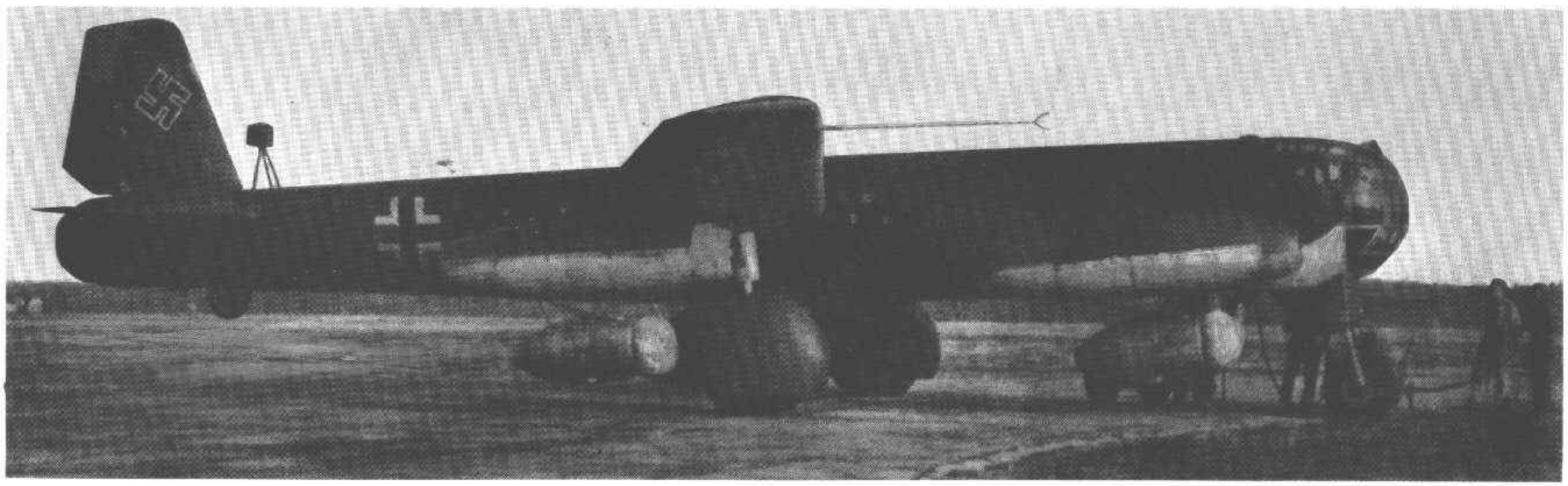


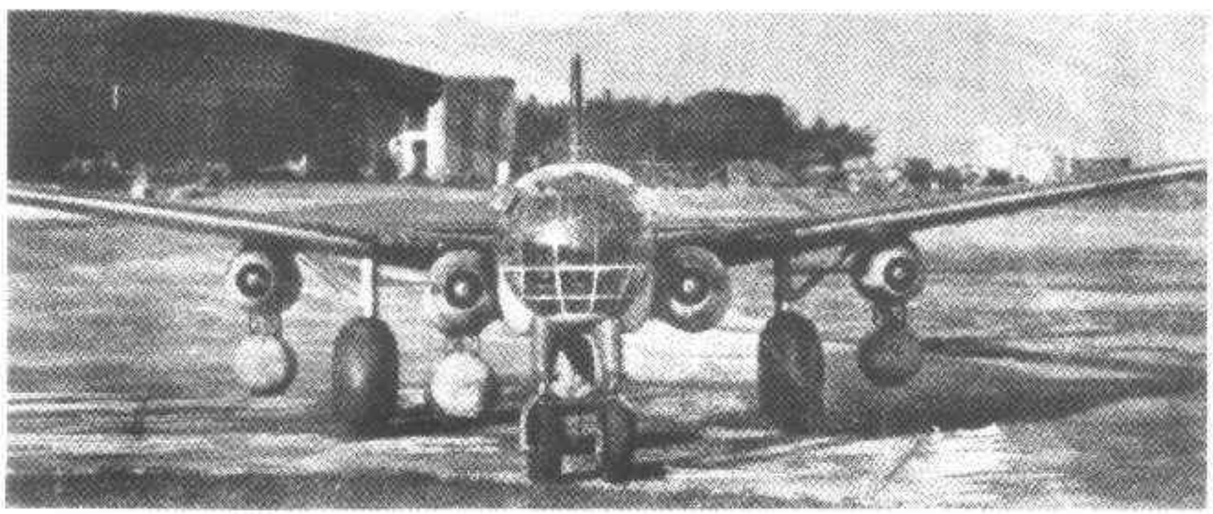


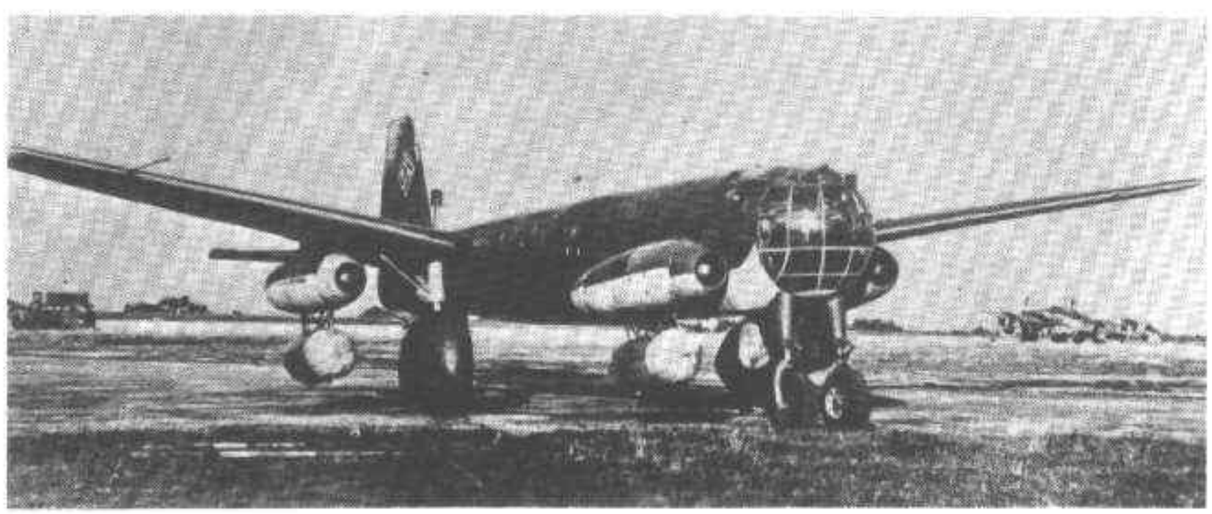


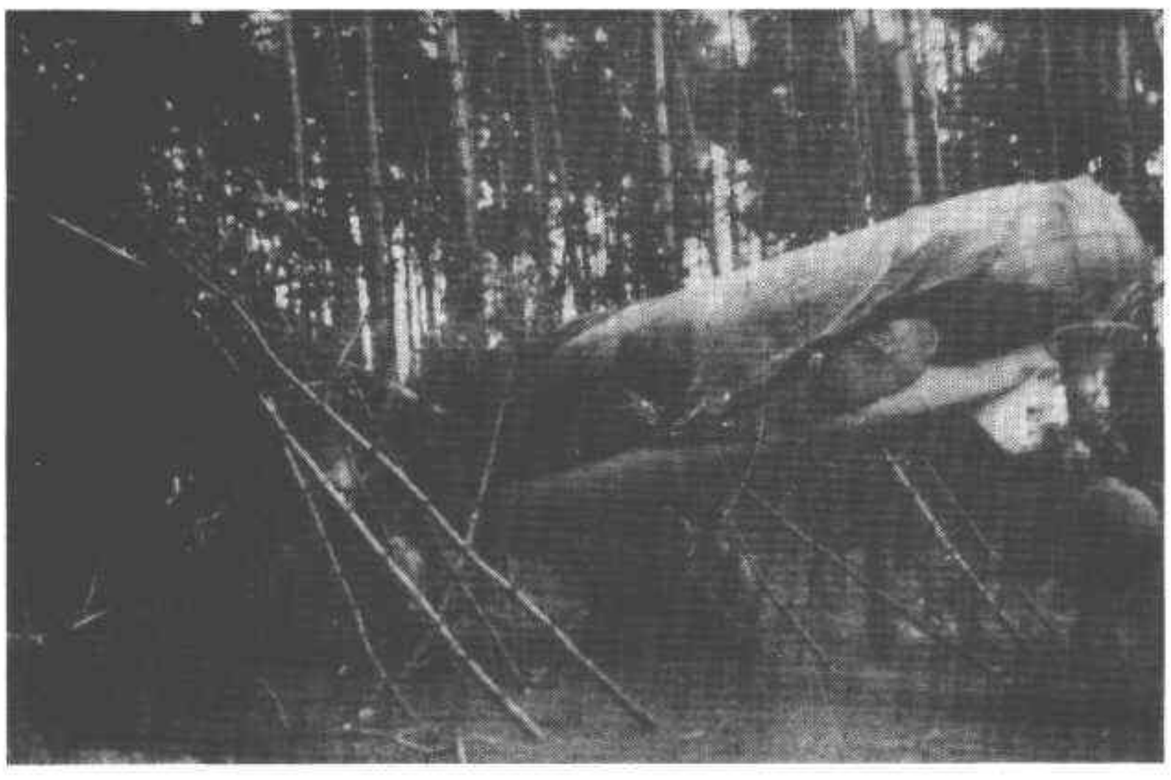


P. 10: Six close-up photos of various components illustrate the attention given to details including the crew entry hatch. Above: These photos taken during one of the subsequent flights reveal the presence of a dorsal movie camera mounted just ahead of the fin and the absence of wheel spats over the nose gear. Note that only three Walter 501 RATO units were employed. Below: Being readied for a test flight, the ground crew make their final inspection. Note that the port nose engine was not fitted with the Walter 501 Rocket Assisted Take Off unit.







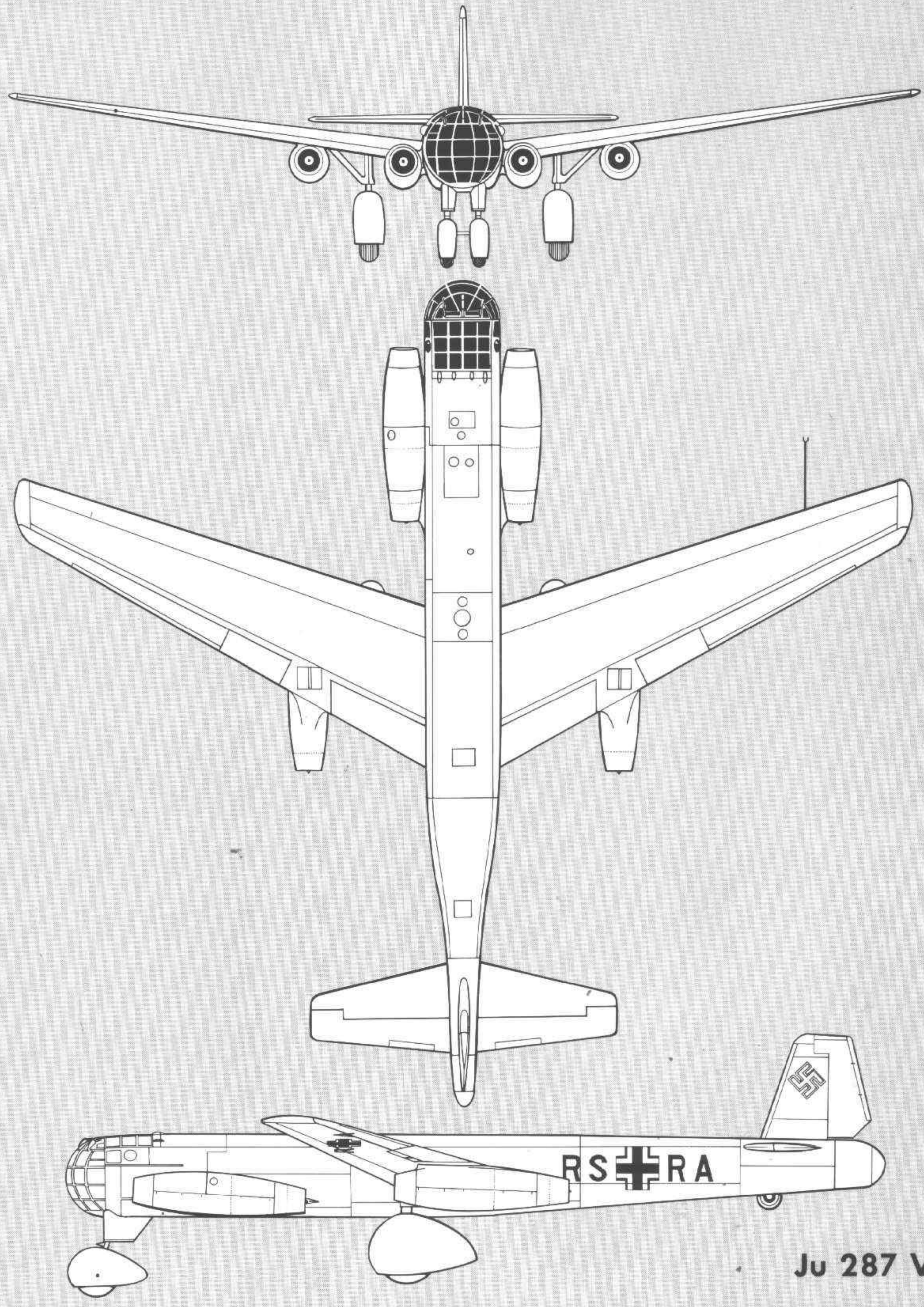


After the first prototype was damaged in an air raid, it was hurriedly repaired and moved to the airfield perimeter as shown above. Top photo illustrates relative size of the Ju 287 V1.

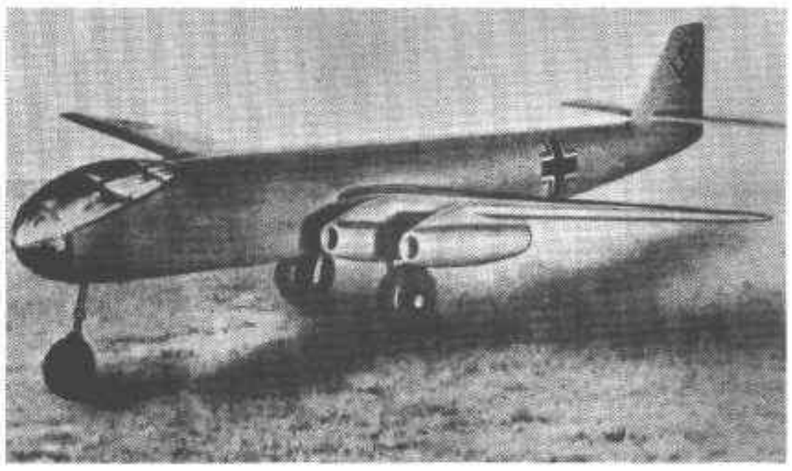
Early in the development of the Ju 287 it had been established that the aeroelasticity of the wings could be controlled only by placing the weight of the engines forward of the wing leading edge, thus achieving some degree of mass balance. Initially it was planned to install four Jumo 004C turbojets each delivering 2,200 lb (990 kg) static thrust. However, owing to the nonavailability of these engines, it was decided to utilize the available BMW 003 A-1 "Sturm" turbojets. Since the BMW unit offered only 1,760 lb (792 kg) static thrust, it was obvious that six units would be required and accordingly a cluster of three was grouped under each wing. Although this arrangement was hardly efficient aerodynamically, it did concentrate the total engine weight slightly ahead of the wing.

Parallel with construction of the second prototype, work proceeded with the third machine, the Ju 287 V3, which was intended to serve as prototype for the initial production series, the Ju 287 A-1. The Ju 287 V3 was similar to the second machine apart from relocation of the engines and the inclusion of complete operational equipment including defensive armament. The six BMW 003 turbojets were to be distributed between the nose and forward underwing positions. Initially, a production rate of 100 machines per month was thought possible by December 1945.

The Ju 287 V4, scheduled as prototype for the Ju 287 A-2 series, was to have been completed by ATG (Allegemein Transportanlagen GmbH) at Merseberg near Leipzig fitted with six of the advanced Jumo 004C turbojets. The next two prototypes, the Ju 287 V5 and Ju 287 V6 were intended respectively for the Ju 287 B-1 and Ju 287 B-2 series. Both were to have been fitted with ejector seats with the Ju 287 V5 receiving four Heinkel-Hirth S 011 turbojets. It was hoped that the Ju 287 V6 would be completed powered by two of the advanced BMW 018 turbojets or two Jumo 012's.



Ju 287 V1



Model of **He 343 A-1**

Early in 1944 a competitor appeared on the scene in the form of the He 343. Initially known as "Strabo 16 to" (Strahlbomber 16 turbo), it was conceived as a rapid development type being essentially a 1.5 times enlargement of the Arado 234. The Heinkel design had several favorable points. 1. The total design was based on proven principles. 2. It was scheduled for powerplants already in production. 3. The wing was of proven design. By mid 1944 considerable competition arose between the Heinkel and Junkers concerns for the high speed jet bomber specifications, each claiming its product's superiority. Officially at least, the RLM displayed only mild interest in Heinkel's project while continued support for the Junkers design remained favorable but less than enthusiastic. This policy was evident during discussions held at Berchtesgaden on May 25, 1944, where the Ju 287 was commented on favorably while there was no mention of the He 343!

Heinkel outlined the relative merits of both competitors in a memorandum directed to Dr. Franz of Junkers dated July 8, 1944.

I. Aims

When, in January of this year, we were given the task to design a jet bomber based largely on the Ar 234, to build a series of 20 prototypes and prepare for its large scale production, this task was based on the following considerations:

1. It is necessary to put an operational jet bomber most soon at the disposal of the Luftwaffe.
2. To avoid all risks for a quick start of series production, the design has to be based on already proven principles.
3. Engines also have to be selected with this in mind. Therefore, only engines already in existence and proven should be installed. Higher powered TL-engines, which are as yet under development and have not proven themselves sufficiently could be planned for a further development of the type.
4. In parallel with this task, Junkers was ordered to design, manufacture prototypes and prepare large scale production of a jet bomber, consciously taking some calculated risks. The risk of the forward swept wing is matched, under most favorable conditions, only by an increase in speed of about 30 km/h *(19 mph)*, which does not appear worthwhile in the case of a type to be produced urgently.

II. He 343

1. Design

a. In the jet bomber field, valuable preparatory work had already been done with our design project P 1068.

b. To avoid all risks for an immediate start of series production, the design was based on 1.5 *times* scaled-up Ar 234.

c. 4 Jumo 004's with a rated thrust of 1000 kg *(2204 lb s.t.)* were selected as engines. This engine has already been fully tested.

d. The design of the aircraft (size, weights, area, etc.) resulted from the tactical demands set for jet bombers.

III. Comparison Between He 343 and Ju 287

1. The attached table gives a comparison of weights and performances of the two prototypes (V-machines).

2. The table shows:

a. the aircraft weight is:

He 343 = 5,260 kg *11,593 lb*
Ju 287 = 7,070 kg *15,582 lb*

Thus, Ju 287 requires approximately 1.8 tons more in materials. This expenditure of material can, in view of the present supply situation, only be justified with considerably increased performance as compared to He 343.

b. He 343's bomb load is 2000 kg., the theoretical load of Ju 287 is 3000 kg *(6,612 lb)*. With a bomb load of 3000 kg, Ju 287's takeoff weight will reach 23,555 kg *(51,915 lb)*. At this weight, the aircraft can take off with takeoff assistances only. Flight safety demands a takeoff angle after liftoff of 3 degrees. Thus, Ju 287's takeoff weight has to be limited to 21.5 tons without takeoff assistance. With jet engines, small takeoff power reserves are critical, since, compared to Otto engines,[2] this fact reduced takeoff ability considerably under higher air temperature. We consider this bad takeoff performance an essential part of the risks of the Ju 287. At the takeoff weight of 21.5 tons, bomb load has to be reduced to 2000 kg *(4408 lb)* and fuel to 6000 kg *(13,224 lb)*. This means that the useful bomb load of both aircraft is the same. The maximum range—at same bomb load and similar fuel tank protection—is approximately 1500 kg *(3306 lb)* for Ju 287 as compared to 1600 kg *(3526 lb)* for He 343. The larger design of Ju 287, therefore, gains nothing in bomb load and range.

c. The **maximum speed** is nearly the same for both types. According to manufacturer's specifications, the power loss with altitude is less with the BMW engine than with the Jumo. Should this be true—which in our experience it is not—the calculated maximum speed of the Ju 287 at 6 km *(18,000 ft)* altitude would be 25 km/h *(16 mph)* higher than He 343's. The Jumo engine specifications on which our calculations are based, are very conservative and proven in flight tests.

d. 6 BMW 003 TL-engines will be installed in the Ju 287. This TL-engine has not so far given any proof of being operational. In view of the nonsatisfactory development stage, an improvement of thrust cannot be expected. The more powerful HeS 11 cannot at present be considered for quantity production.

IV. Deductions From The Comparison

1. Ju 287's space utilization brings no advantages. Ju 287's performance is matched by He 343, however, with considerably less material and with 4 instead of 6 engines.

2. He 343 can successfully be used as a reconnaissance plane or destroyer. This flexibility does not apply to the heavier Ju 287.

3. He 343's flight tests should not present any problems. It would thus be easier to realize than the Ju 287, which for a number of new design features, such as the forward swept wing, has yet to prove feasibility. Thus He 343 will probably be **earlier** in quantity production than Ju 287.

The above explanations should prove that the Ju 287's performance can be obtained with He 343 at less expense (man-hours, fuel) and without such a considerable risk. It would be **in the interest of home defense** therefore, to at least order quantity production of He 343 parallel to that of Ju 287.

This production order would bring us back to the original design specifications: to make available to the front as soon as possible a fully operational, powerful jet bomber at the lowest possible risk.

Vienna, June 16, 1944.

Professor Hertel's response to Heinkel's memorandum, also directed to Dr. Franz and Prof. Mader of Junkers raises significant questions concerning Heinkel's figures.[3]

Comments on Prof. Heinkel's Memorandum

Heinkel's report leads to a grossly mistaken assumption which basically results from three fundamental mistakes in Heinkel's assumptions:

1. For the He 343, Heinkel's official performance data (sheet No. 1423 of May 24, 1944), is based on the less powerful Jumo 004B in accordance with possible circumstances, which is already in series production. The comparison with the Ju 287, however, *(reproduced on p. 32)*, shows the more powerful Jumo 004C which has not been secured for jet bomber use. On the other hand, Heinkel's performance sheet No. 1423 gives 900 kg thrust *(1984 lb)* for the BMW 003 in the He 343, reduces this to 800 kg *(1763 lb)* in his comparison with the Ju 287. Thus, 115 kg *(254 lb)* thrust were added to the He 343 and 100 kg *(220 lb)* deducted for the Ju 287 (contrary to his own assumptions). The difference of 215 kg *(474 lb)* per engine, i.e., 27% additional power, shows He 343 in a much more favorable light, which however, is absolutely unjustified.

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[2]Otto engines refers to all reciprocating gas/air engines as distinct from Diesel engines. Its name is derived from its inventor Nicholaus August Otto.

[3]Herr Hertel's talents were such that late in 1942, in an effort to save the languishing Heinkel 177 program, the RLM requested that he leave Junkers and return to the Heinkel company as an RLM Official with broad powers. It will be remembered that Professor Hertel had been with Heinkel, but moved on to a highly responsible position with Junkers in 1939.

2. Heinkel compiles data sheets showing use of various jet engines in the He 343, overlooking the fact that Ju 287 is also designed and capable to be equipped with more powerful TL-engines, as soon as these are available. IFA (Junkers Flugzeug & Motorenwerke A.G.), which chose to equip Ju 287 with BMW 003 only for reasons of development and supply situation of TL-engines and as an initial solution, has however, never considered not to use the Jumo 004C. If Heinkel believes he is able to use the Jumo 004C at 1015 kg *(2238 lb)* thrust for the He 343 with certainty,[4] this also should be used in comparing it with the Ju 287, which—in its overall design—took this engine already into consideration as an advanced solution. Taking the TL-engine Jumo 004C for both designs will immediately show the great superiority of Ju 287.

3. The Ju 287 performance data used by Heinkel in his comparison may be those of some stage in its development, but never those of the final design. Therefore, the data used by Heinkel for Ju 287 give greater weight and lower performance. A comparison as of mid-June 1944 should have been based on weights and performance of the Ju 287 design stage which had then been reached instead of some old and incorrect data. During design development, the RLM has been thoroughly informed of weight saving measures and the successes resulting therefrom. Armament and ammunition were incorporated additionally without exceeding the originally projected weight.

The weight and performance comparison of Professor Heinkel's memorandum is basically wrong since the versions compared cannot actually be thus compared. The two tables attached to these comments should be taken instead.

Table I

Since production of the 004C will not begin before mid 1945, and these improved engines doubtlessly will be used for the fighter and destroyers now under design, the 004B with a thrust of 900 kg will have to be applied. To avoid any difficulties from the fact that the more powerful C-engines will not be available for an early beginning of jet bomber production, the BMW 003 is to be used initially with GL/C-B approval. The comparison shows this engine with the performance figures as given by its manufacturers as maximum load, i.e., 900 kg thrust for short periods and 800 kg continuous thrust. The table shows that this honest comparison gives a bomb load of 3000 kg to Ju 287, i.e., twice that of the He 343 with 1500 kg, and Ju 287's range at 1900 km, larger by 45% than the 1330 km of He 343. Despite the drag created by the moveable armament, the Junkers aircraft calculated speed is higher by 70 km/h.

Table II

Nevertheless if it should be possible to produce the 004C earlier and in such quantities that it would be available for jet bombers, which is to be hoped, it naturally also will be employed by the Ju 287.

The most objective values are obtained by comparing the two designs powered by the same engines particularly favored by Heinkel, the Jumo 004C, Table II. To avoid any dispute, the data published in Heinkel's memorandum have been inserted. This comparison of the 2 designs equipped with the same engines shows the great superiority of the Ju 287:

a. bomb load is 3000 kg with Ju 287 as opposed to 2000 kg with the He 343,

b. despite the 50% higher load, Ju 287's range of 1930 km is 20% above the 1600 km of He 343,

c. Ju 287's maximum speed is 70 km/h faster than that of He 343, despite its moveable armament,

d. as further comparison, Table II also gives performance for Ju 287 with a 4-ton load at previous fuel capacity. It is shown that in this version the Ju 287's bomb load is twice that of He 343 at similar range. This example is of particular importance since it shows that the bomb bays of Ju 287 can be utilized to the utmost (i.e., 2 x 200 kg or 8 x 500 kg bombs stored in fuselage). On the other hand, He 343 can carry greater bomb loads only externally, thus again reducing the originally already lower speed of this design. Additionally the following points should be considered to Ju 287's superior performance:

e. He 343 does not have any moveable armament despite its inferior speed. The fixed rear armament is considered insufficient. Apparently Heinkel accepts the need for moveable rear armament since he himself—in his design 343.01-11B of May 24, 1944, suggests a version of a destroyer with twin fins and rear gunner. The design of two radically different fuselages and tails hardly appears logical.

We are still of the opinion that it is important to design the armament for such versions for manufacture as a Rüstsätz from the start, so that conversion can be made at any time. Weight and drag of armament have been taken into consideration when compiling the Ju 287 figures. With the installation of moveable armament, the data given for He 343 will suffer accordingly.

f. Heinkel's figures do not show whether He 343 is pressurized, since the initial design and the mockup were not. This would be essential for a jet bomber. Ju 287 will have a pressurized cabin from the start.

g. Heinkel's repeated remarks as to the risk of swept wings cannot be substantiated, since comprehensive research has proved that this problem can be overcome within a short time.

Conclusions

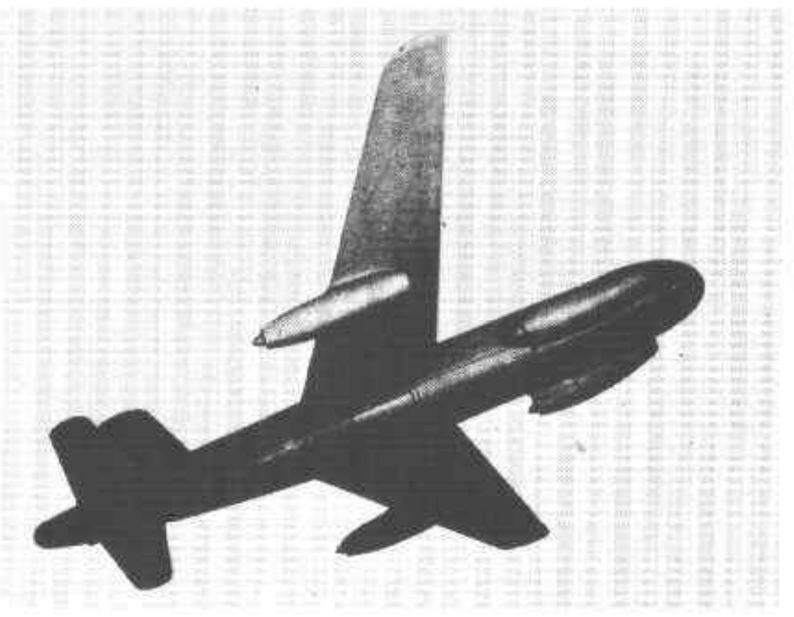
In contradiction of the "memorandum," which constructs apparently similar performances of the two designs, Table II as enclosed proves without doubt the superiority of Ju 287 with Jumo 004C: **doubled bomb load at the same range, 70 km/h higher speed, moveable armament, pressurized cabin.**

The design of the Ju 287 was based from the start on the Jumo jet, and incorporates the increase of flying weight for the 004C of more than 33 tons so there will be no problem in supplying the fuselage and wings for this version (except for an initial delay, since the blueprints for the BMW jet have only now been delivered).

It is irresponsible to leave the two projects fluctuating between varying proposed performances and availability of engines. To end this insecurity on the design side and to stop the juggling around with engine proposals, all measures have been taken to ensure design preparation for the installation of either BMW 003 or Jumo 004C. However, the production departments should be informed in good time of the type of engines to be installed and every change of the previous plans will delay production.

Due to lack of time, no comments are made on the rest of the memorandum.

Dessau/Raguhn, July 9, 1944



Ju 287 PRODUCTION MODELS

Before Germany's collapse, the Junkers concern had planned quantity production of the Ju 287 in accordance with the eleventh hour request by the RLM in March 1945.

Ju 287 A-0

A single preproduction machine was identical to the third prototype in all respects. A crew of three was carried within a pressurized cabin. Defensive armament of 2 x MG 151 was mounted in the tail barbette and was remotely controlled from the cockpit by means of two periscopic sights.

Ju 287 A-1

The full production model was virtually identical to the A-0 which it was to follow. Had the original production schedule been uninterrupted, and had the war lasted a few more months, it was estimated that one hundred Ju 287's could have been completed by September 1945. Six BMW 003 A-1's were the designated powerplants.

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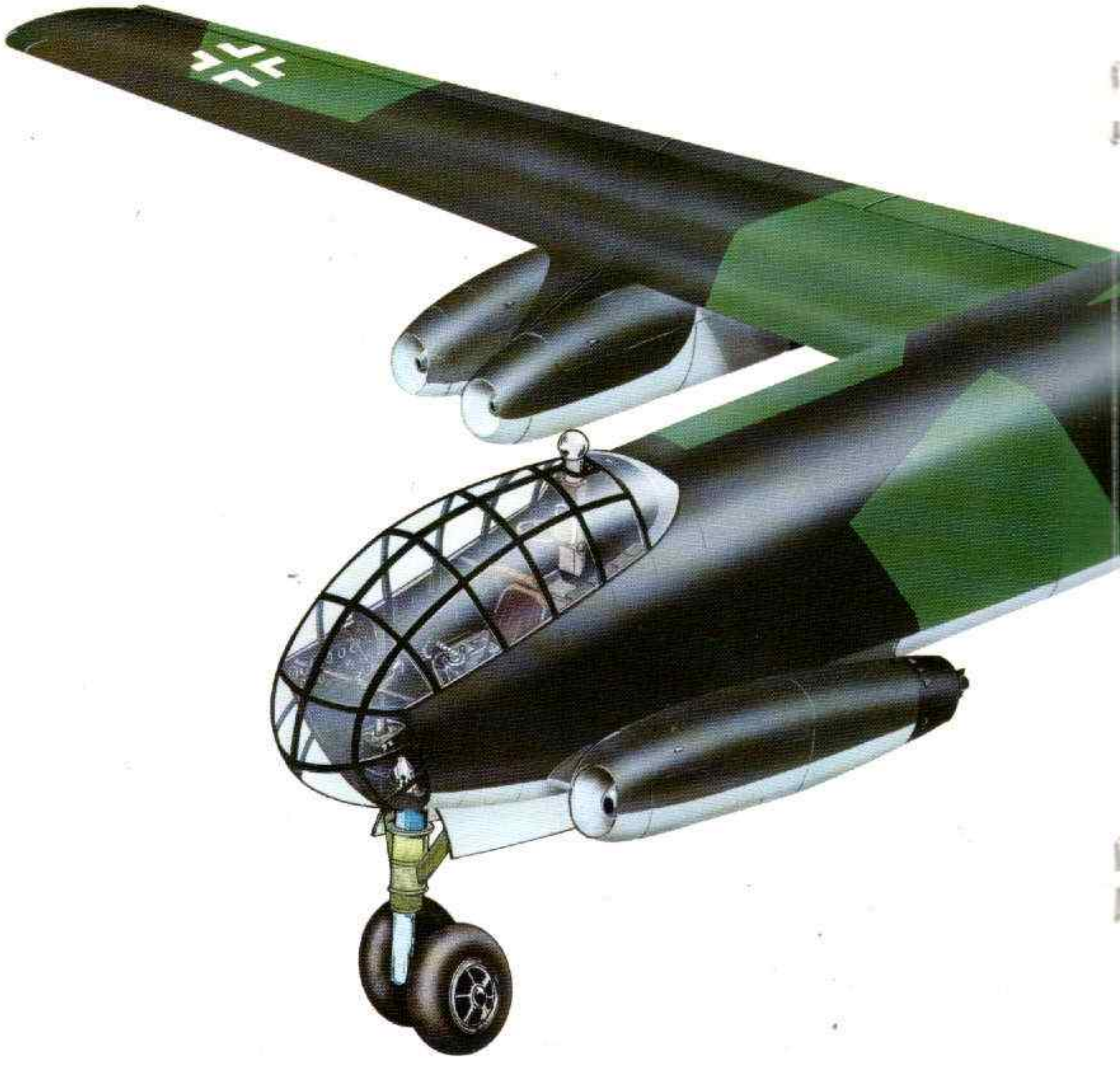
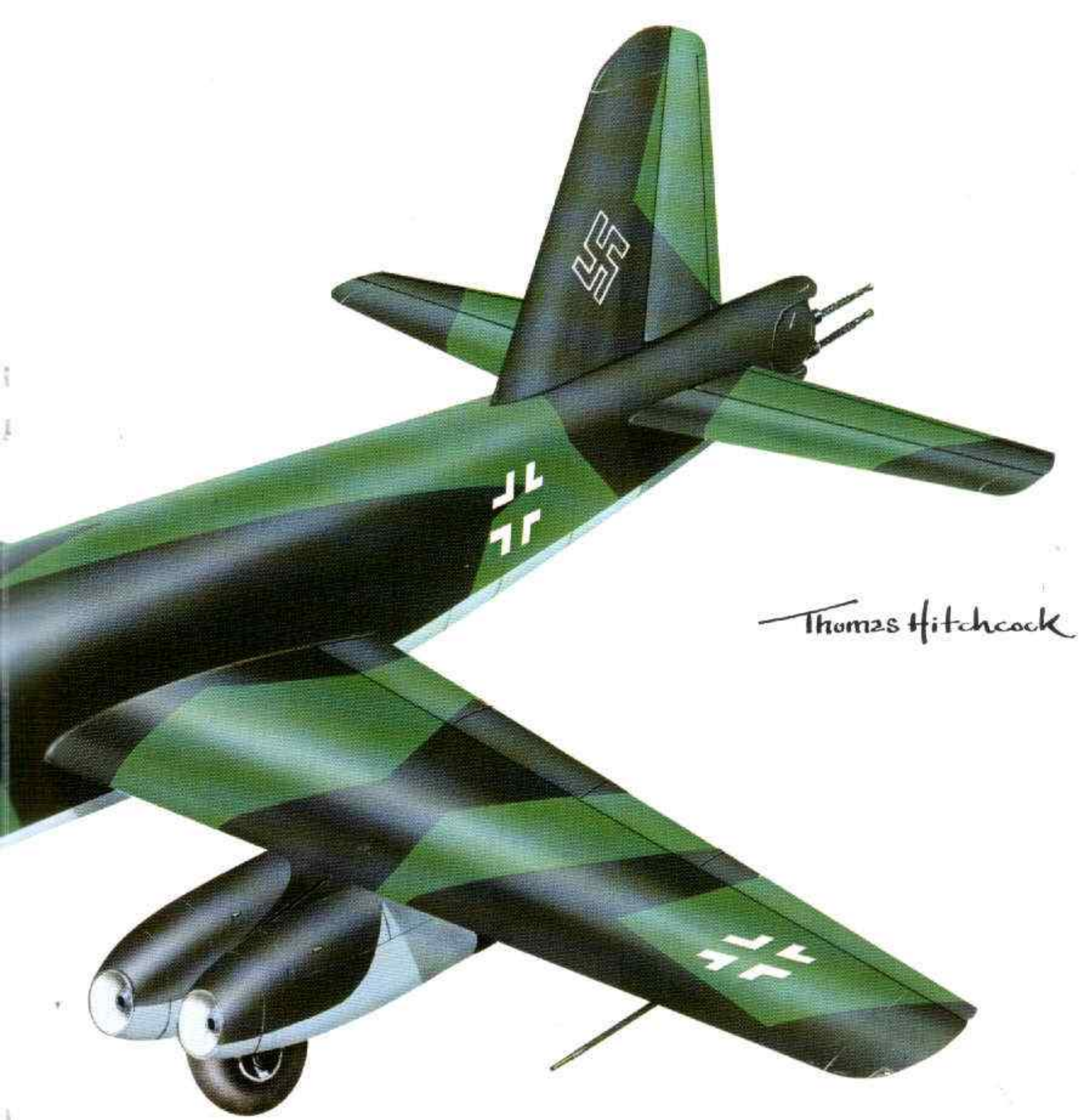
[4]The memorandum claims erroneously under paragraph IIc that Jumo 004C with 1000 kg thrust has already finalized its tests. So far, only the B version with 900 kg thrust has been tested.

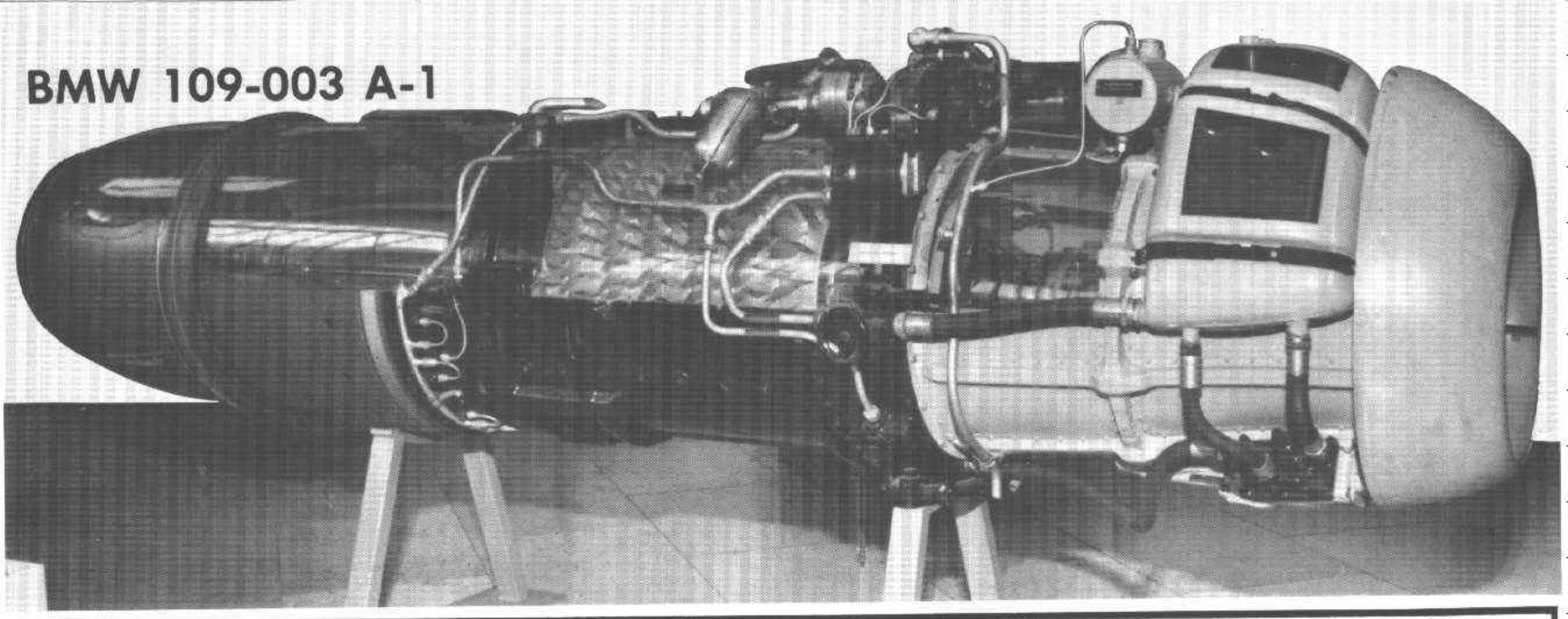




Thomas Hitchcock

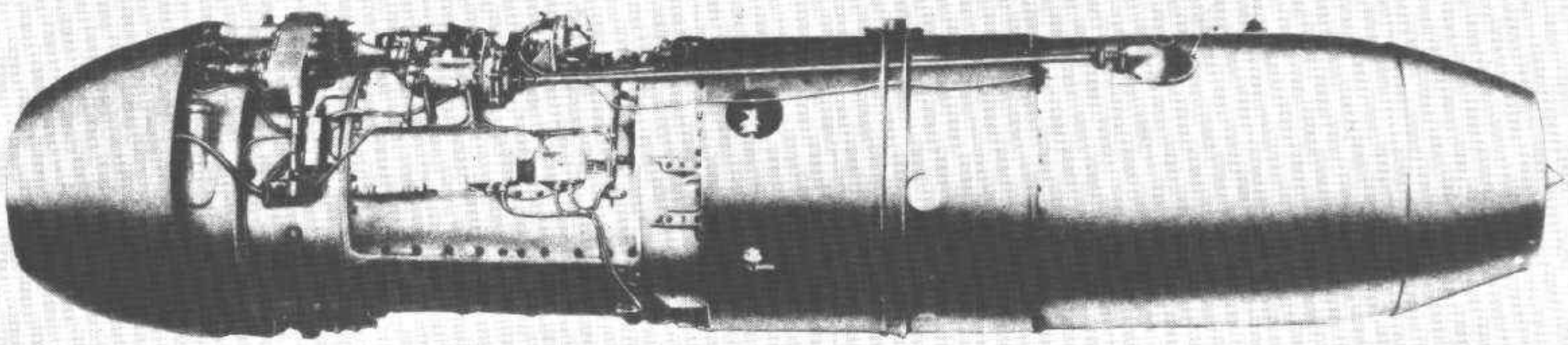
JUNKERS Ju 287 A-1

BMW 109-003 A-1



TL	TYPE	THRUST	RPM	C/R	TURBINES	FUEL	LENGTH	DIAMETER	WEIGHT	YEAR	REMARKS
003 A-1	7 Stage Axial Flow	1,760 lb 792 kp	9,500	2.7:1	1	B4	11 ft 8 in 3,510 mm	2 ft 3 in 690 mm	1,252 lb 564 kg	1945	77 turbine blades - identical to A-0 series
003 A-2	"	"	"	"	"	"	"	"	"	"	66 Turbine blades - 500 A-1/A-2 built
003C	"	"	"	3.4:1	"	"	"	"	"	"	Brown-Boveri compressor
003D	8 Stage Axial Flow	1,763 lb 800 kp,	"	4.9:1	2	"	?	?	?	-	Ordered by RLM April 1945
004 B-1	"	1,984 lb 900 kp	9,000	3.4:1	1	J2	12 ft 8 in 3,864 mm	2 ft 7¾ in 805 mm	1,653 lb 750 kg	1944	Standard production model - approximately 6,010 built
004 B-2	"	"	"	"	"	"	"	"	"	"	Improved compressor stator blade design
004C	"	2,204 lb 1,000 kp	"	"	"	"	"	"	1,586 lb 714 kg	1945	Improved B-series with auxiliary fuel injection - mid 1945
004H	11 Stage Axial Flow	3,967 lb 1,800 kp	?	5.0:1	2	"	12 ft 11½ in 3,950 mm	3 ft 4 in 1,020 mm	2,424 lb 1,100 kg	-	Smaller version of the larger Jumo 012

BMW 003 A-0 (preproduction model) - 100 built; 003 B = ?; 003 E-1/E-2 = A-1/A-2 but for He 162; Jumo 004B-3 = modified turbine entry; 004 B-4 = separate compressor discs. Hollow turbine blades; 004 D-4 = As B-4 but with new throttle regulator & 2 stage fuel injection; 004E = As D-4 but with short tailpipe.



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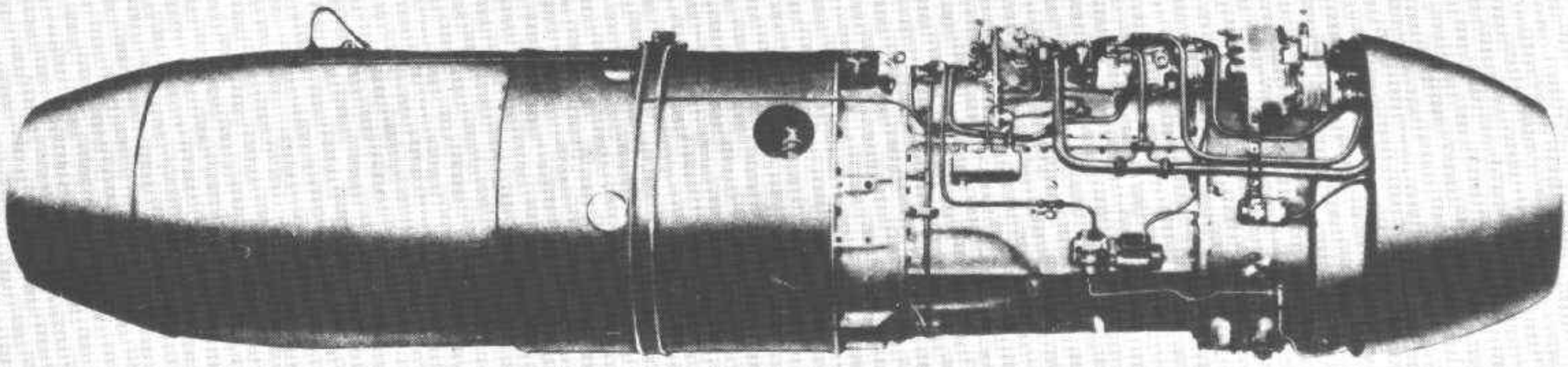
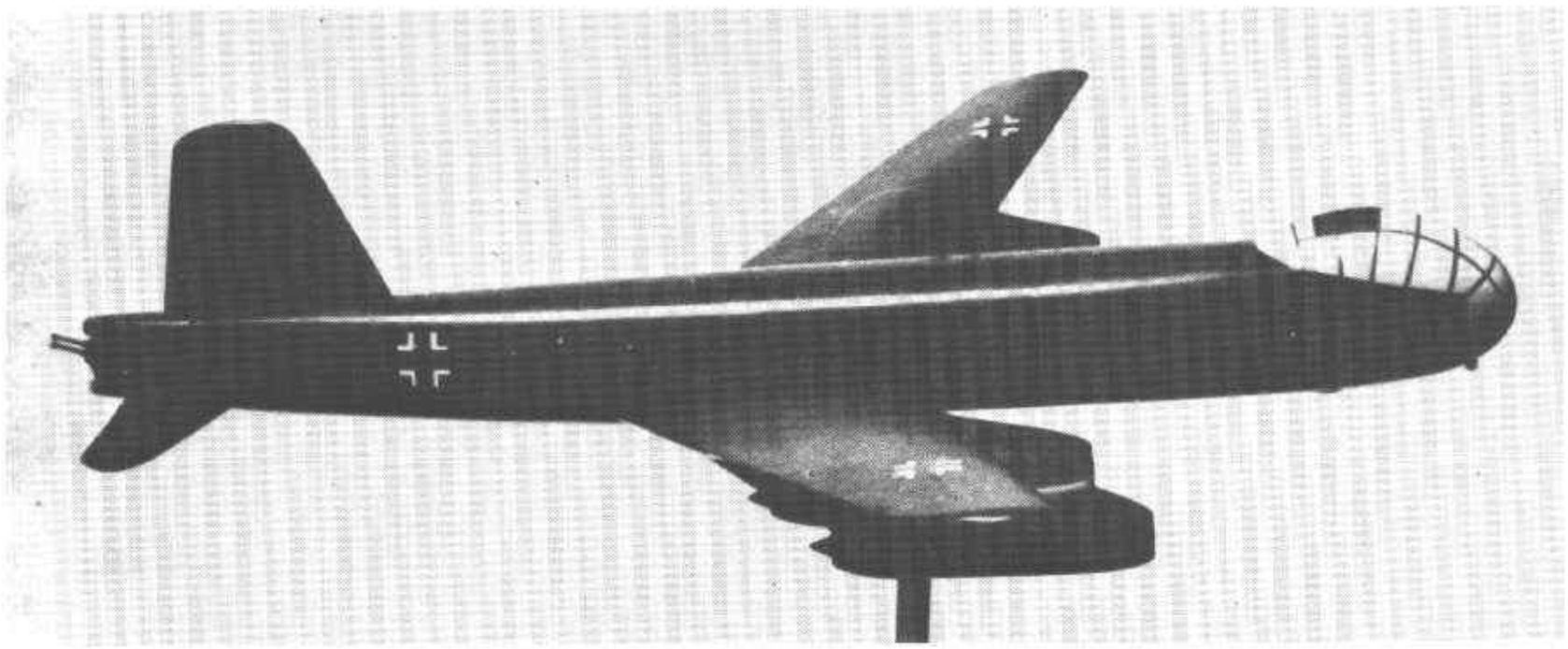
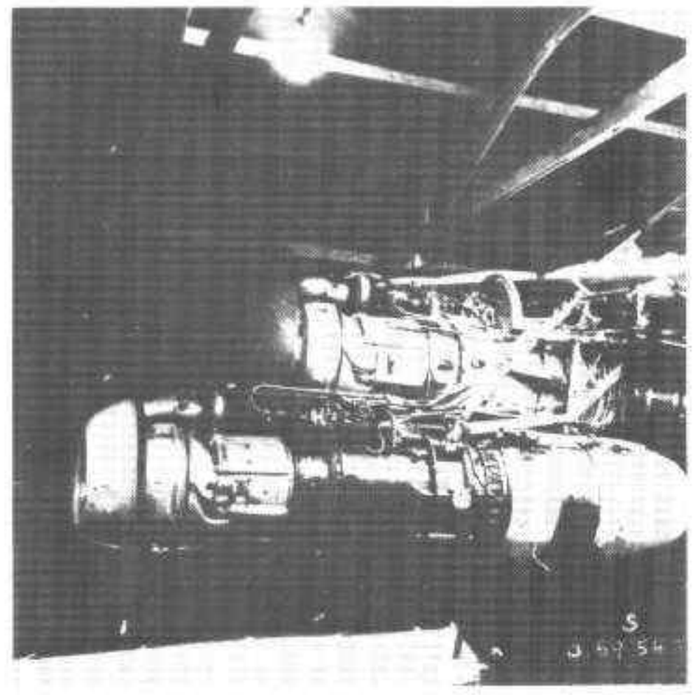
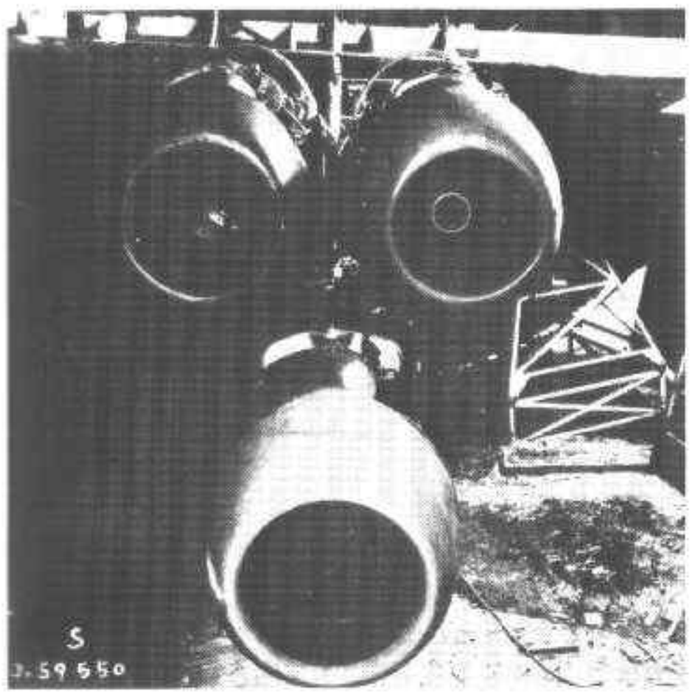
Jumo 109-004 B-1

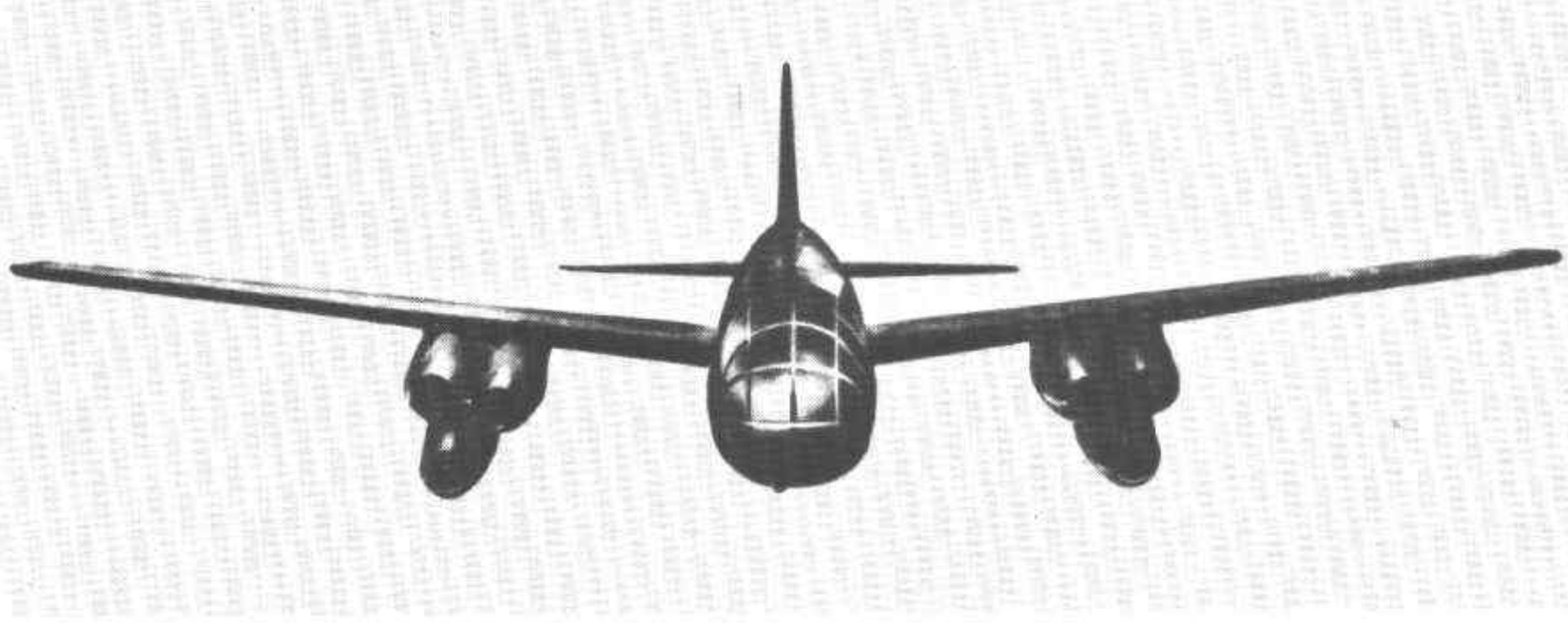


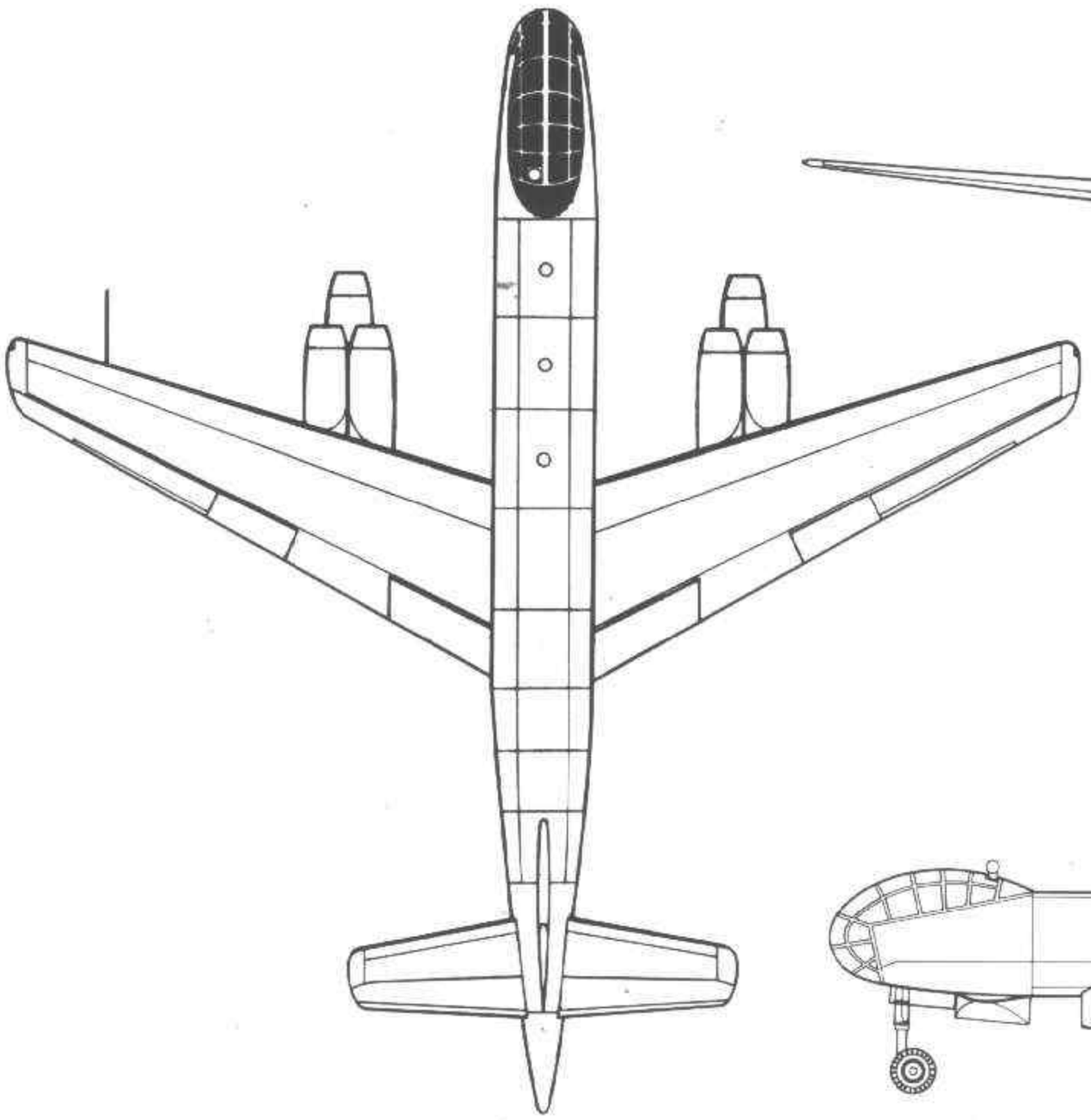


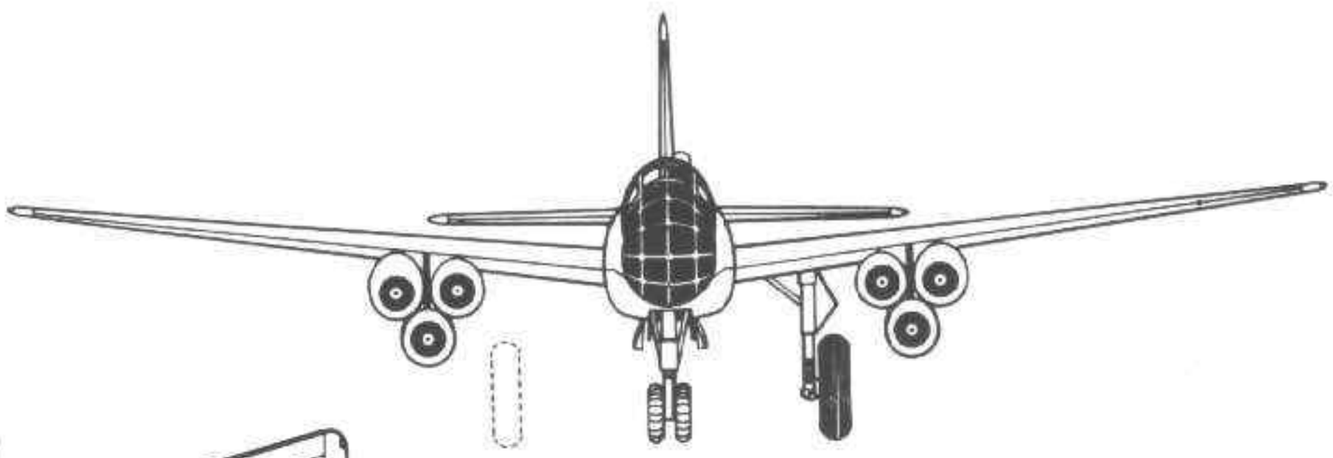


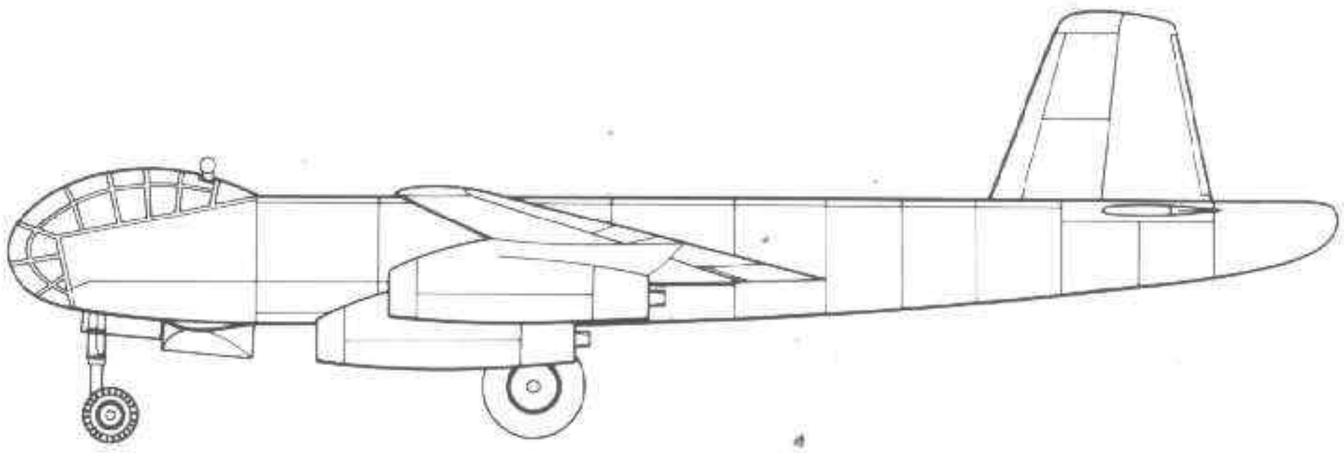
Model and engine mockup arrangement illustrate the Ju 287 V2. Note that tail armament has been attached to the model although the second prototype was not scheduled for weapons. This resulted from the Ju 287 V2 being essentially the Ju EF 131 with projected defensive armament. *(See p. 29.)*



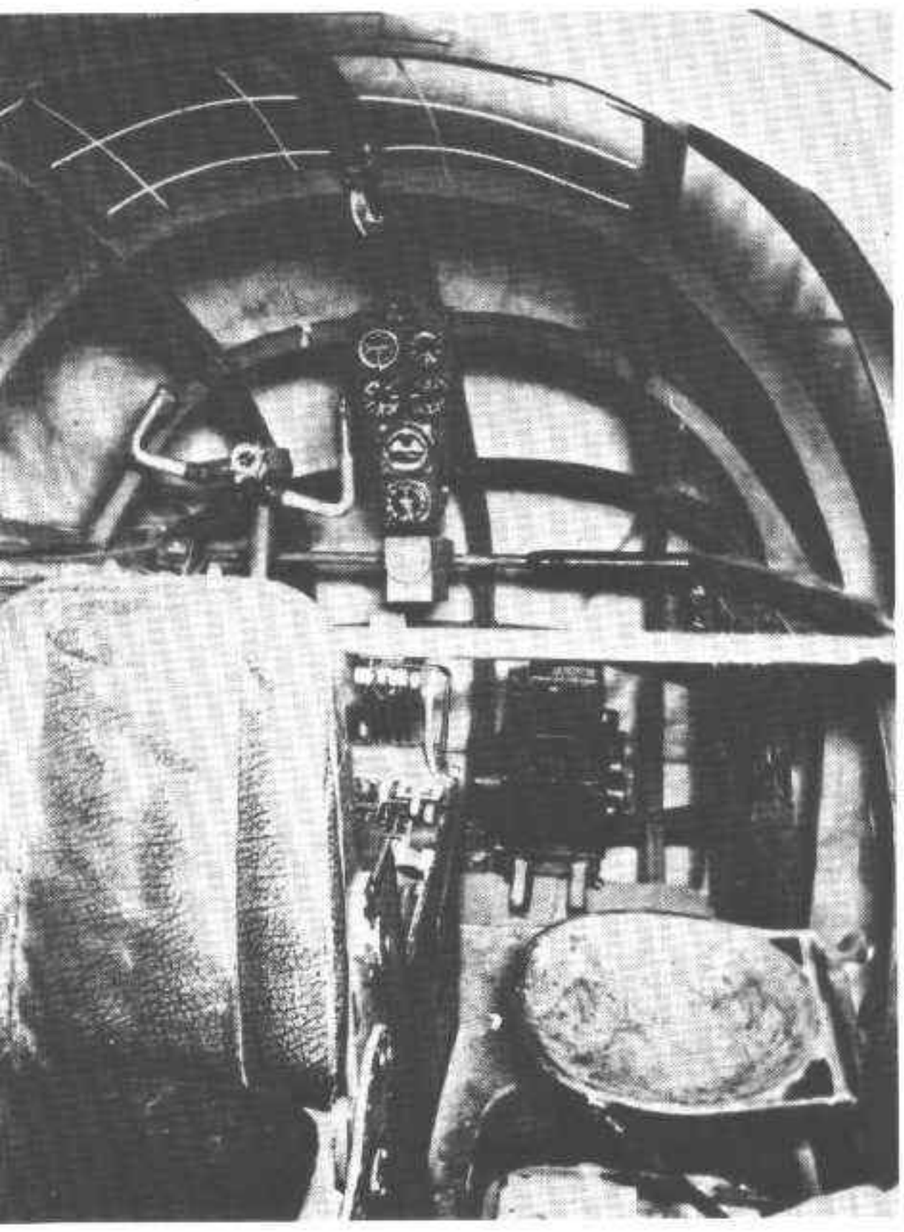


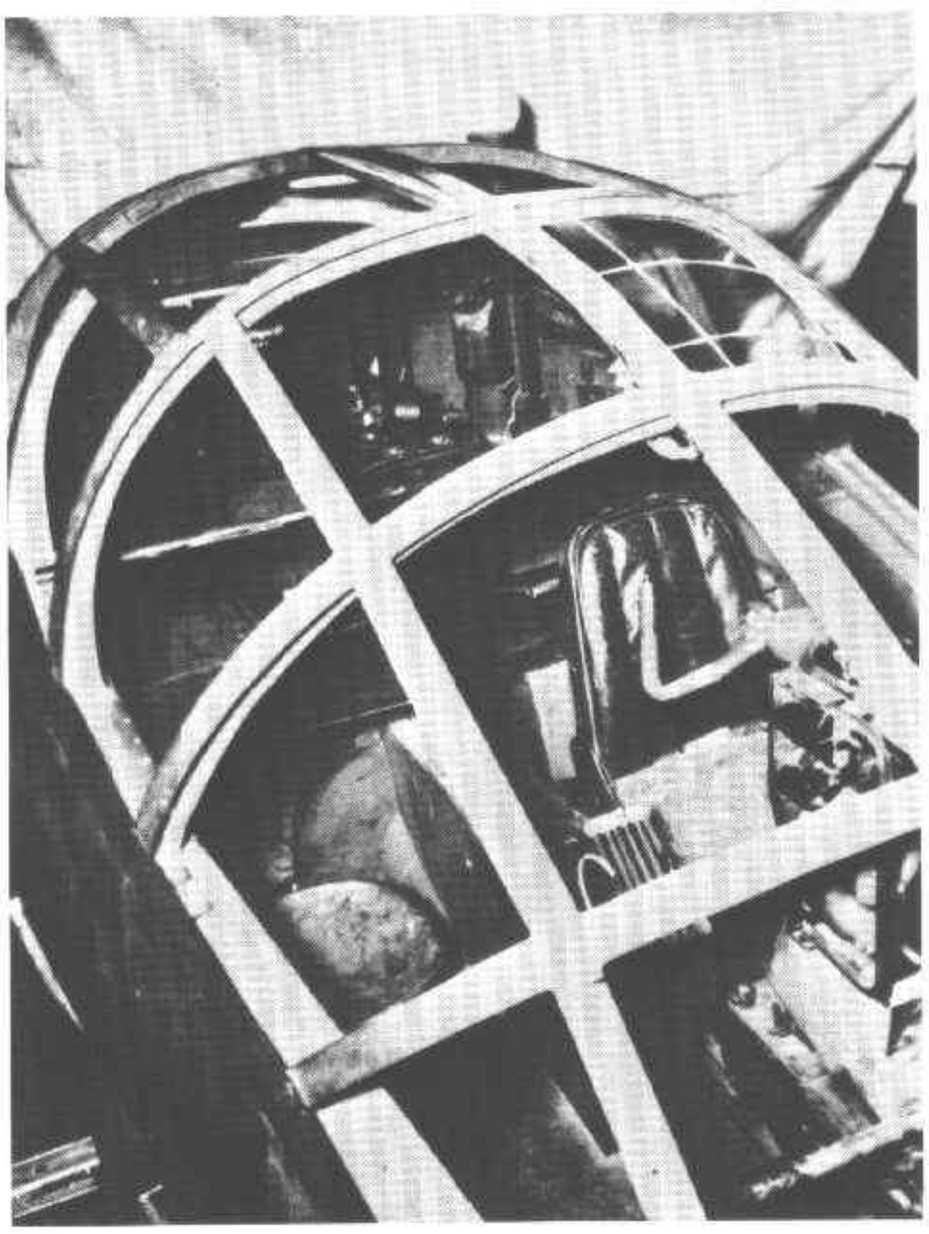


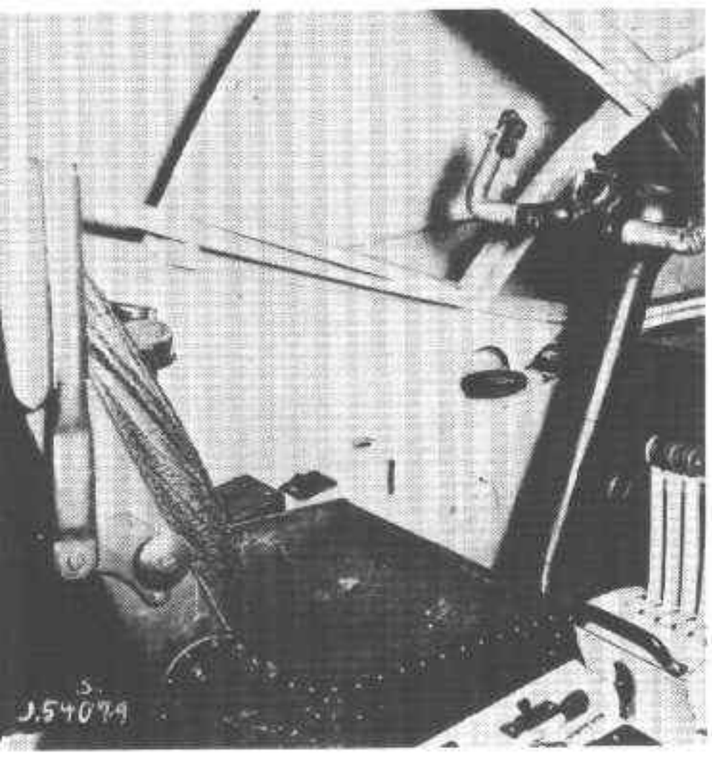


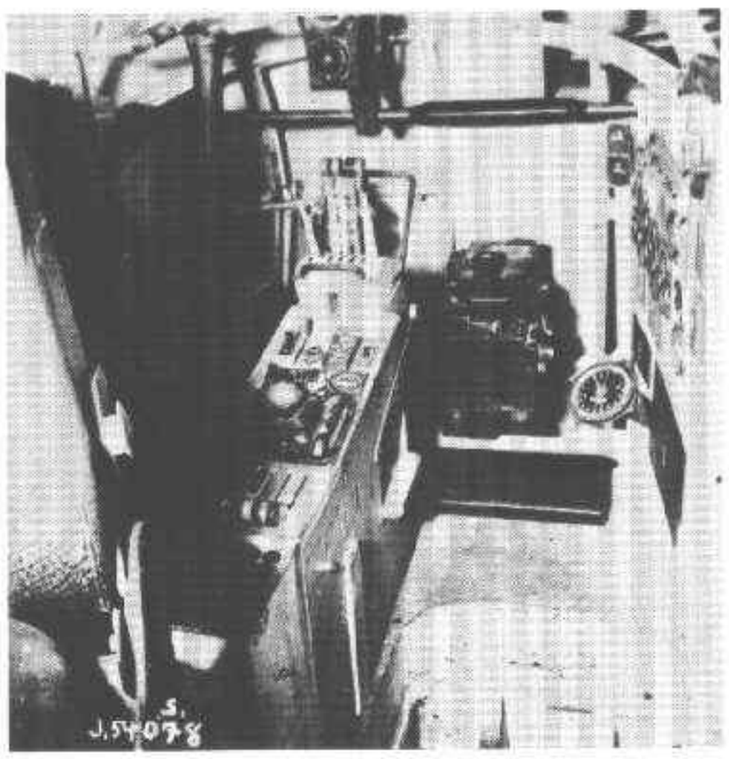


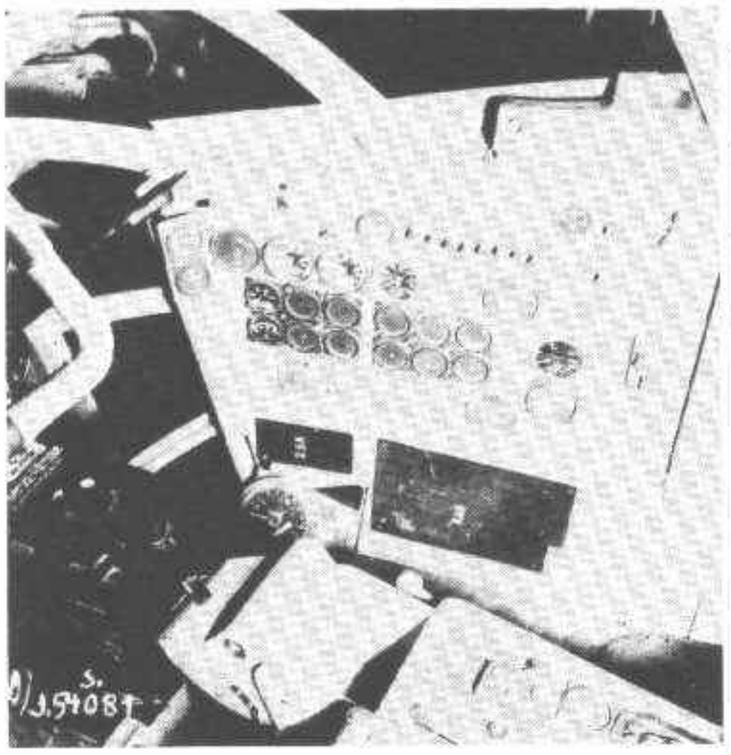
Ju 287 V2

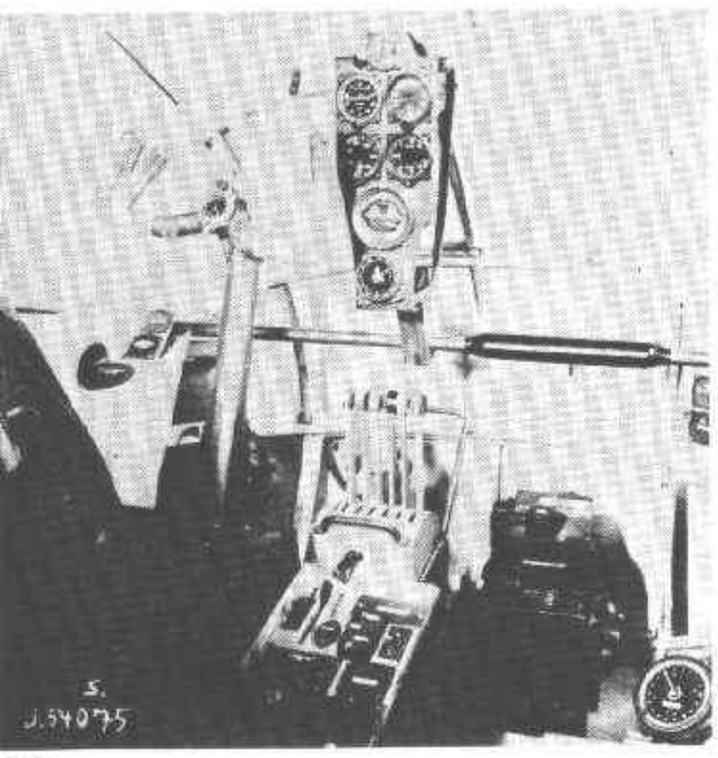






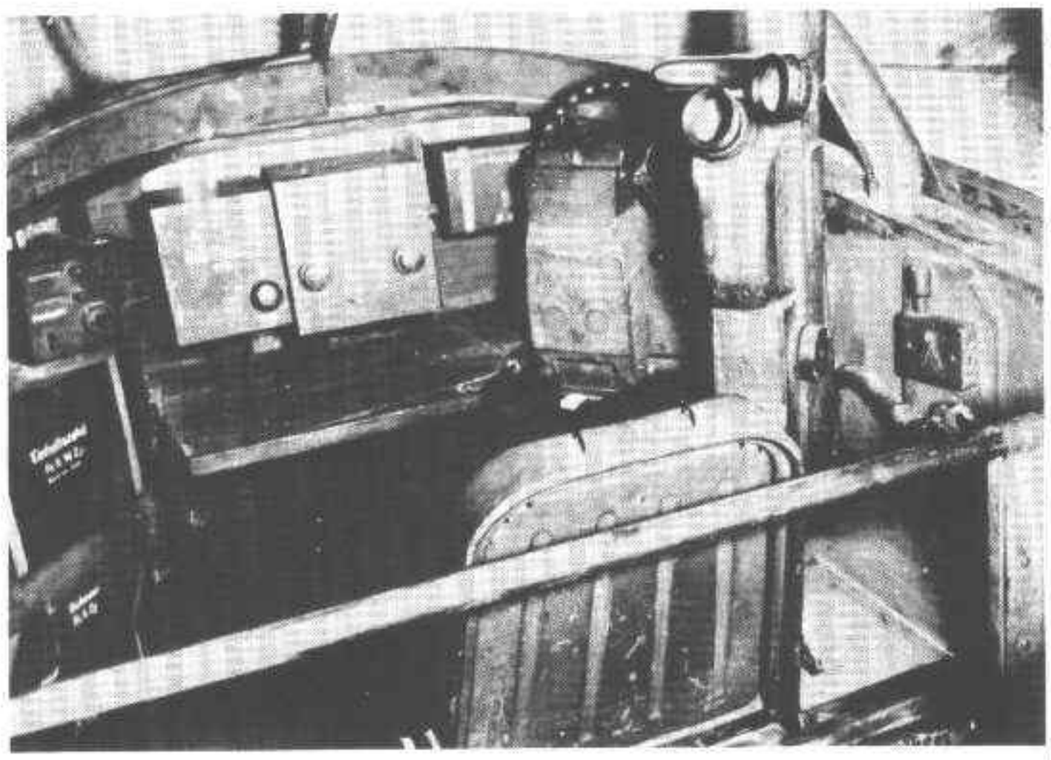


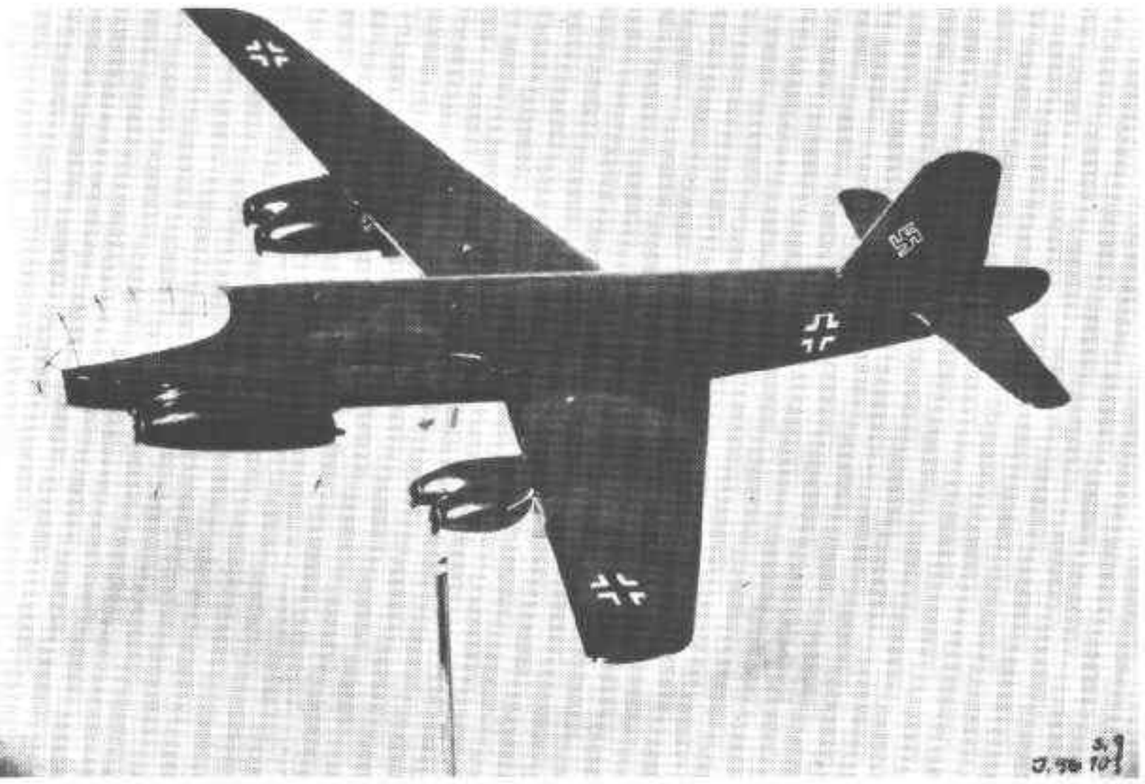


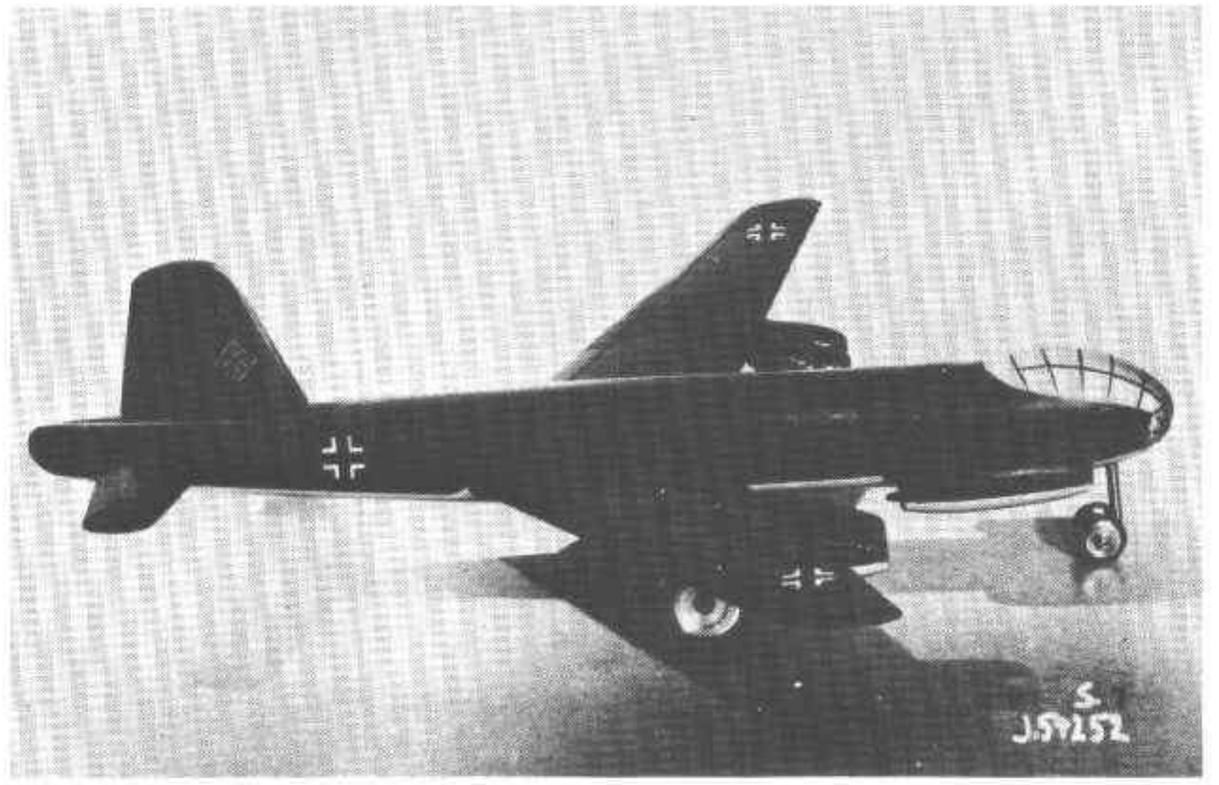


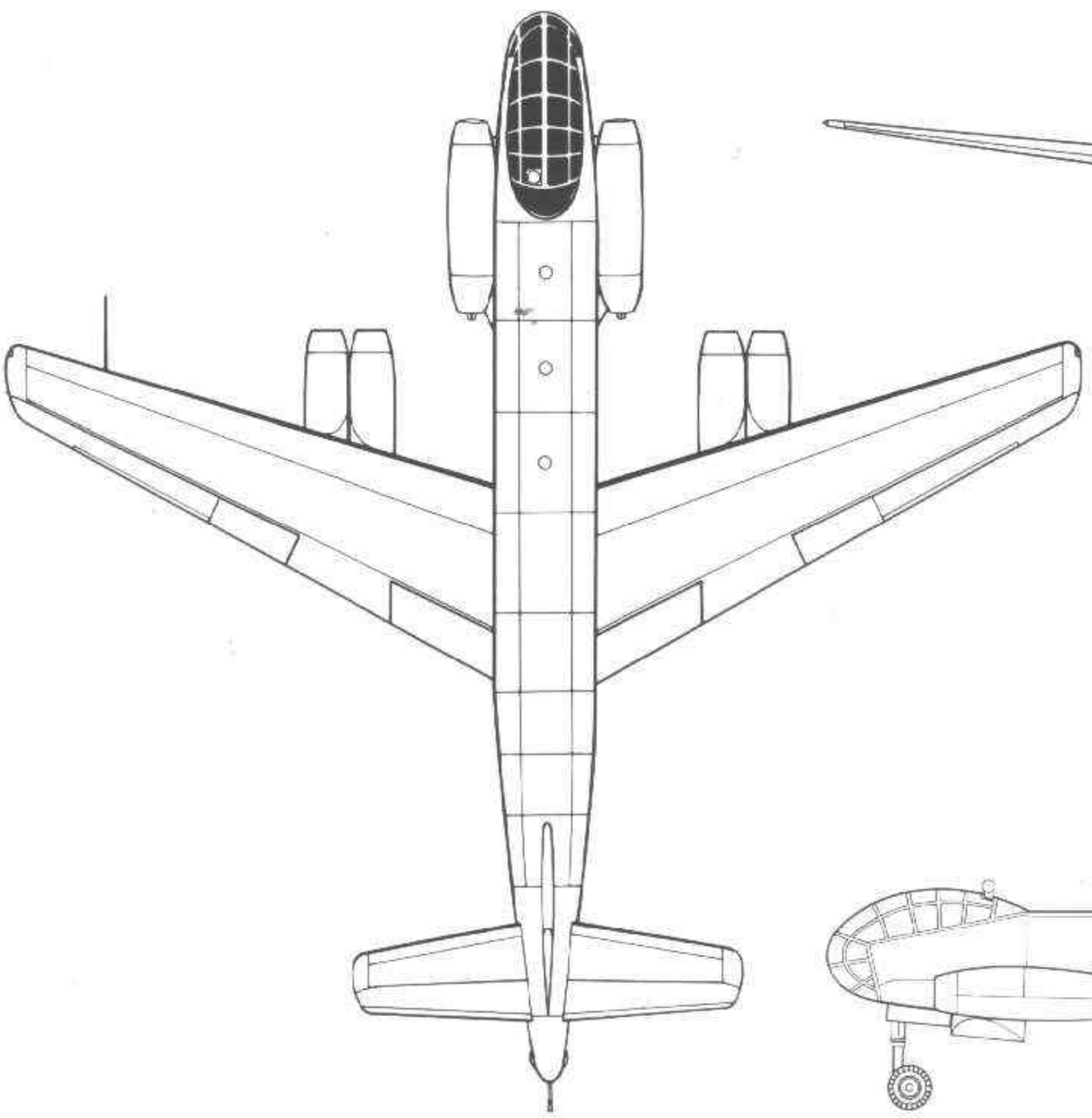
These photographs illustrate the Ju 287 V3 cabin mockup complete with instrumentation. Undoubtedly cabin visibility would have been exceptional and most instruments appear to be well placed for easy reference.

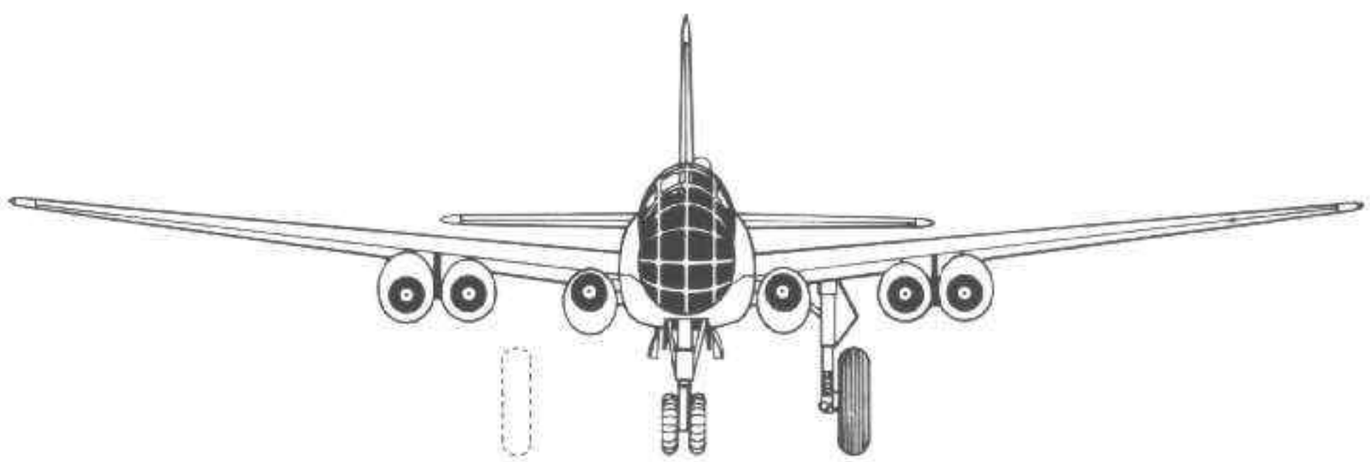
Photo to the right reveals the rear crewman's position and the periscopic sight used to control the tail gun position. A variety of radio gear was intended including the FuG 16Zy unit to the left.



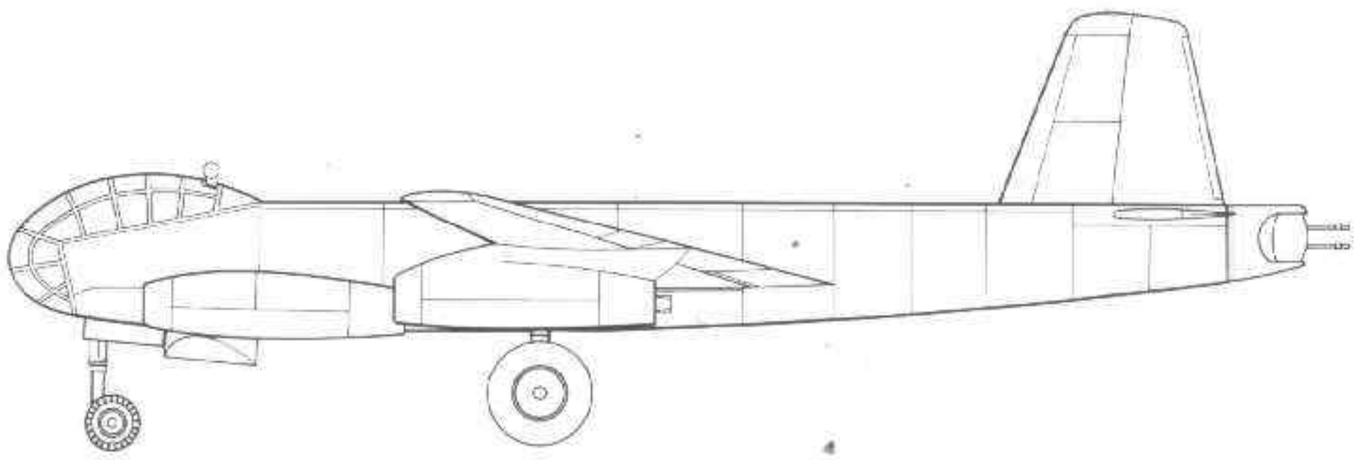


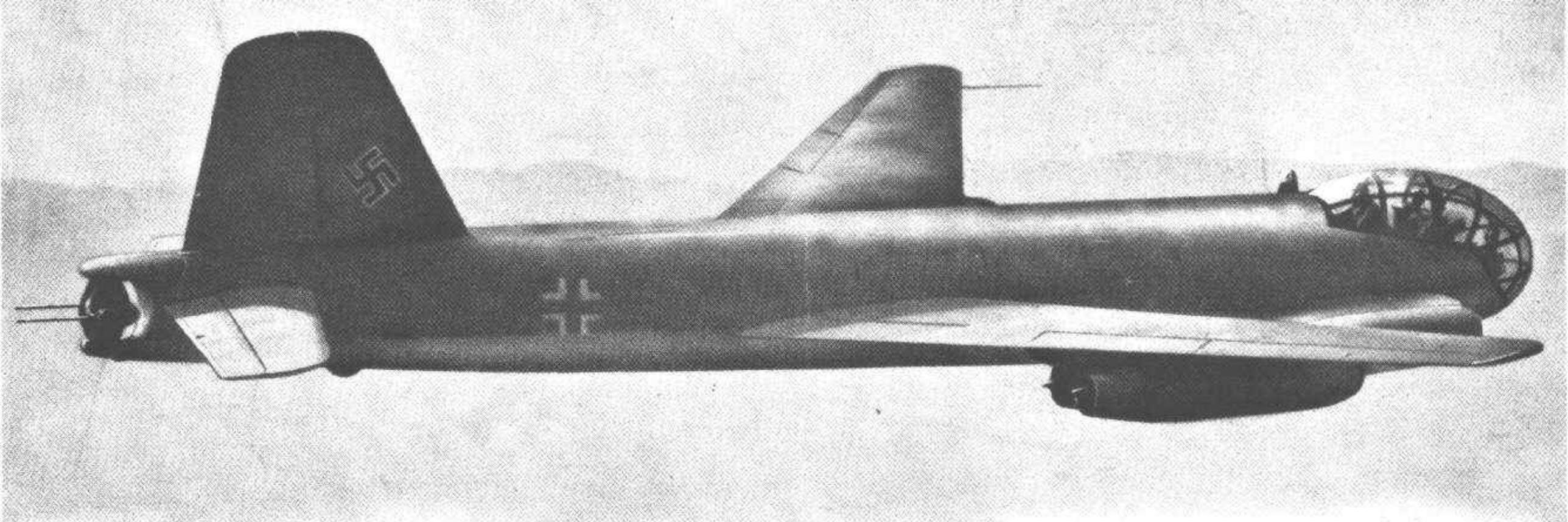


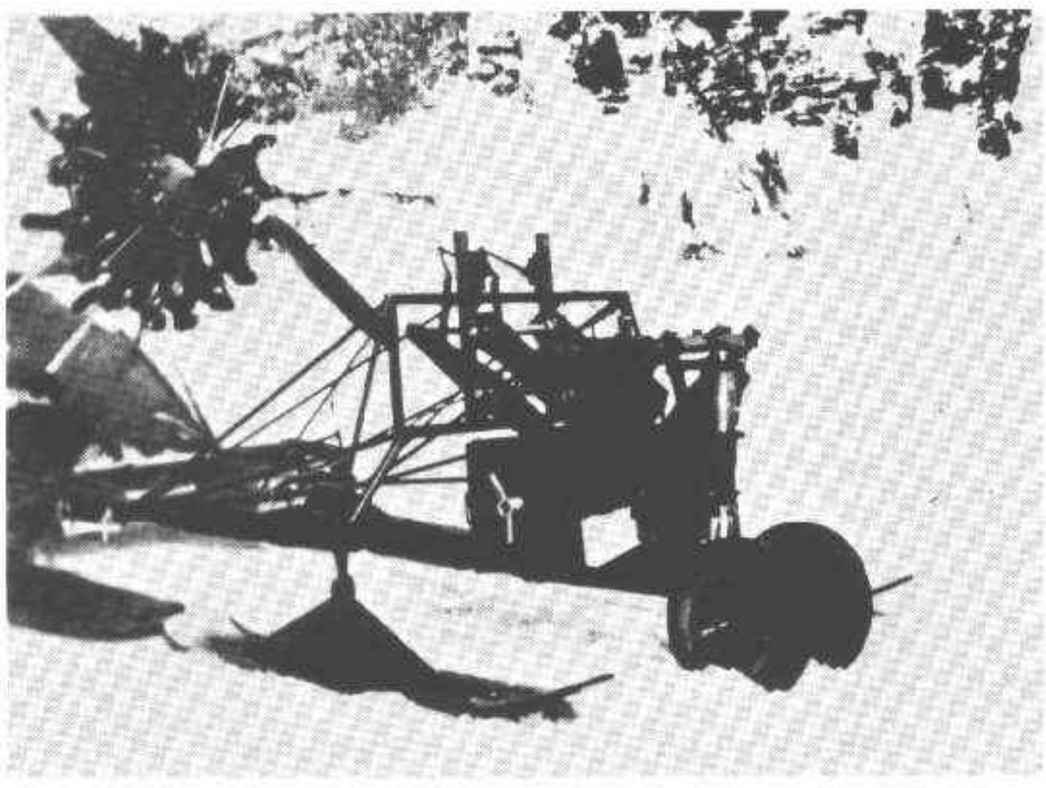




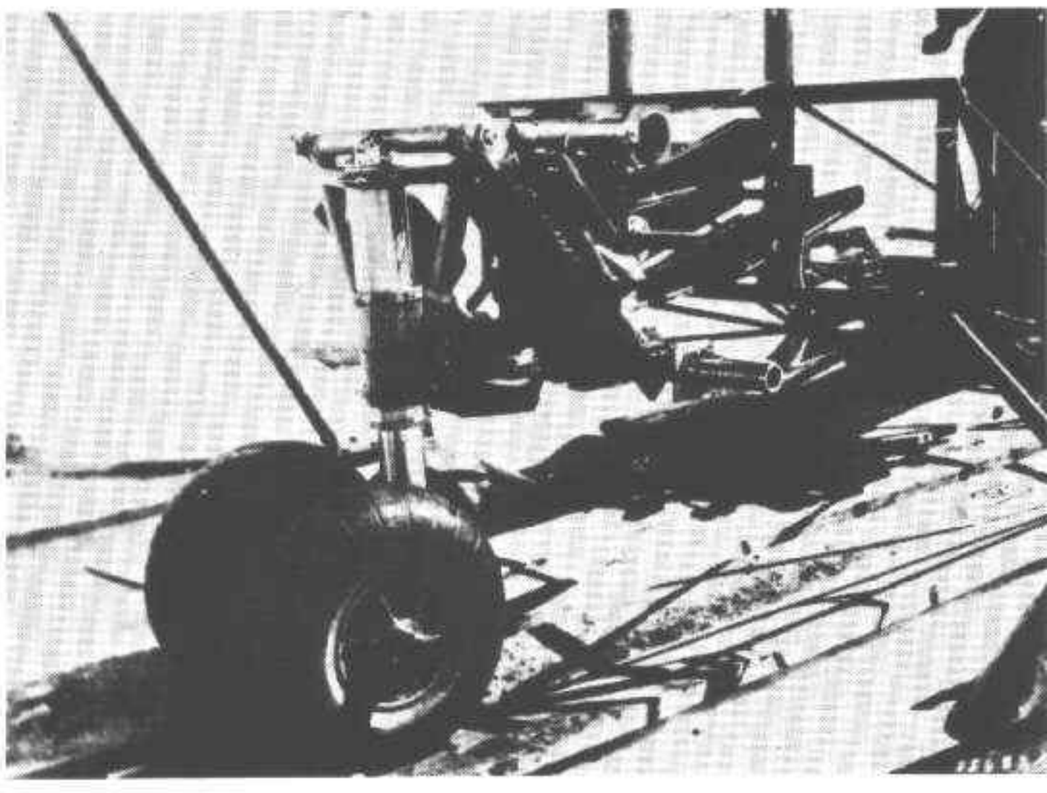
Ju 287 V3 (A-0/A-1)

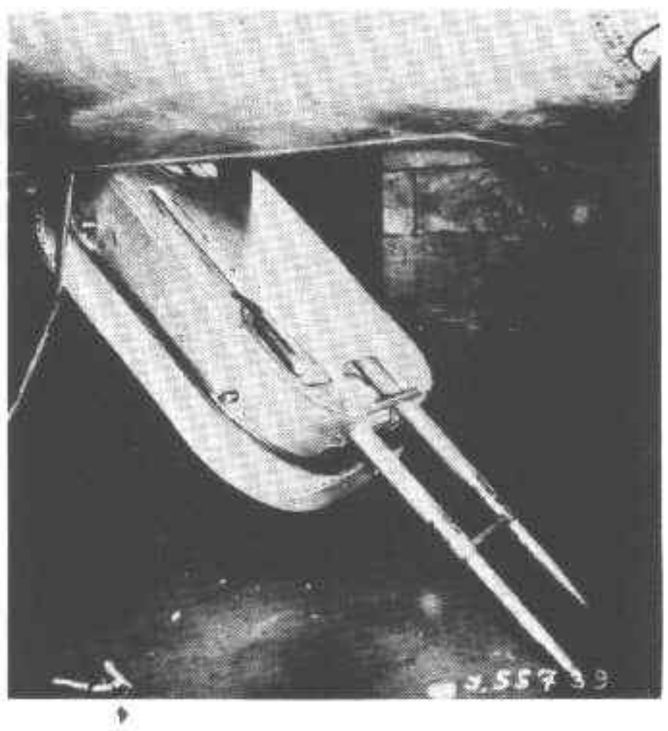




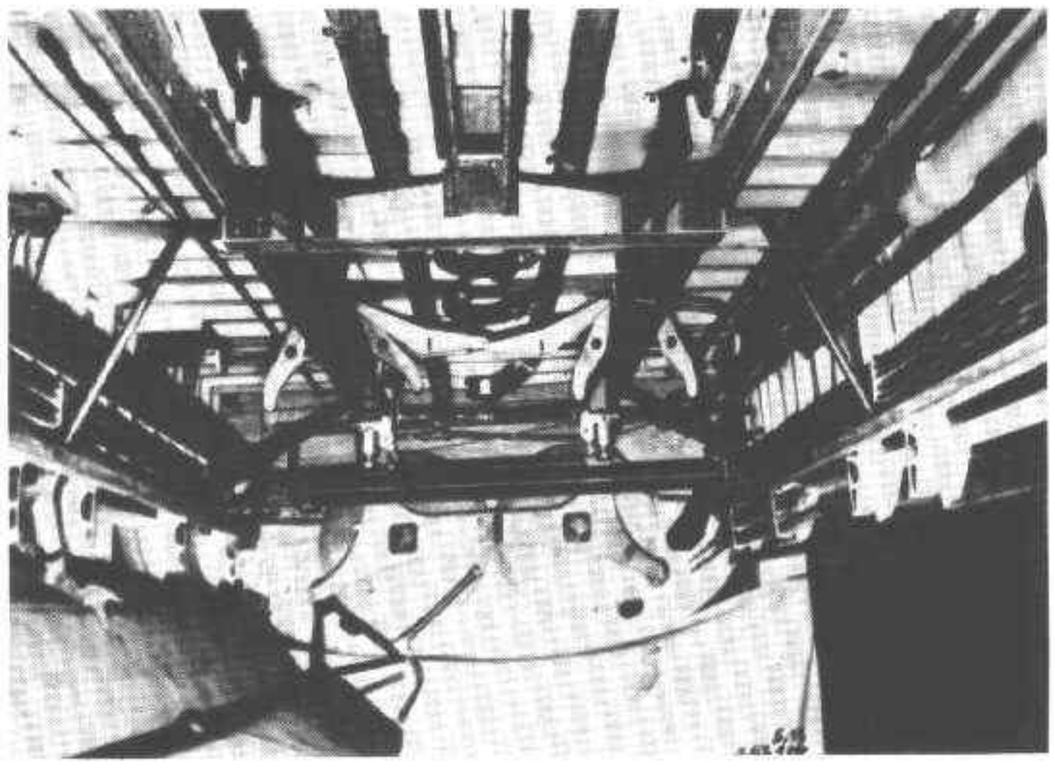


Unusual test sled assembled for the purpose of evaluating the new dual nose gear.

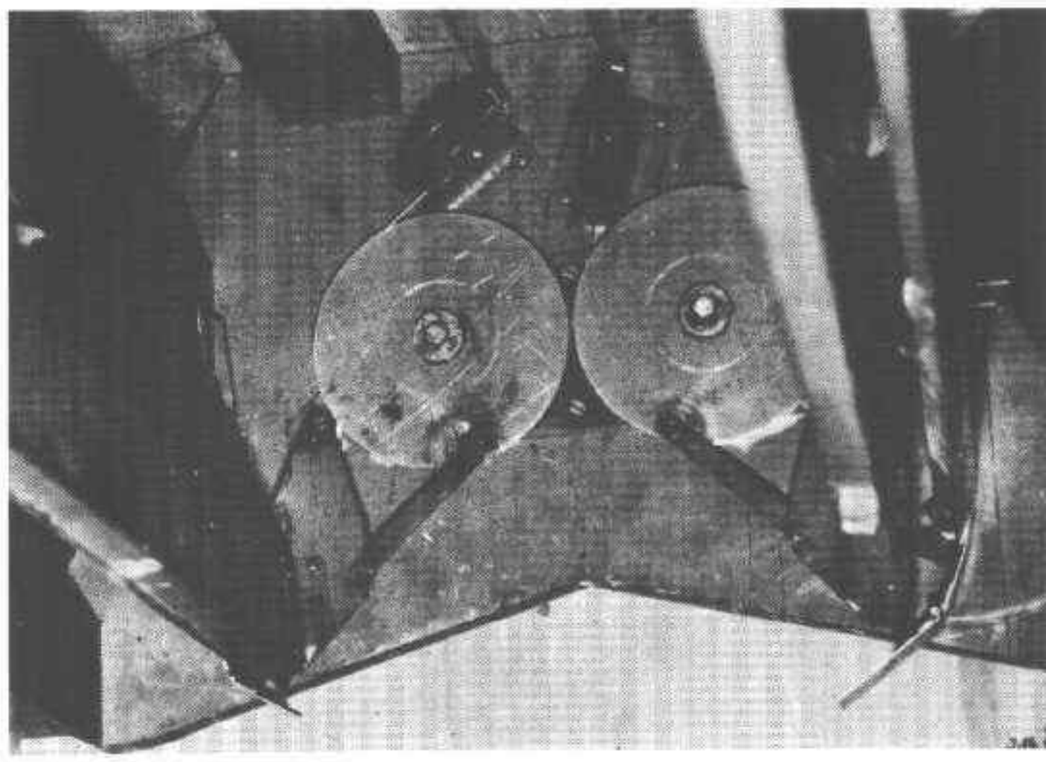


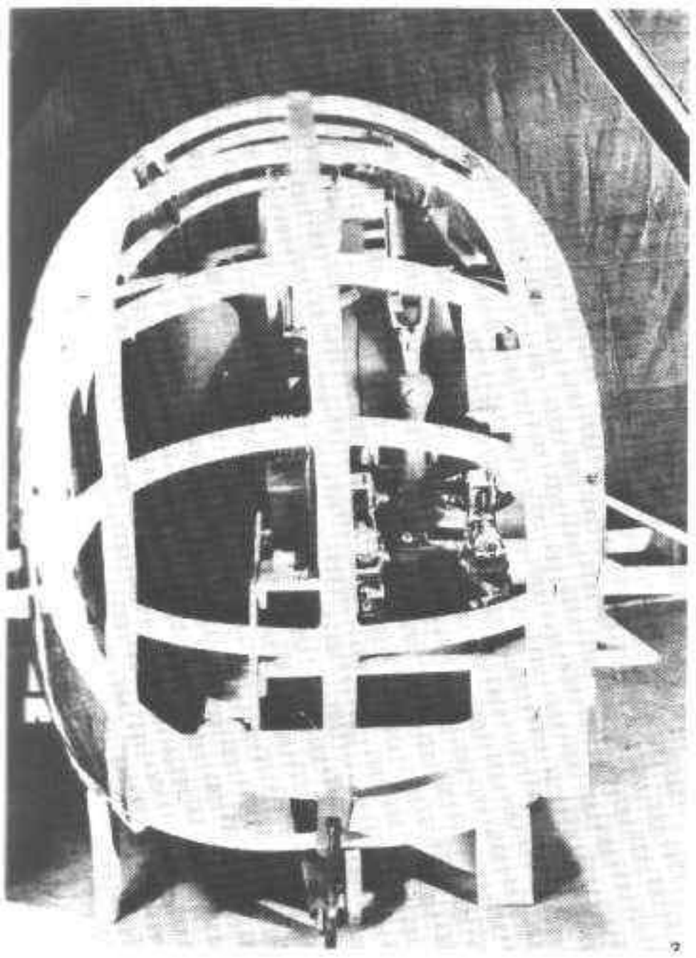


Left: Crew entry hatch in lowered position.
Right: Close-up of main gear hub assembly. Wheels had to rotate through a complex arc during retraction.

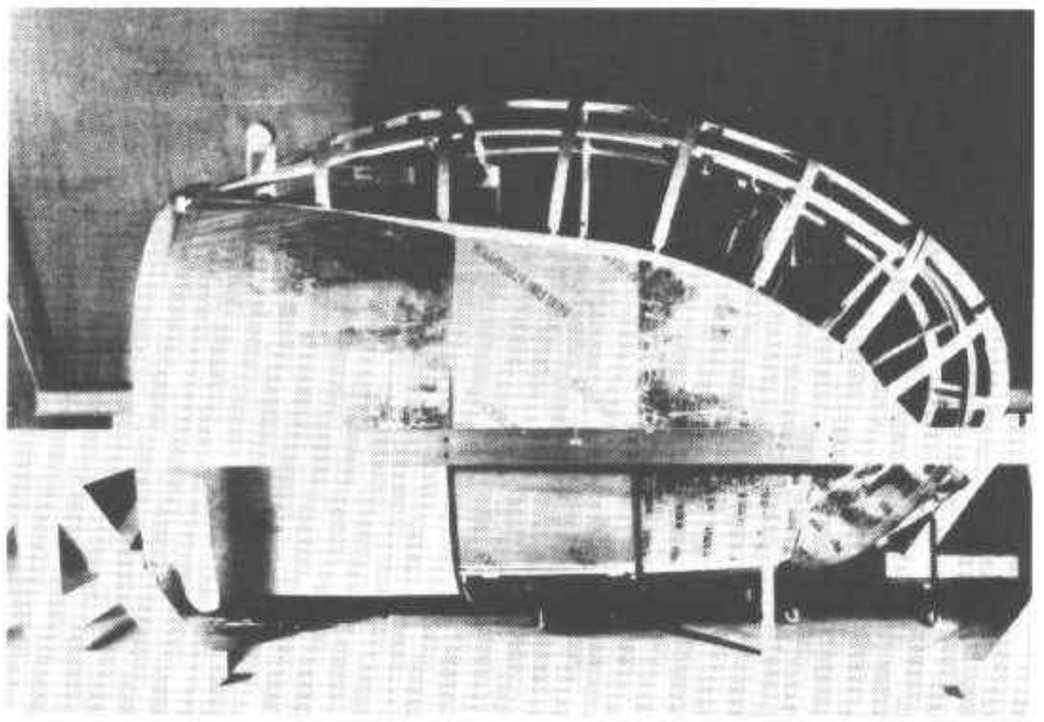


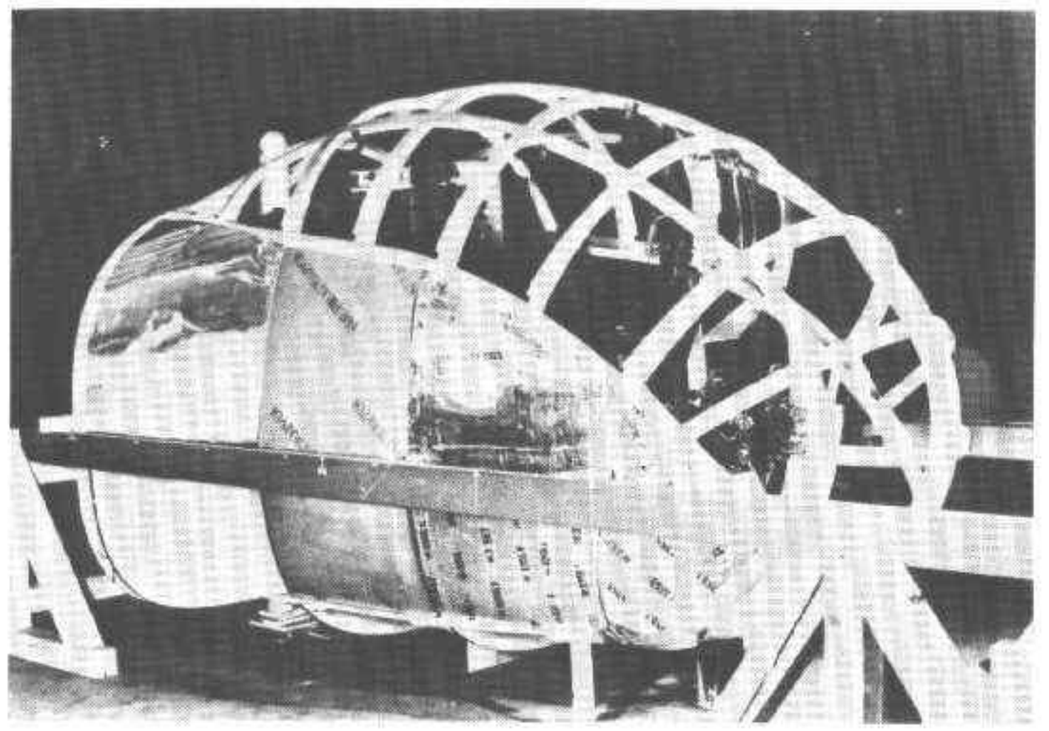
Mockup of the bomb bay area shows the method by which the doors could be opened without excessively entering the slipstream.

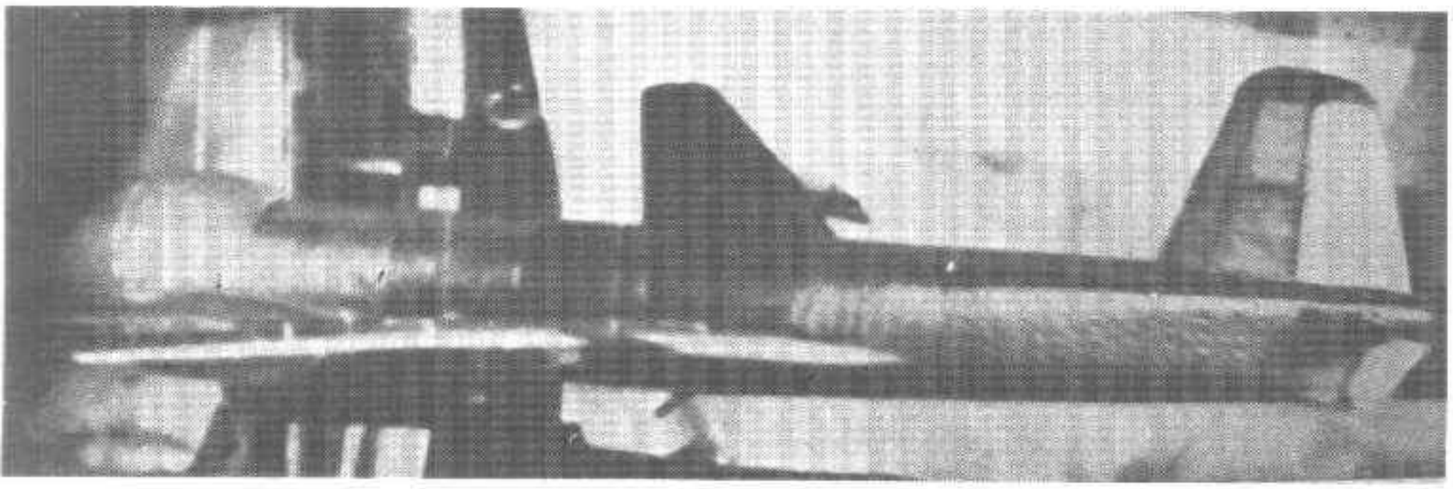




One of the preliminary cockpit mockup studies is illustrated by these three photos.

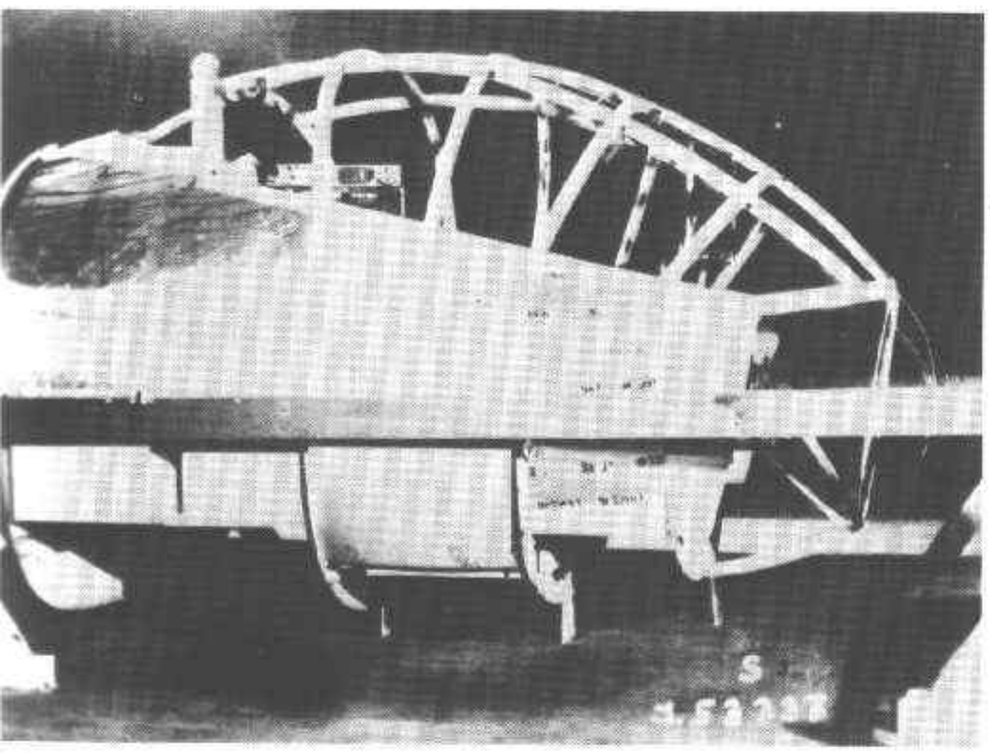


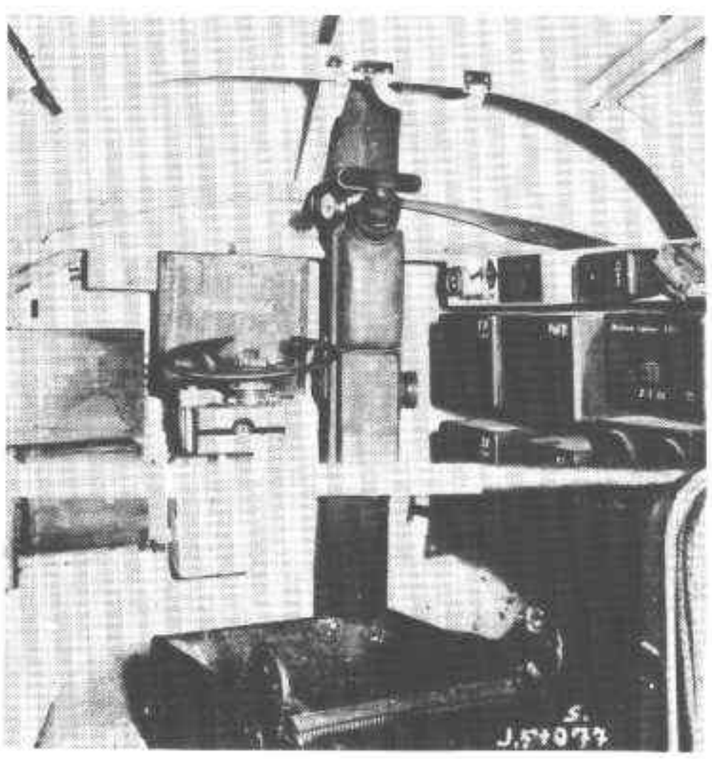


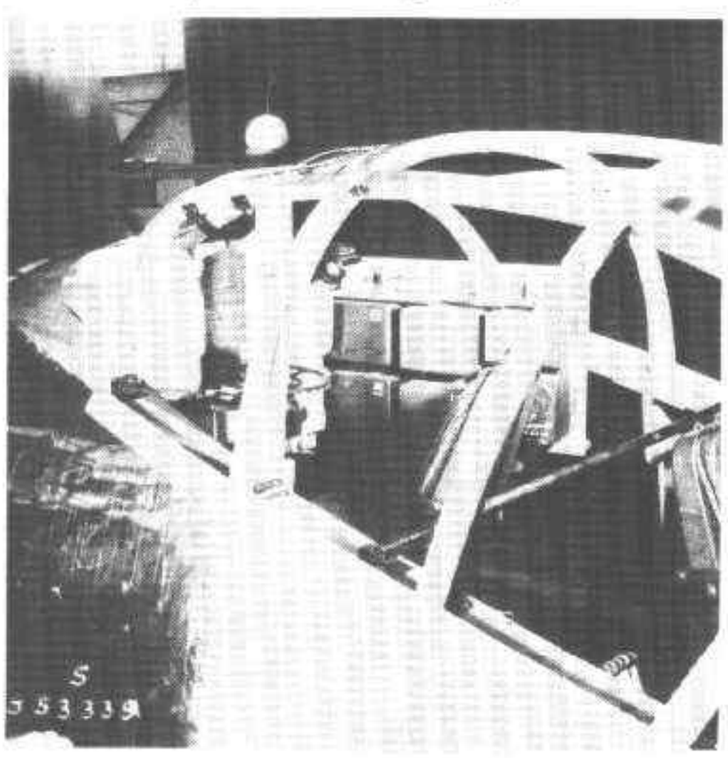


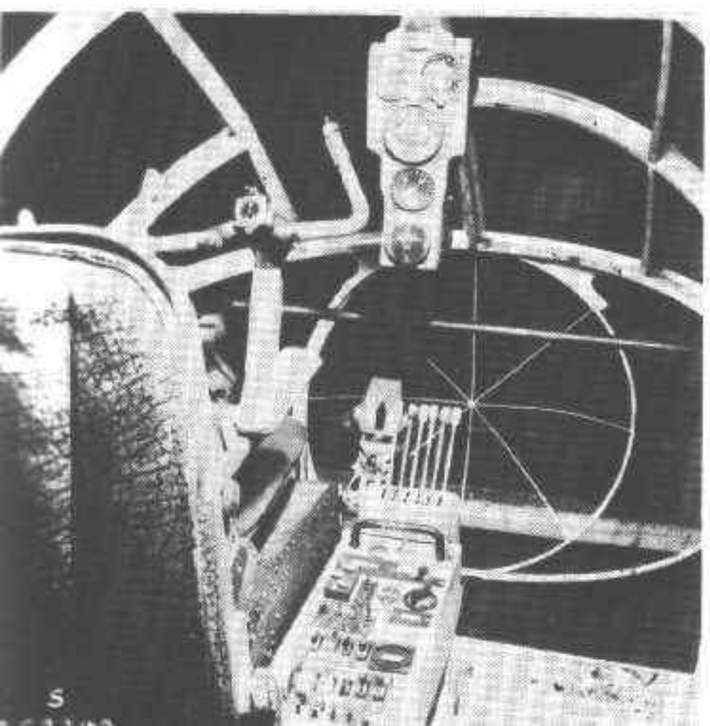
Wind tunnel model of the Ju 287 A-1.

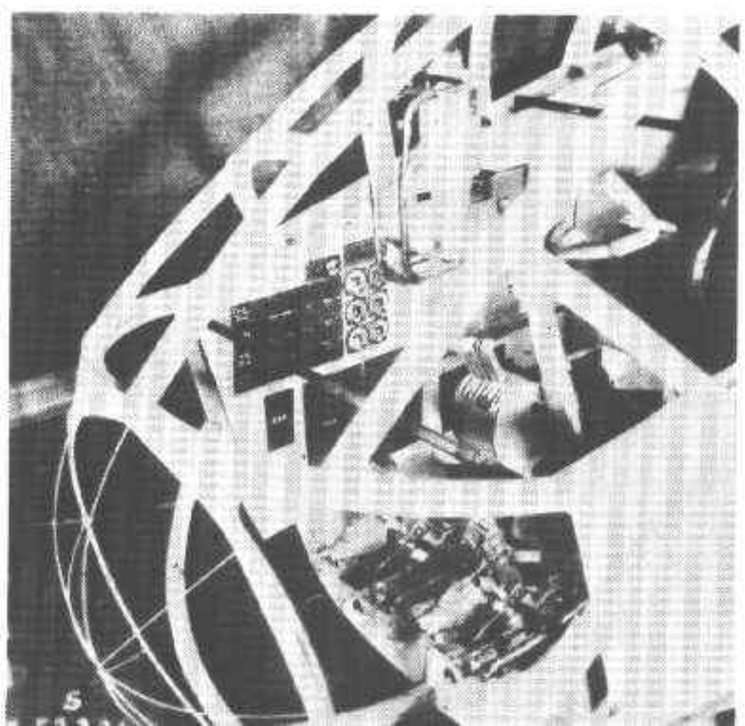
The lower six photos depict yet another variation under consideration utilizing hemispherical nose glazing.

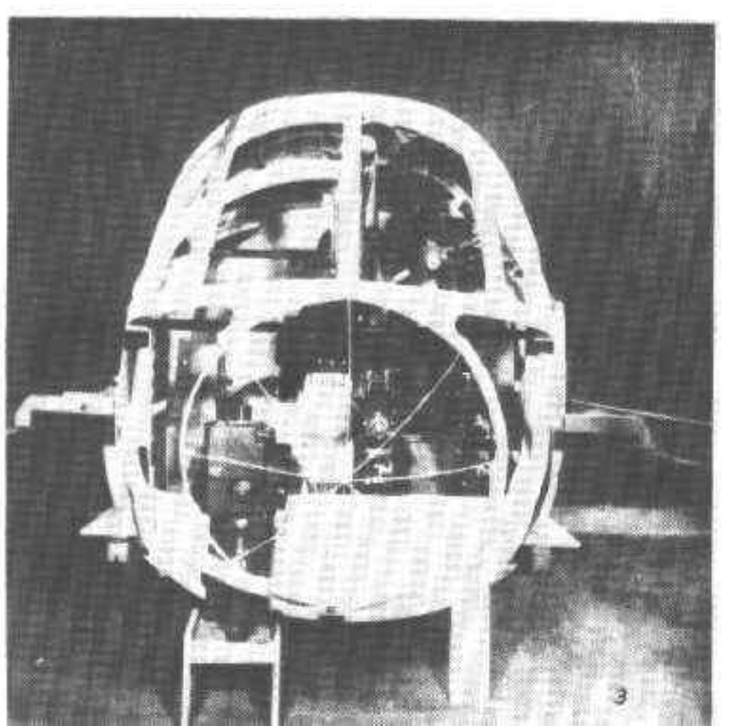








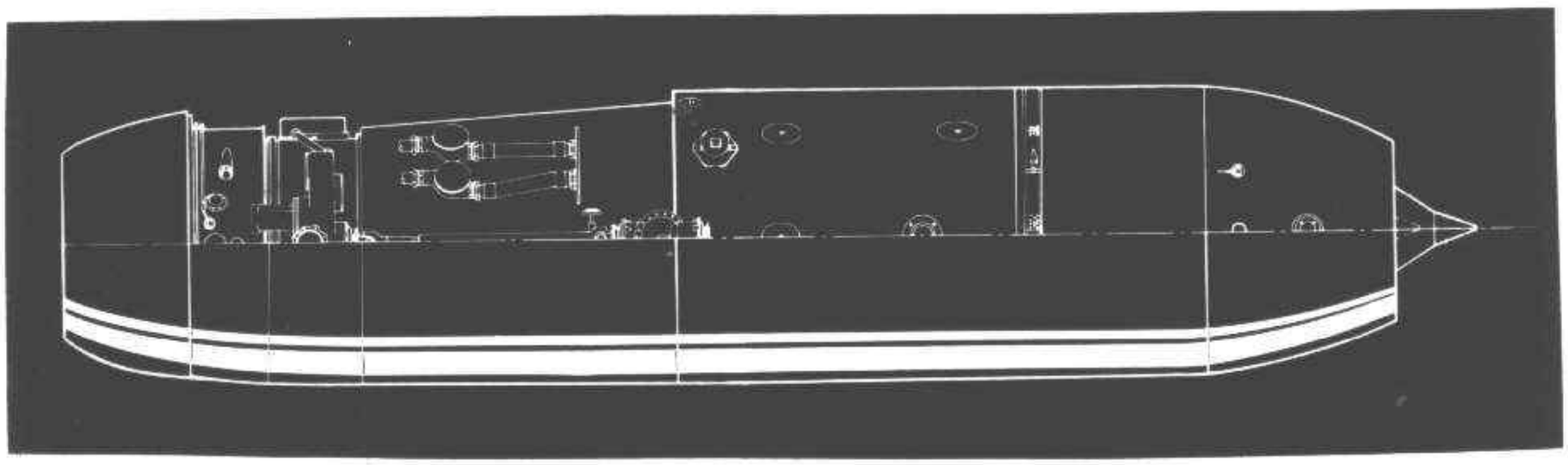




	JUNKERS Ju 287 V1		JUNKERS Ju 287 V3 (A-0/A-1)	
Span	65 ft 11 3/4 in	(20,110 mm)	65 ft 11 3/4 in	(20,110 mm)
Length	60 ft 0 1/2 in	(18,300 mm)	61 ft 0 1/4 in	(18,600 mm)
Height	17 ft 0 in	(5,100 mm)	13 ft 3 in	(3,975 mm)
Wing Area	628 sq ft	(58.3 sq m)	628 sq ft	(58.3 sq m)
Aspect Ratio	6.5:1		6.5:1	
Sweep Forward	25°		25°	
Weight Empty	27,557 lb	(12,510 kg)	26,278 lb	(11,930 kg)
Weight Loaded	44,100 lb	(20,000 kg)	47,507 lb	(21,555 kg)
Maximum Bomb Load	None carried		6,612 lb	(3,000 kg)
Armament	None carried		1 x FHL 151Z (Ferngerichtete Hecklafette)*	
Maximum Speed	347 mph at 19,685 ft	(559 km/h at 6,000 m)	533 mph at 19,685 ft	(860 km/h at 6,000 m)
Cruising Speed	318 mph at 22,695 ft	(512 km/h at 6,809 m)	493 mph at 22,960 ft	(792 km/h at 7,000 m)
Landing Speed	118 mph	(190 km/h)	114 mph	(185 km/h)
Takeoff Distance	7,550 ft	(2,265 m)	3,960 ft	(1,200 m)
Landing Roll	2,330 ft	(700 m)	2,330 ft	(700 m)
Rate of Climb	1,500 ft/min at sea level	(450 m/min)	2,887 ft/min at sea level	(880 m/min)
Time to Climb	10.5 min to 19,700 ft	(5,910 m)	10.0 min to 23,100 ft	(7,000 m)
	33.0 min to 32,800 ft	(9,840 m)		
Service Ceiling	35,425 ft	(10,800 m)	35,400 ft	(10,620 m)
Range	932 miles maximum (1,500 km)		1,180 miles with 6,612 lb bombs	(1,900 km)
			1,325 miles with 4,400 lb bombs	(2,120 km)
			2,760 miles optimum	(4,416 km)
Crew	2 - Pilot; Radio-Navigation operator		3 - Pilot; Bombardier/Navigator; Radio op./gunner	
Turbojets	4x Jumo 004 B-2 "Orkan"		6 x BMW 003 A-1 "Sturm"	

*Remotely-sighted tailmounting; Z=Zwilling/twin

PROJECTED POWERPLANTS SCHEDULED FOR THE JU 287 B-2

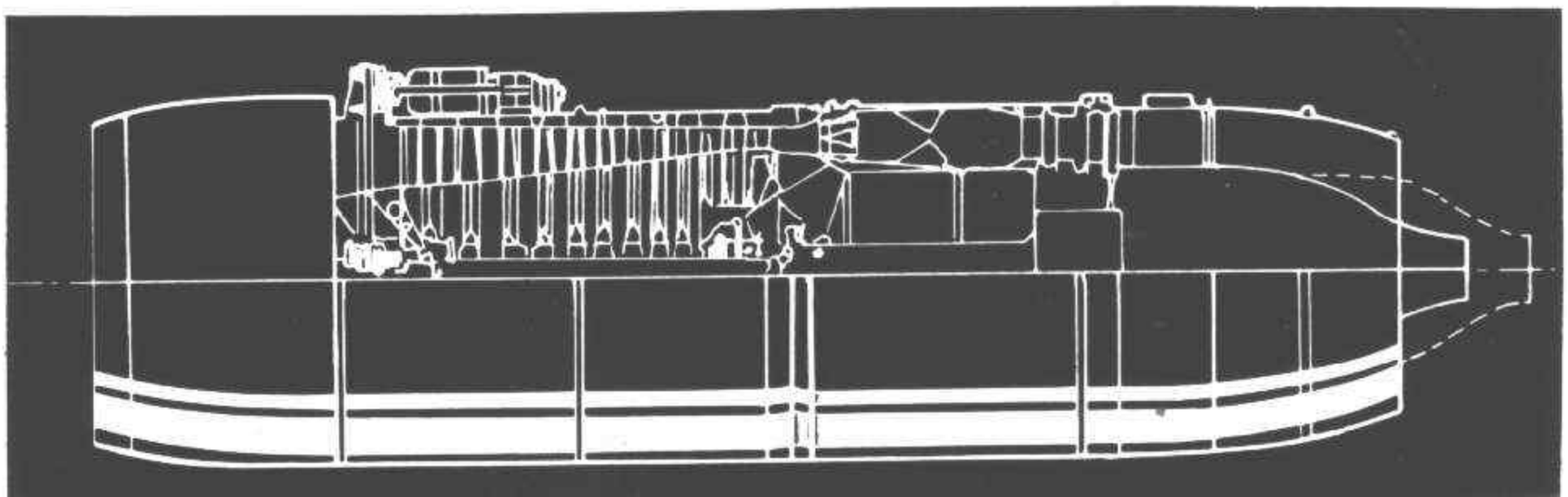


Junkers Jumo 012A *Proposed powerplant for the Ju 287 B-2 together with the BMW 018. None completed by 1945.*

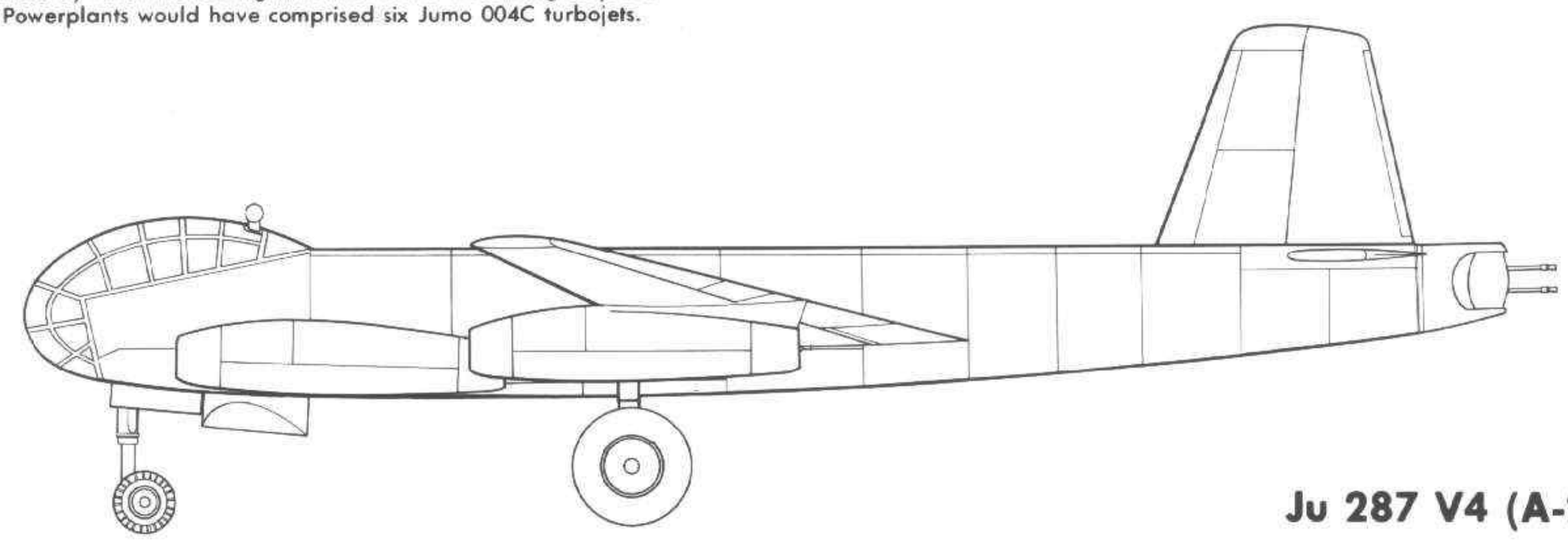
Type	*11 stage axial flow*
Static thrust	*6612 lb (3000 kp)*
Turbines	*2*
Length	*14 ft 6½ in (4330 mm)*
Diameter	*3 ft 6⅞ in (1090 mm)*
Weight	*4400 lb (1980 kg)*
Fuel	*J2 (K1 if J2 unavailable)*

BMW 018A *Proposed powerplant for the Ju 287 B-2 together with the Jumo 012. None completed by 1945. Primarily a high altitude engine.*

Type	*12 stage axial flow*
Static thrust	*7600 lb (3420 kp)*
Turbines	*3*
Length	*15 ft 7 in (4750 mm)*
Diameter	*3 ft 11 in (1200 mm)*
Weight	*4849 lb (2200 kg)*
Fuel	*J2 (K1 if J2 unavailable)*

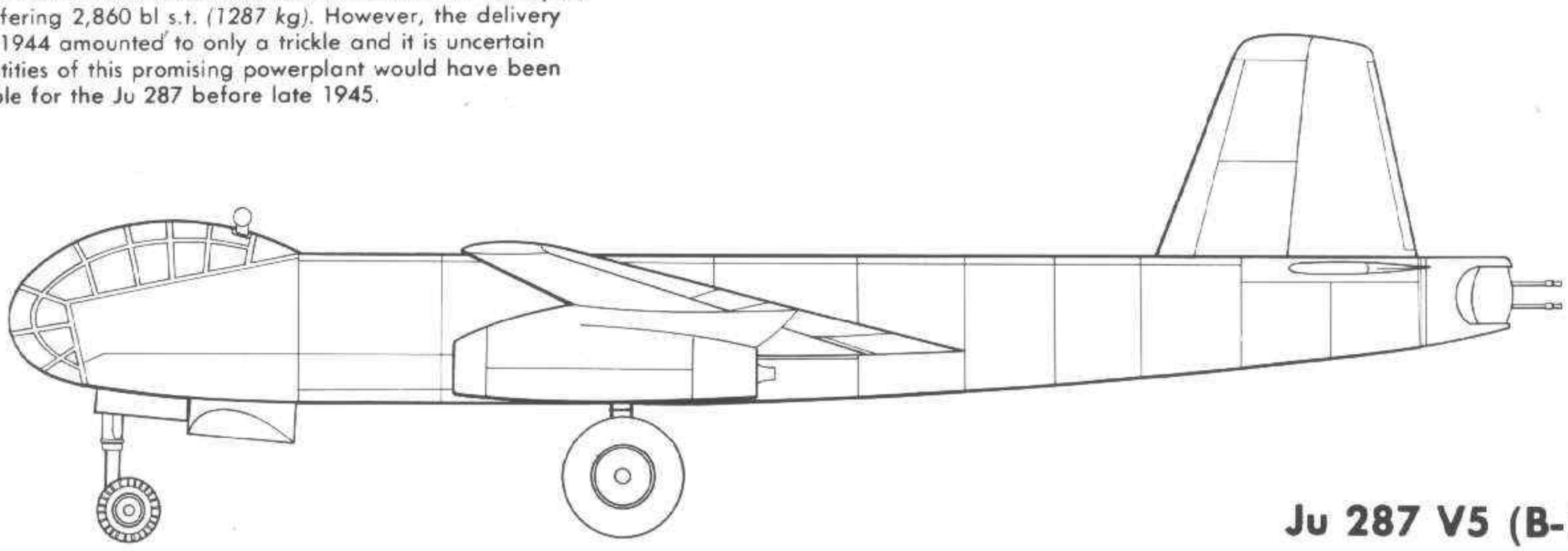


Ju 287 A-2 (V4)
Similar to the initial production model, this series was to have been assembled by ATG. Merseburg with the Ju 287 V4 serving as prototype. Powerplants would have comprised six Jumo 004C turbojets.



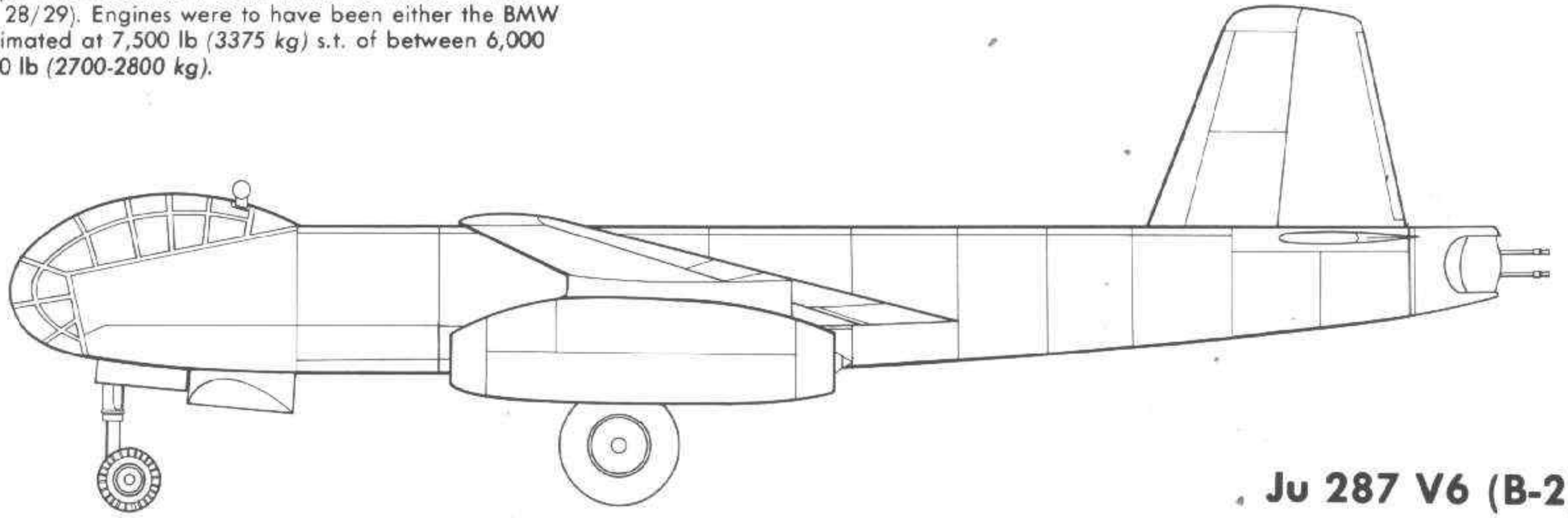
Ju 287 V4 (A-2)

Ju 287 B-1 (V5)
This series was identical to the A-series apart from the planned installation of four Heinkel-Hirth S 011 A-1 turbojets, each offering 2,860 bl s.t. *(1287 kg)*. However, the delivery in mid 1944 amounted to only a trickle and it is uncertain if quantities of this promising powerplant would have been available for the Ju 287 before late 1945.



Ju 287 V5 (B-1)

Ju 287 B-2 (V6)
The B-2 series was the final planned production model of the Ju 287 for which the Ju 287 V6 was scheduled as prototype and would have been similar to the Ju EF 125 (see p. 28/29). Engines were to have been either the BMW 018 estimated at 7,500 lb *(3375 kg)* s.t. of between 6,000 to 6,400 lb *(2700-2800 kg)*.



Ju 287 V6 (B-2)

Without doubt, development of the Ju 287 hinged on the availability of suitable engines. In this respect a letter written by Herr Prof. Hertel on July 21, 1944, reveals the realities of the situation.

During the discussions in Dessau on June 17, 1944, you raised the question why IFA had abstained from equipping the Ju 287 with Jumo engines and also whether the installation of Jumo engines would be possible at all.

May I give the following explanations:
1. The Ju 287 project was planned originally with the Jumo 004C. The 004C was supposed to have a takeoff thrust of 1200 kg and a continuous thrust equivalent to 1000 kg ground (sea level) thrust. At the time when delivery of the first production Ju 287 is supposed to begin, only the 004B engine will be available due to the delays in the development of the 004C engine. This has: 900 kg takeoff and combat thrust and a cruising thrust equivalent to 720 kg sea level thrust. We thus faced the new situation to work with only 72% continuous and 75% takeoff thrust as compared to the original project. Moreover, I was informed that it would be impossible to increase the production of Jumo 004B's, since further increase of the originally rather high production figure for Me 262 and Ar 234 are impossible. A final consideration, the conversion from the 004B to the 004C should initially benefit the fighters and destroyers, since principally the newest and most powerful engine would, by preference, be fitted to these aircraft.

Therefore, despite the advanced development work on the 004C we have had to postpone this project. This was done in agreement with RLM authorities.

2. When the difficulties in the realization of the jet bomber specification employing the Jumo 004 began, RLM suggested equipping with the HeS 011 and the project was thus redesigned on RLM request.

After various technical discussions with the Heinkel-Hirth Works and with the RLM branch involved, we could not share in the hopes of the manufacturers of this turbojet. In particular, it evolved during one of the meetings arranged by you at Zuffenhausen that, amongst others, realization of the Jet Bomber 1945 powered by Heinkel engines would not be possible since the engine would not be ready for operational use and series production.

3. When it developed that engines of the projected performance of the 004C and HeS 011 would not be made available, it was decided to project a version of 6 engines. In this respect, the chances of using Jumo and BMW-TL's *TL=Turbo-Lader/turbojet* was discussed. The Jumo engine was objected to on the same grounds as for the 4-engined version, namely that production was utilized mainly for the fighter-destroyer section and a production increase found impossible, while the RLM pointed out that an increase at BMW would be possible. Moreover, we always had in mind to convert the project from an initial 6-engined version to 4 engines if and when more powerful engines would appear. We were, therefore, obliged to keep the aircraft as light as possible and therefore to equip the converted version with the lightest available TL engines. The fact that the BMW turbojet was repeatedly confirmed as being able to be run at a continuous power of 800 kg thrust while the Jumo 004B offered 720 kg only, also favored the BMW engine. This 10% reduced output went together with o weight difference of 20% more, so that preference was given to the BMW powered version, not only performance wise, but also in view of a later 4-engined version.

Moreover, we were convinced slowly that—in comparison with the original RLM version and our own design—takeoff assistance equipment as planned would meet with considerable difficulties, particularly in raw materials. Thus, the emphasis was on a light aircraft able to take off with little or no special equipment. This can be realized if the BMW turbojet can be run at 900 kg takeoff power for 1.5 minutes. Test runs at BMW made this almost certain and design work was started on that basis.

4. Points 1 to 3 above show that urgent technical reasons led to the BMW powered version. However, it is possible to equip the aircraft with the more powerful Jumo engines without much redesign for a new subseries. After our latest research, we believe that with the increased power requirements, it will then be correct to equip this version with 6 Jumo 004C's. Few details have been made available by our engine works regarding the output of this version, since the factories are fully occupied with the 004B production. According to your statements on June 17, 1944, 1100 kg thrust are estimated after conversions. After a discussion between the Ju 287 design team and that of the 004 turbojet, a combat power of 1000 kg, continuous power of 800 kg and maximum takeoff power with additional injection of 1100 kg which is under development, is now estimated. Looking ahead, it is correct to stay with the 6-engined version on the basis of the Jumo turbojet. We are now working on design conversion and shall submit this soon.

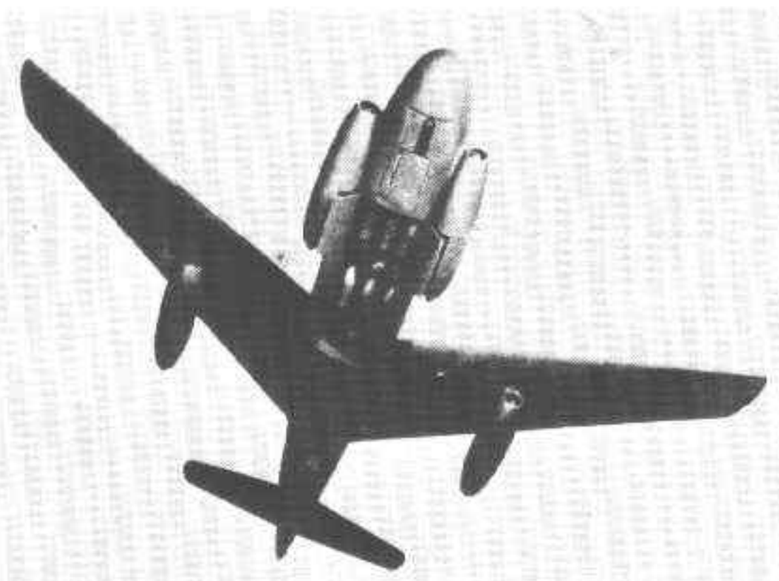
5. When assessing the operational use of TL's, particular attention should be paid to the fact that it is of prime importance for a jet bomber to be able to cruise at maximum altitude during the whole flight and that any reduction of cruising power will influence the average altitude and range. The performance figures given by BMW for the series version of the 003 turbojet can be taken as particularly favorable, while the Jumo's, being designed for higher combat power but possessing a lower cruising power in relation to their weight, would be rather more suitable for fighters/destroyers than for the tasks of a long range aircraft.

I hope to have shown in the above explanations, which not only should have clarified the design evolvement leading to the present stage of Ju 287, but also make the appropriate deductions from this, that it is correct to continue with the 6-engined BMW version of the Ju 287.

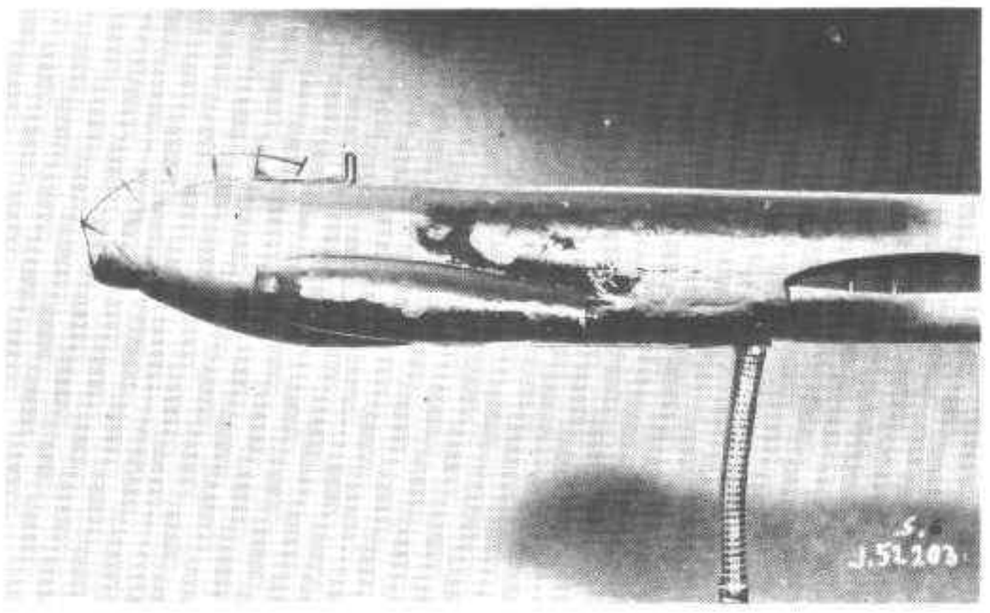
I must stress again, however, that BMW's full cooperation is absolutely needed and BMW should make all efforts to finalize the operational turbojet. As to the operational use of the turbojet in the Ju 287, we feel that there is no reason for concern, since the BMW 003 will already be operational in the Ar 234 before Ju 287 production begins and must thus have been combat proven for the Ju 287.

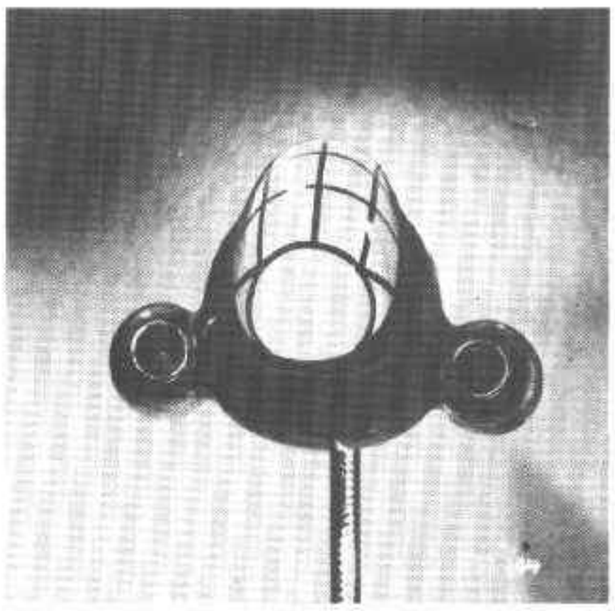
I would greatly appreciate if you could check my explanations and advise me if you should find any mistakes or errors. I would also be grateful if these remarks would be shown by you to the gentlemen competents and those interested in the development of Ju 287. I have in mind particularly Gen. Fieldmarshal Milch, Hauptdienstleiter Saur, Gen. Vorwald, Cols. Diesing and Petersen. I would be especially pleased if the result of this renewed discussion of the problem of the operational use of TL-engines would lead to a new and final settlement of the question, which would then enable us to work unhindered along the whole line.
With best regards . . .

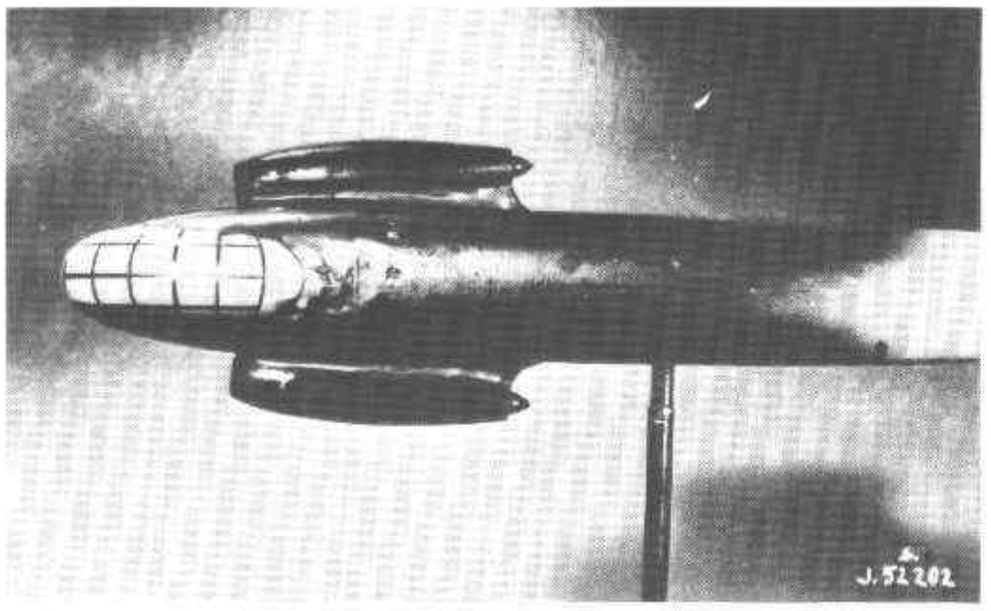
Prof. Hertel



One of the interesting project developments of the Ju 287 is represented by the three photographs to the right. Although data on this particular version is completely lacking, several features are worth a second look. Apart from the two forward jet engines and a shallowness to the rear fuselage, one is struck by the similarity to the proposed Junkers Ju 488 A-1. It is possible that consideration was given toward employment of the Ju 488 as a jet bomber. In this eventuality such a project undoubtedly would have enjoyed great range thanks to the considerably enlarged fuselage.



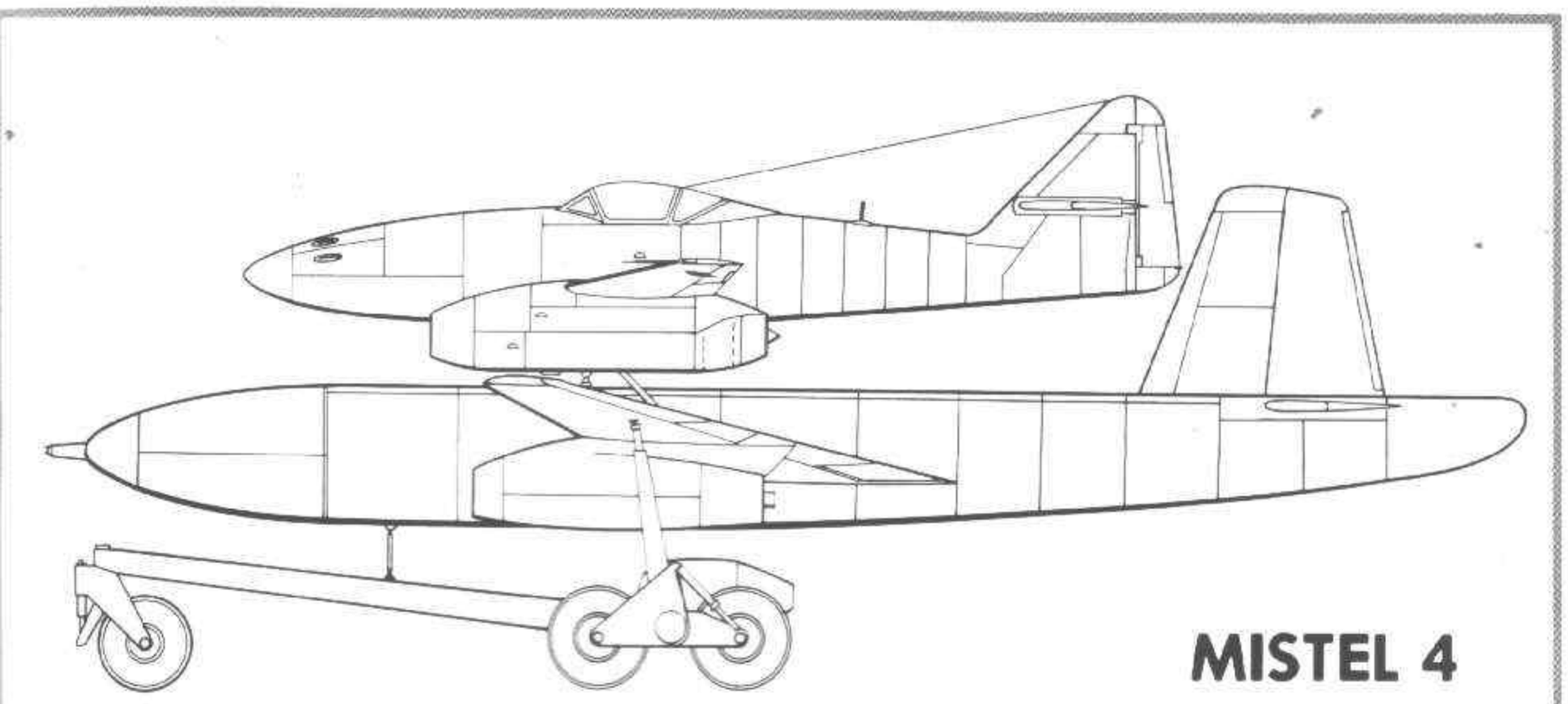




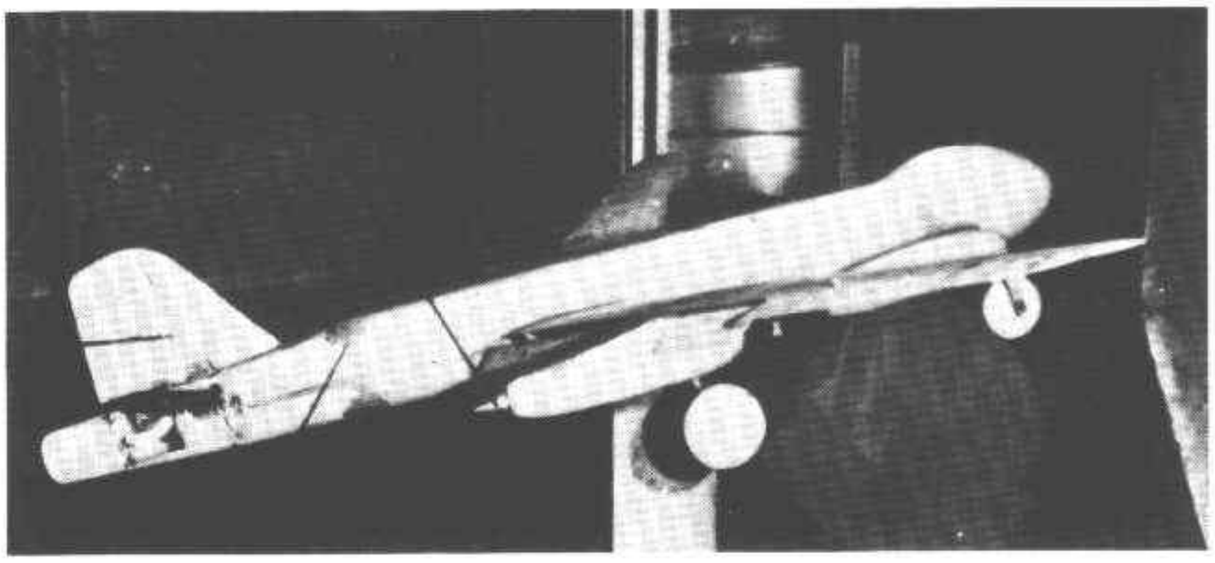
Me 262 A-2a, *Werk Nr. 111759 ("Ohio" port, "Missouri" starboard) found abandoned between Munich and Rosenheim, April 1945.*

An unusual derivation of the Ju 287 was known as **Mistel 4** *(Misteltoe 4). It was conceived late in 1944 as a means of hitting well-fortified prime targets where conventional bombardment would have proven impractical.*

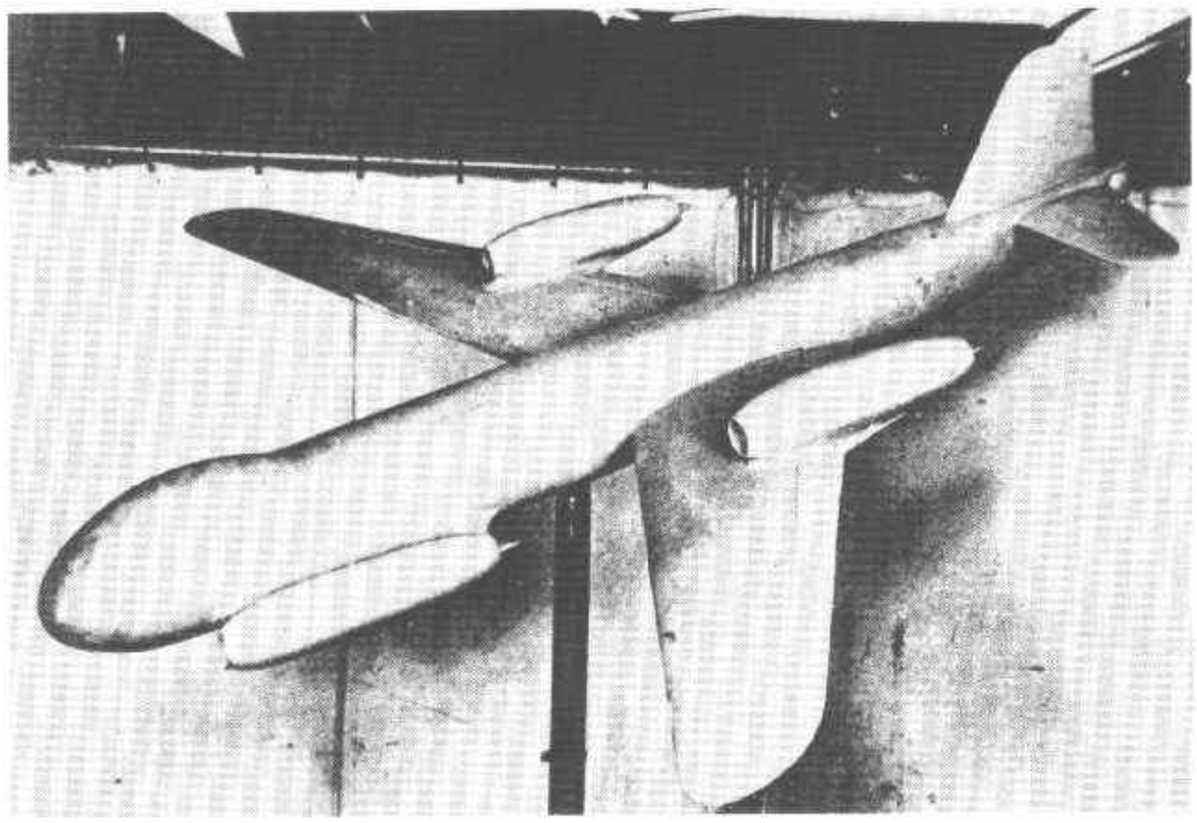
The Mistel 4 was but one of several similar projects employing a standard fighter aircraft mounted above a modified bomber type. Here it was proposed to replace the entire forward fuselage of a standard Ju 287 B-1 with a so-called Hollow Charge warhead. This unusual warhead had an enormous penetrating capability far exceeding conventional HE ordinance. Additionally all armament and landing gear systems were dispensed with. The upper component was to have comprised a single seat Me 262A jet fighter. Takeoff was effected by means of a five wheel dolly with all engines of the Mistel 4 composite operating. Four auxiliary HWK 501 RATO units mounted on the dolly were intended to reduce takeoff distance by one-third. Upon separation the Me 262 pilot was free to operate in the fighter role. By 1945 the use of such weapons had become purely academic and development of the Mistel 4 ceased.



MISTEL 4

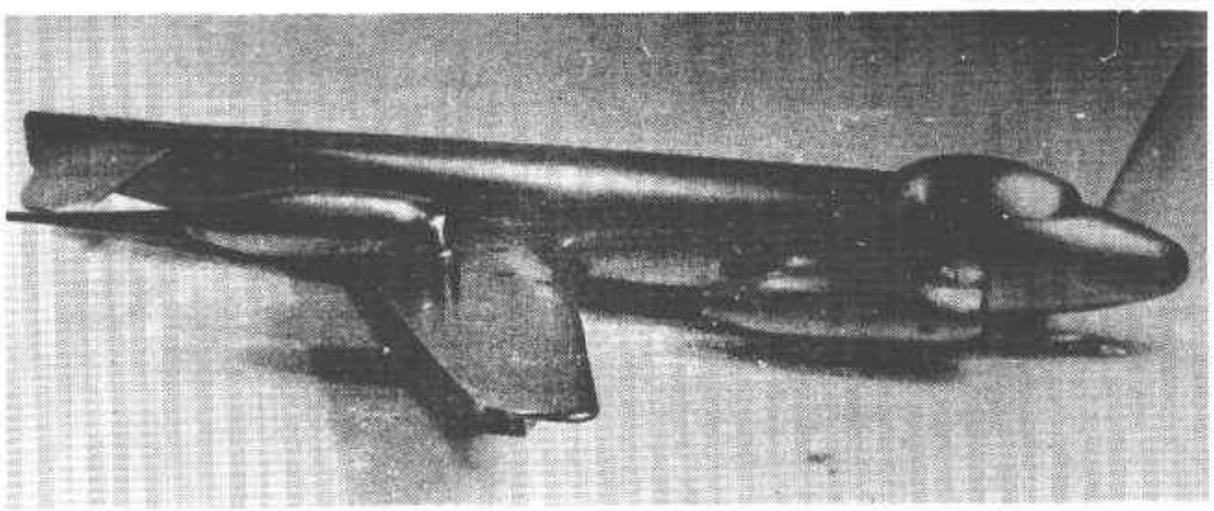


During the development of the Ju 287, several Junkers design projects were researched extensively to determine the most efficient layout. Numerous scale models were evaluated in wind tunnel experiments designed to study the most favorable position for engines and control surfaces. Essentially the Ju EF 122 was similar to the proposed Ju 287 B-1 series apart from a subtle redesign of the rear fuselage encompassing a broken back appearance. Four turbojets of unspecified make were projected with unique landing brake slats designed around the circumferences. To be extended upon landing, they were designed to reduce the landing roll. Although the EF 122 would have probably been restricted to transsonic speeds, a variety of tail units were evaluated with and without swept surfaces (See p. 4.) in an effort to establish critical elevator control over all speed ranges. The above photo illustrates a model participating in tests early in 1944.

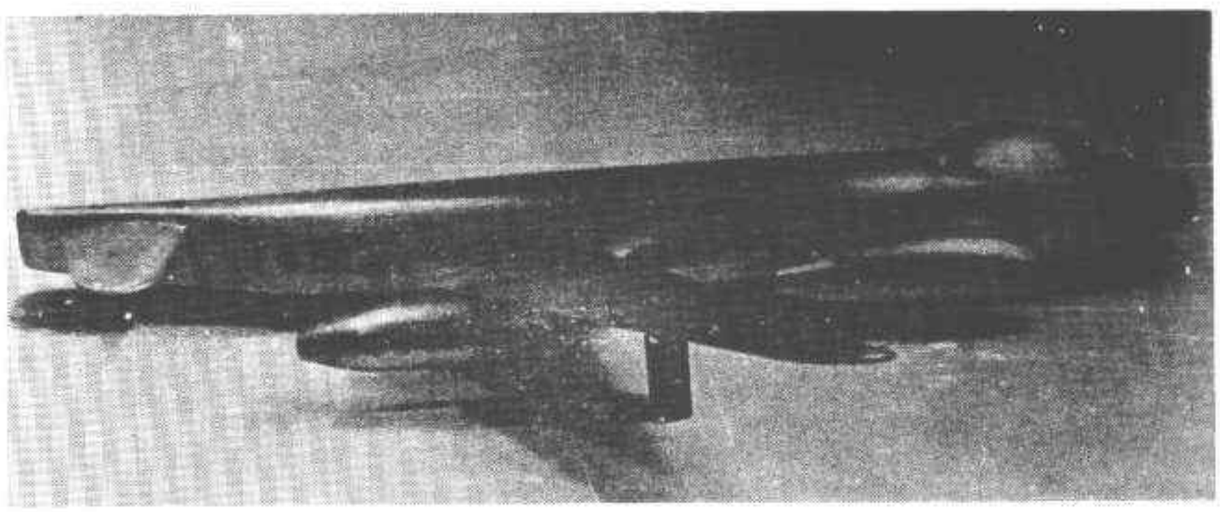


Placement of the wing engines was thoroughly integrated in an effort to resolve the aeroelasticity/mass balance problem common to the forward swept wings. In the variation shown above, it is unclear how exhaust turbulence would have affected elevator control, but such obvious consideration to this and other factors were not unresolved.

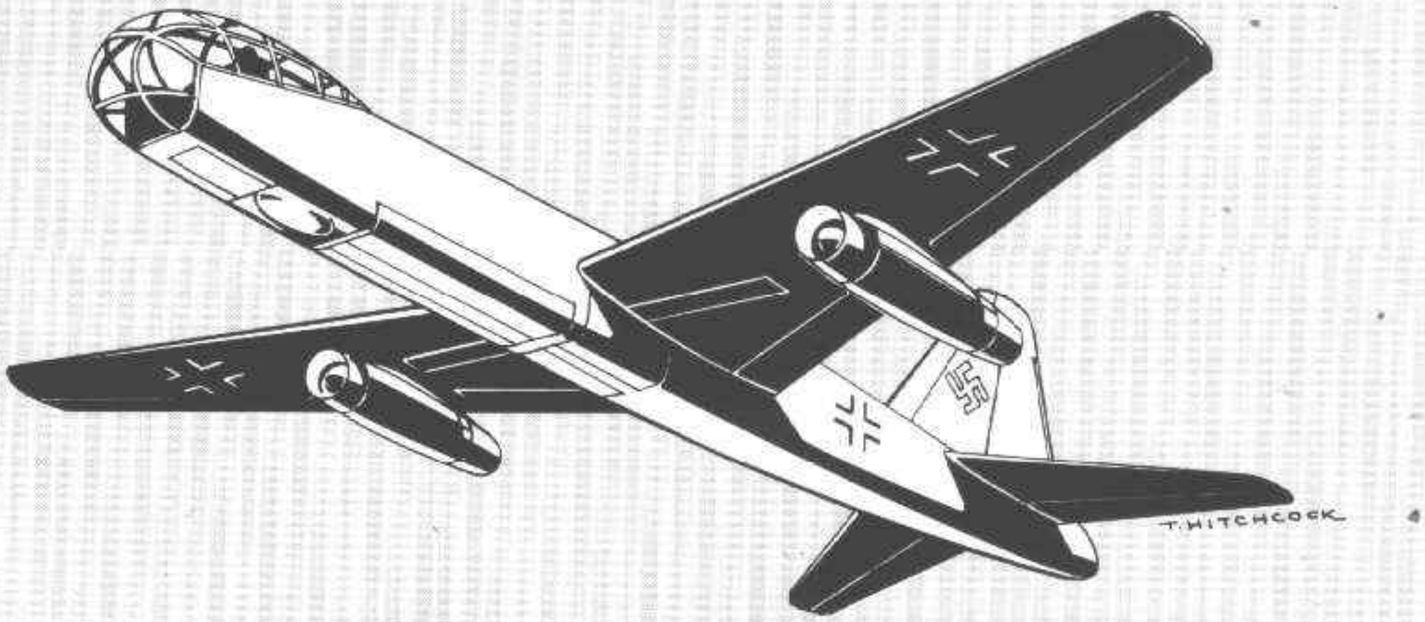
JUNKERS ENTWICKLUNGS FLUGZEUG EF 122, EF 125, EF 131, EF 132



Another derivation of the EF 122 investigated during the early months of 1944 featured a redesigned cockpit with a solid nose intended to house the latest electronics. In other respects this modification appears similar to the EF 122/II.

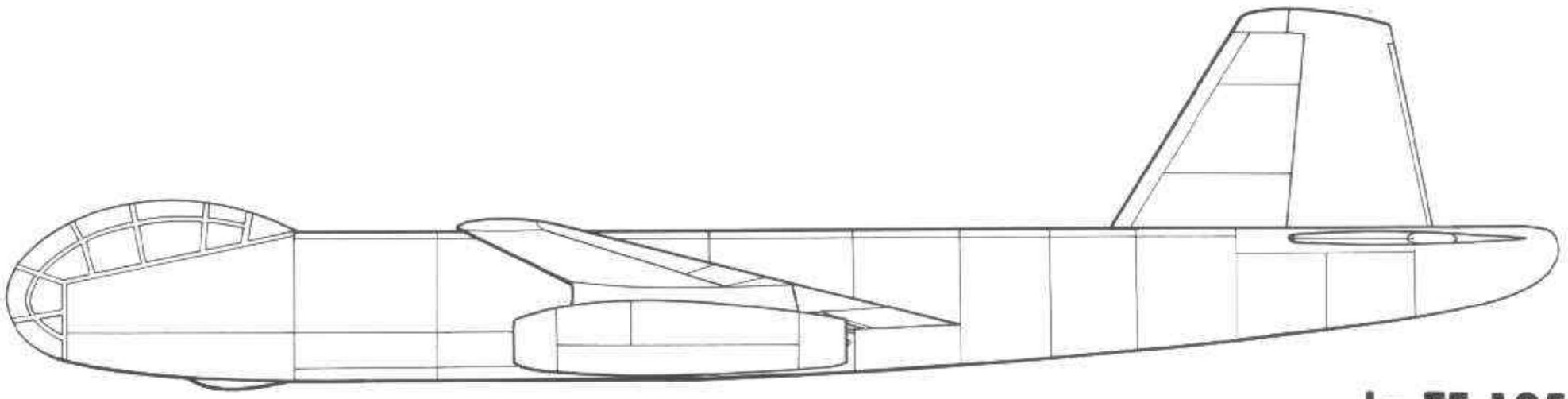


Again the wing engines were moved. Studies were made with fore, aft and midway positioning to determine the most satisfactory underwing position relative to the leading edge of the wing. Curiously no information can be found regarding the Ju EF 123, EF 124 or EF 129 projects.



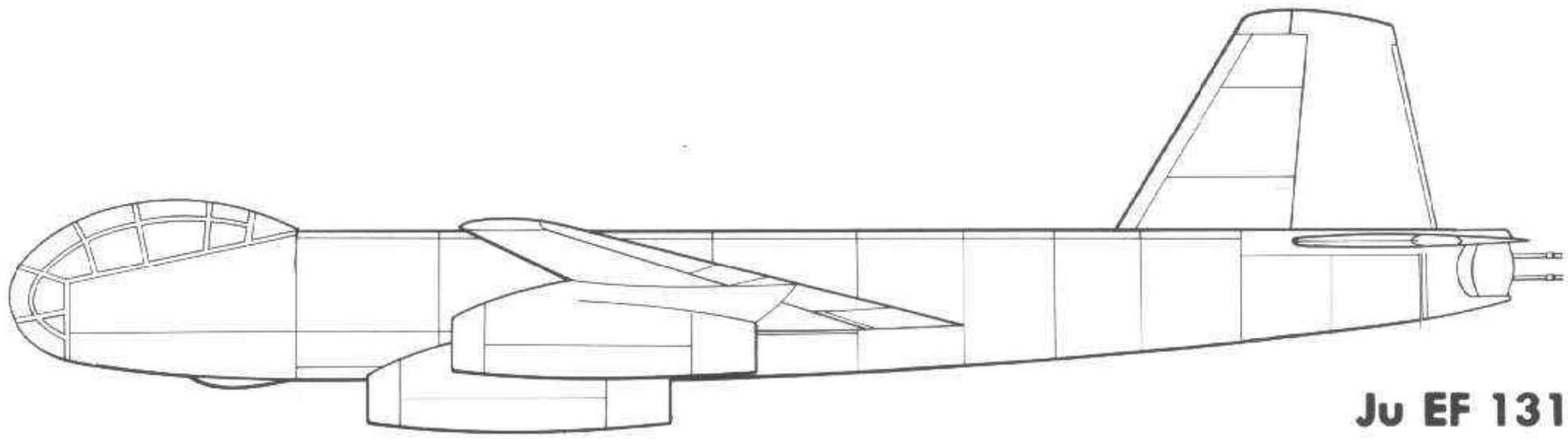
Ju EF 125

Ju EF 125 *project was to employ two Jumo 012 or BMW 018 turbojets. Construction was to have been carried out by DFS under the designation Ju 287 B-2 (V6). See p. 25.*



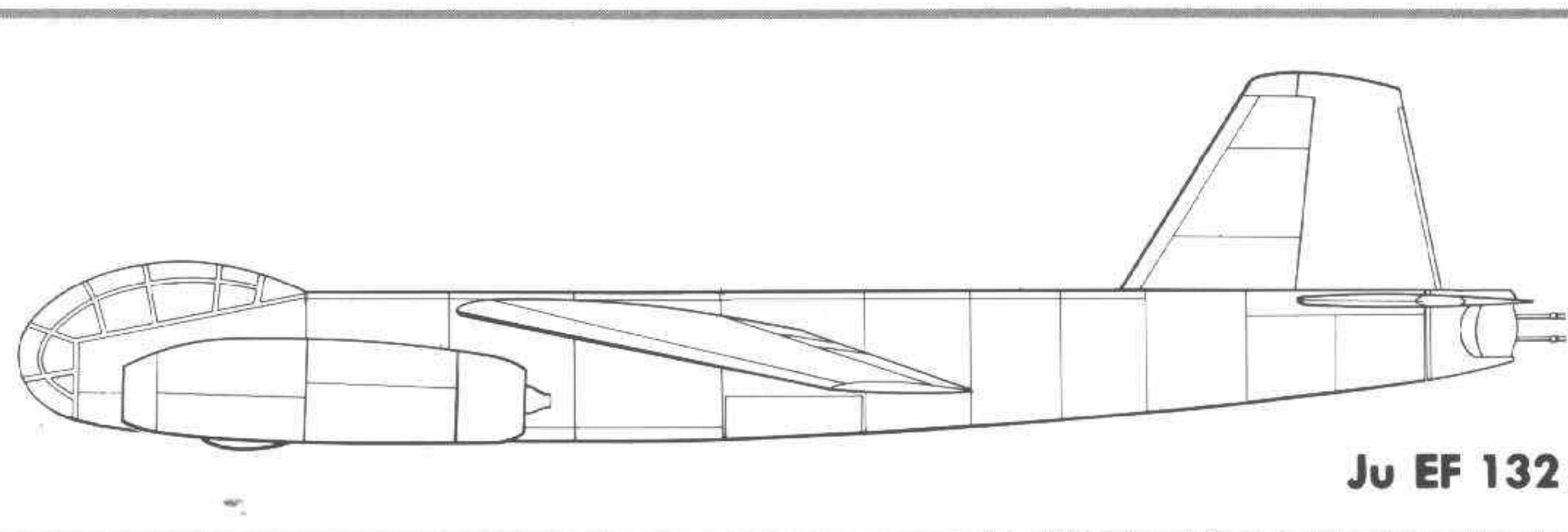
Ju EF 125

Ju EF 131 *project was assigned to the Ju 287 V2 program. Powerplants were six BMW 003A's. Rear armament was given as 2 x MG 151/20's mounted in a FHL 151/Z mount. See p. 19.*



Ju EF 131

Ju EF 132 *project discarded the forward swept wings in favor of the more conventional swept-back configuration. Additionally the horizontal tail surfaces also were swept back. This project was intended as a supersonic high altitude bomber to be powered by two advanced turbojets.*



Ju EF 132

SOVIET DEVELOPMENT

German wartime technology was not lost on the Soviets. Soon after occupation of the eastern zone by Soviet forces during July 1945, representatives of the Soviet Air Technical Intelligence arrived at Leipzig-Mockau and Dessau for inspection of all captured research projects. Key Junkers officials as well as Dipl. Ing. Baade, Ing. Wocke and Dr. Scheibe were closely scrutinized. The Russian objective required the enlistment of German personnel to continue research and development of all promising weapons for eventual Soviet use. To that end the Junkers group was offered continued employment in the Junkers Dessau factory at current wages if they would agree to Soviet stipulations. The Soviets knew that talented engineers and technicians would be invaluable to their pressing military needs. It should be stressed, however, that the Western Allies were thinking along similar lines when "Operation Paperclip" was engaged during the latter half of 1945. Over two hundred personnel were brought to the U.S.A. during this operation including no less a personage than Dr. Werner von Braun.

Soon after Soviet occupation of the Dessau factory, rebuilding of the offices and workshops was initiated and in a few weeks development of the Ju 287 was resumed. Manufacture and assembly of two prototypes recommenced. One aircraft was assigned for flight testing while the other prototype was intended for static and load tests. Completed in Dessau in 1946, the Ju 287 V2 was engaged in a short test program carried out by Junkers test pilot Flugkapitän Jülge. Soviet authorities then notified the Junkers team of the intention to carry out a complete flight test program in the Soviet Union. Flying the Ju 287 V2 to its destination in the USSR was considered. However, this was abandoned and the partly disassembled airframe was transported by land to Ramenskoje near Moscow. In September 1946 a team of German flight test personnel, who were allegedly only to stay for the period of flight testing, were sent to the Soviet Union. Dipl. Ing. Wocke notes, "We saw them again after our deportation, on our arrival in Dimitrow, the railway station of what was later to be our place of work, Podberesje."[5]

[5]At 5 A.M. on the morning of October 22, 1946, personnel from both the airframe and engine plants were taken for deportation. Personnel from the airframe plane were transported to Podberesje, and those from the engine plant to Kuibyshew. As far as the Junkers development team was concerned, there was no further activity at Brandis near Leipzig.

Toward the end of 1946 the Junkers team was assigned the task of building the plant in Podberesje located north of Moscow near Kimry. Workshops, drafting rooms, machinery, and all support facilities were dismantled and rebuilt as they had stood in Dessau. Secrecy was such that Junkers personnel were not informed as to the destination of the relocation transport. Complete engines, spare parts, manufacturing jigs, completed airframes, drawings and documents were shipped East.

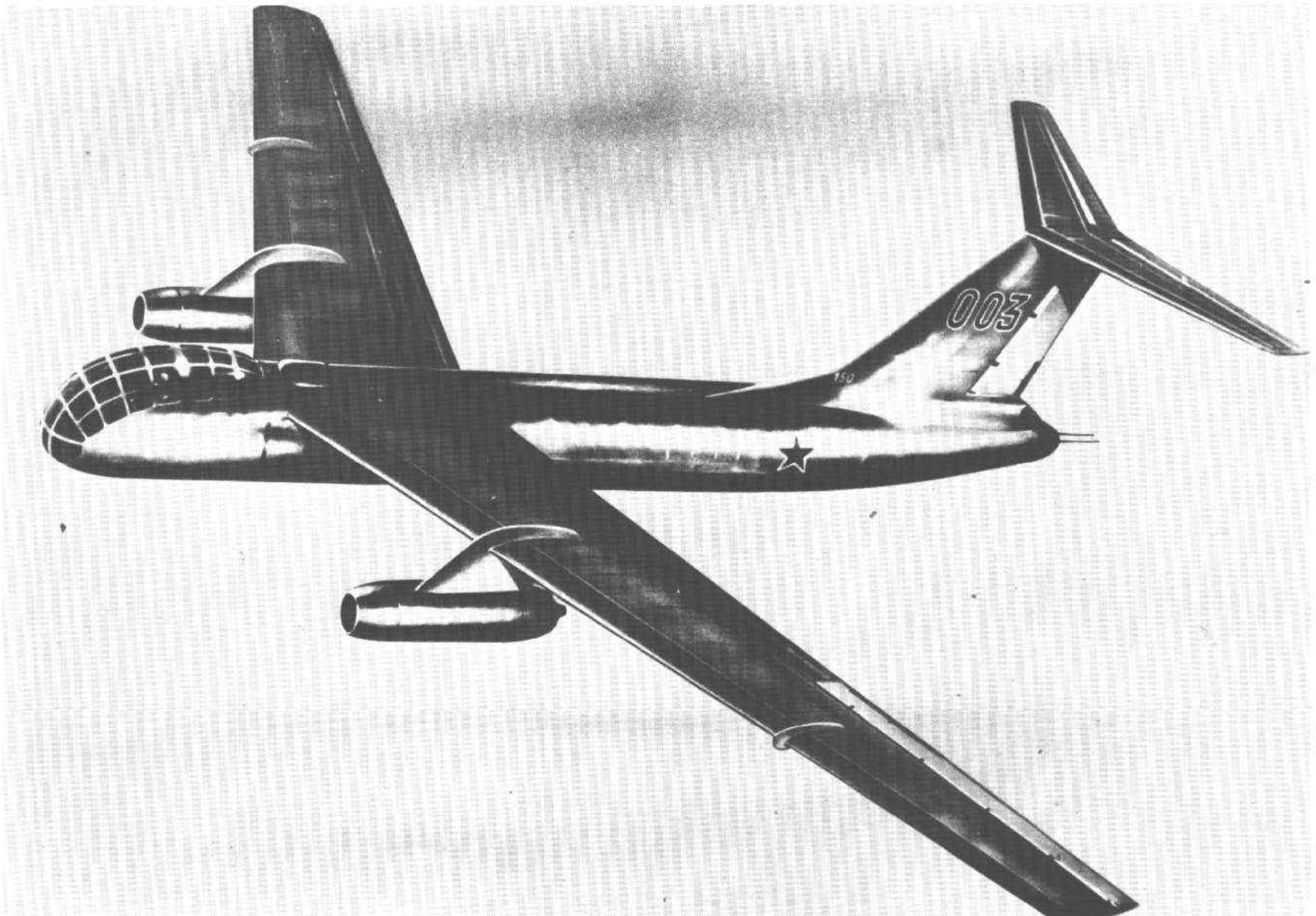
During the next four months the Ju 287 V2 had flown more than two hundred hours from Ramenskoje mainly as a test vehicle for airframe and engines. Both BMW 003's and Jumo 004's were evaluated with complete success. Ultimately it was withdrawn and presumably retired from the aviation scene in 1948-1949.

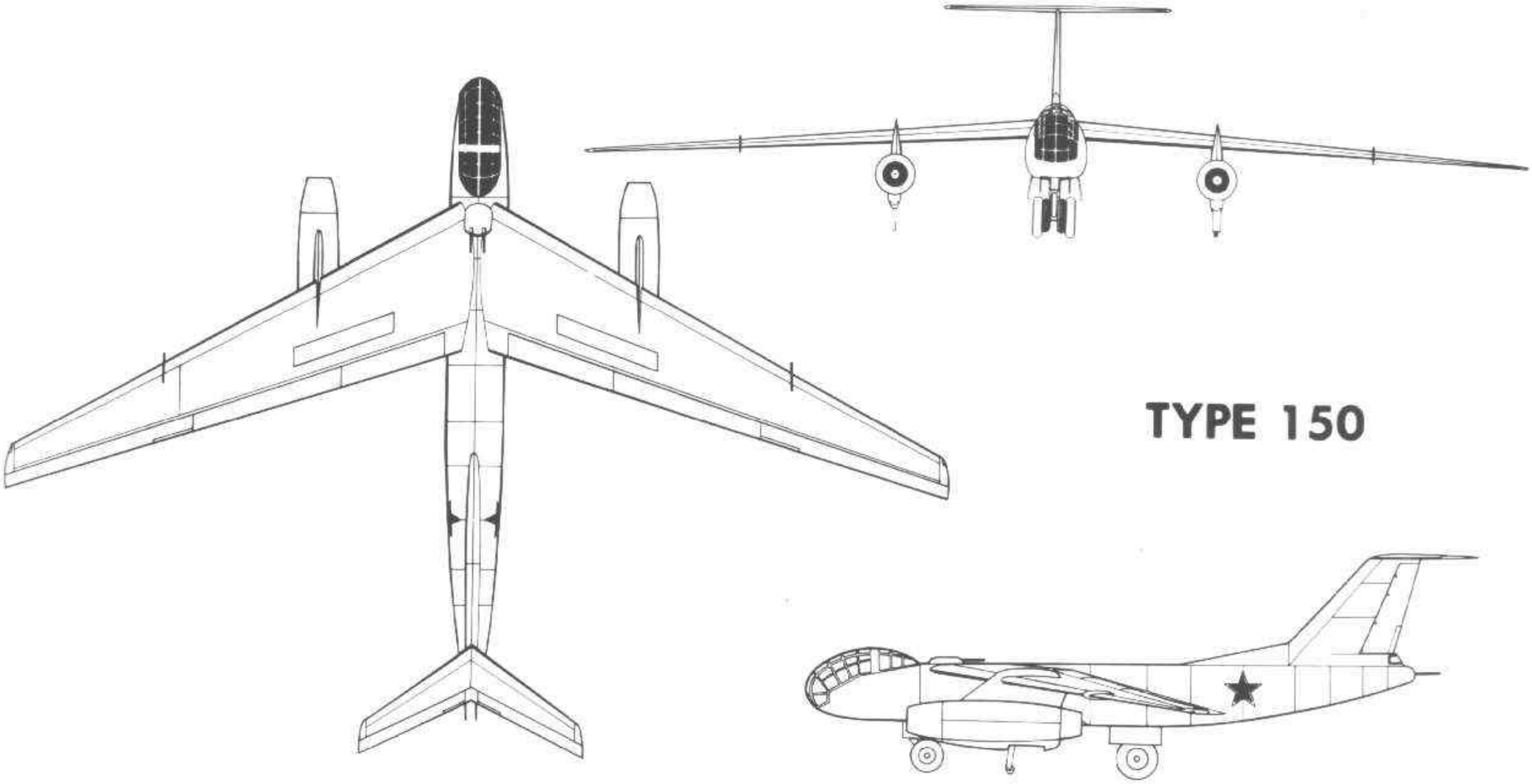
The Ju 287 V3 was used for extensive test under static loading by the Central Aerodynamic and Hydrodynamic Institute (ZAGI) in Moscow, where it was studied with respect to fulfilling stress requirements.

Apart from the new swept horizontal tail surfaces and engines grouped under the wings, the Ju EF 132 was similar to the Ju 287 V2. The Ju EF 132 project abandoned the radical forward swept wing for today's conventional sweptback layout. Only two engines were proposed, probably two Jumo 012's as these were estimated to be substantially more powerful than anything under test. As a further break from practice, the turbojets were located on either side of the cockpit, leaving the wing free of protuberances. Soviet development of the Ju EF 132 is unverifiable although undoubtedly it was investigated for possible development. However, an altered version of the Ju EF 132 popularly known as "Type 150" was produced.

After nearly four years Type 150 was completed and flown powered by two 6,400 lb static thrust, Mikulin turbojets each weighing 4,400 lb. These engines were in fact Soviet produced examples of the Jumo 012. The engines were suspended under the wings which were fitted with two sets of boundary layer fences. The fences were a simple solution designed to control the flow of air over the wing at critical speeds in an effort to eliminate wingtip washout. Since the wing thickness was greatly reduced, the main undercarriage members were of the double wheel quadricycle type mounted in tandem and retracting into the fuselage. The front gear member was slightly shorter giving the Type 150 a negative ground angle. This configuration resulted in improved ground traction and shorter landing rollouts. A small outrigger wheel was installed in the lower engine nacell which offered control on soft-field operations. Wing spoilers and brake flaps extended to 90° enabling steep glide angle approaches to be made at 170 mph (274 km/h). Type 150 was reported to have had a maximum speed of 650 mph (1,047 km/h) with a service altitude of 46,000 ft (13,800 m). Range was in the order of 2,250 mi (3,600 km). Although extensive flight tests were carried out over the next year, principally at Kimry near Moscow, no quantity production was initiated. After a hard landing, which resulted in damage to the undercarriage and structure, "150" was not restored to air worthy condition. Its ultimate fate is unknown.

Artist's impression of the **Type 150.**





TYPE 150

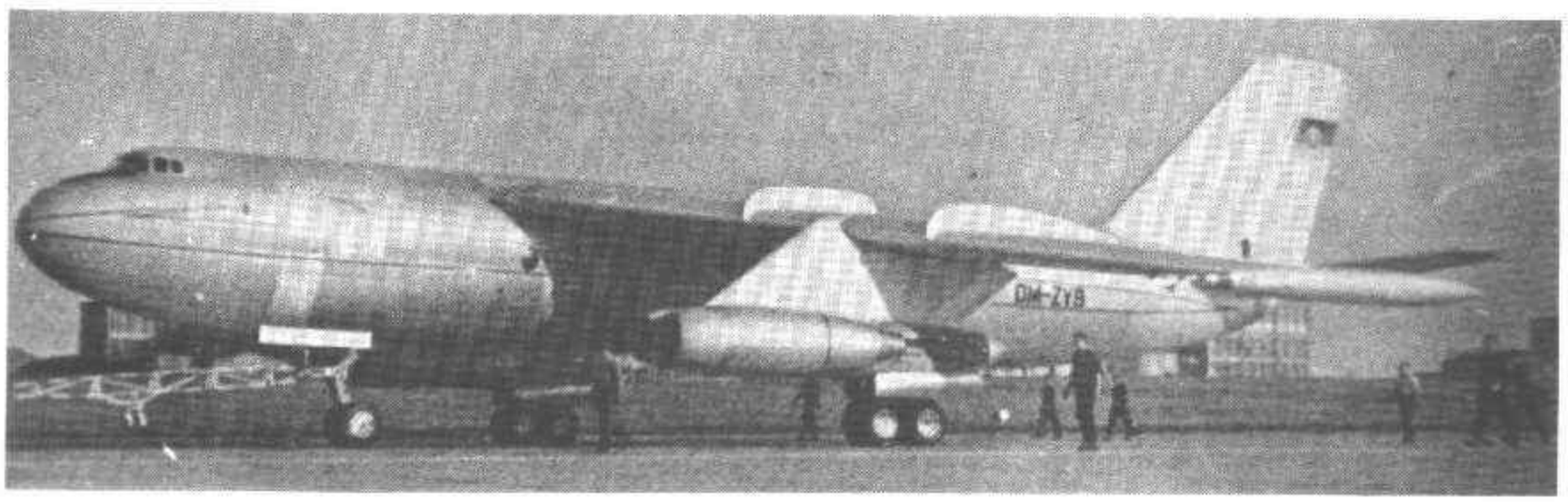
POSTSCRIPT

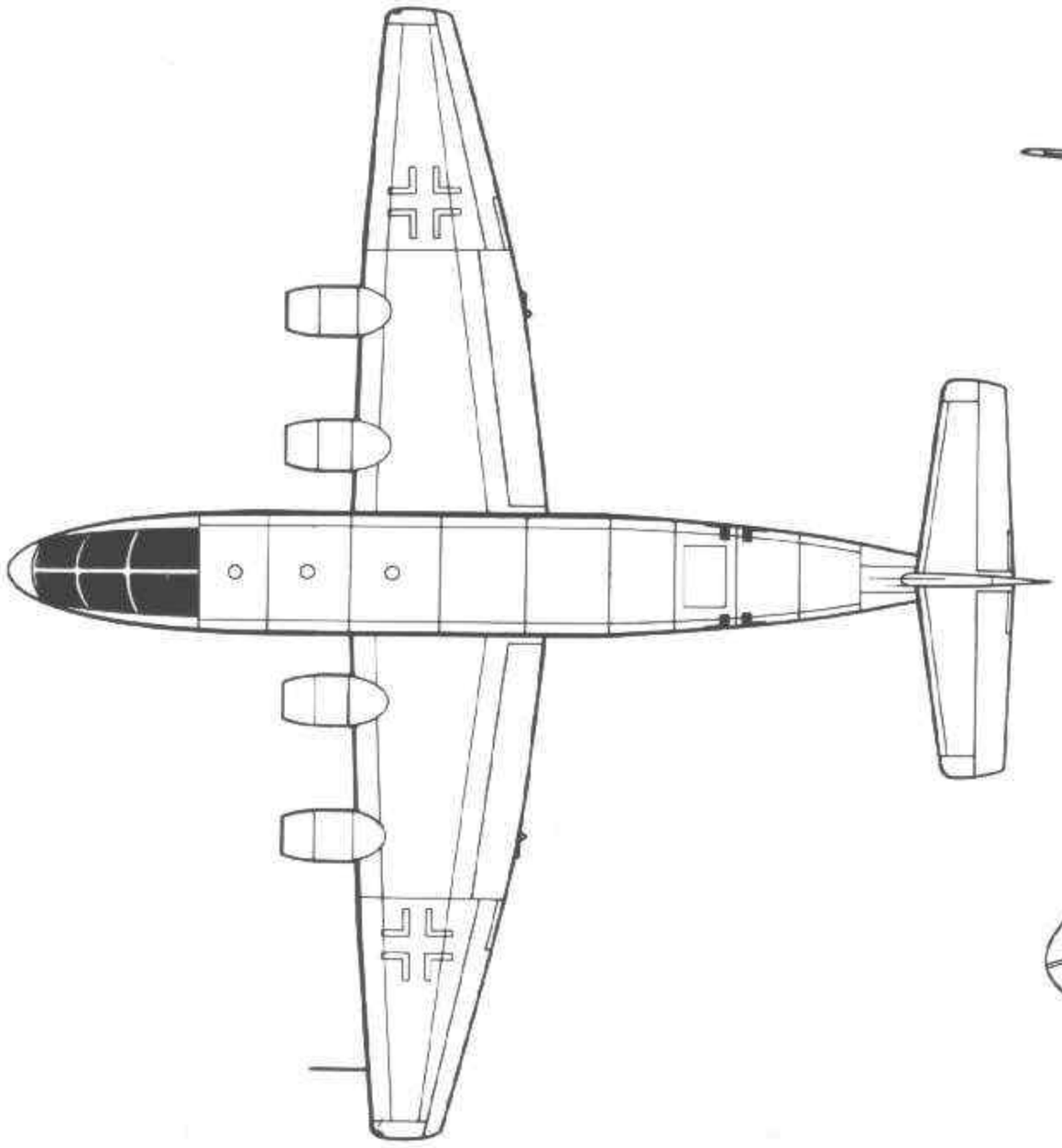
The three leading personalities involved in completion of the Ju 287 program, Dipl. Ing's. Baade, Hertel and Wocke continued their aeronautical research in unique ways. Brunolf Baade returned to East Germany where he was given responsibility for the design of the Baade Type 152, a four-engined jet airliner. His ill-fated Type 152 of 1958 never progressed beyond three prototypes and three nearly complete production models before all work was halted by the East German government. In all fairness, it must be pointed out that the demise of the Baade Type 152 was tied to severe state economic problems and did not result from the unfortunate crash of the first prototype of this promising aircraft.

Heinrich Hertel who had overall responsibility for the development of the Ju 287 and, who after the war, following several years of professional activity in France (which ended at the aero-engine company SNECMA) returned to Germany to become professor and holder of the chair for Aviation at the Technical University of Berlin.

Hans Wocke left the East to join the HFB concern of Hamburg. His more recent creation, the HFB "Hansajet," is still enjoying wide acceptance in the West. Incidentally, the HFB 320 is one of the few powered aircraft flying today with the forward swept wing! Certainly this is evidence of Hans Wocke's continued conviction of its practicality

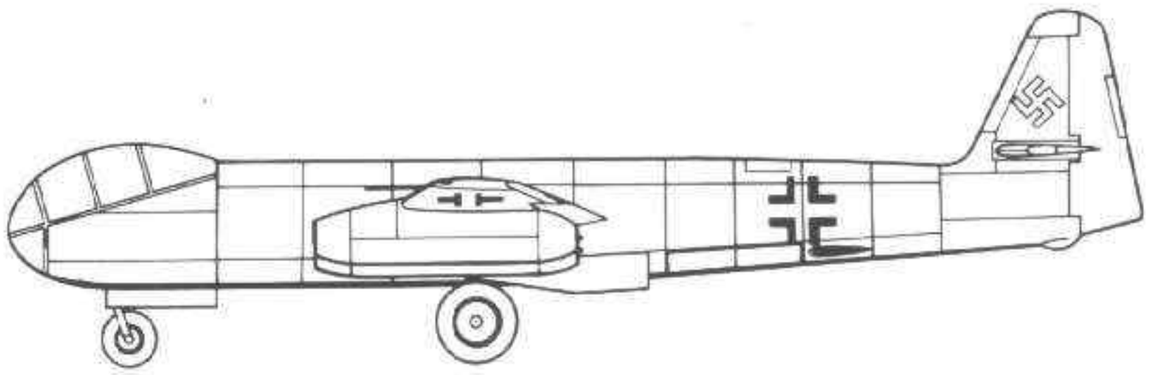
Above: **HFB 320** *"HANSA JET" Below:* **BAADE TYPE 152 II**





HEINKEL He 343 A-1

4 x Jumo 004C
Span: 59 ft 0 in (18,000 mm)
Height: 17 ft 7 in (5,370 mm)
Length: 54 ft 1½ in (16,500 mm)
W. Nummern: 850 000



He 343 A-1 (Bomber) 4x Jumo 004C

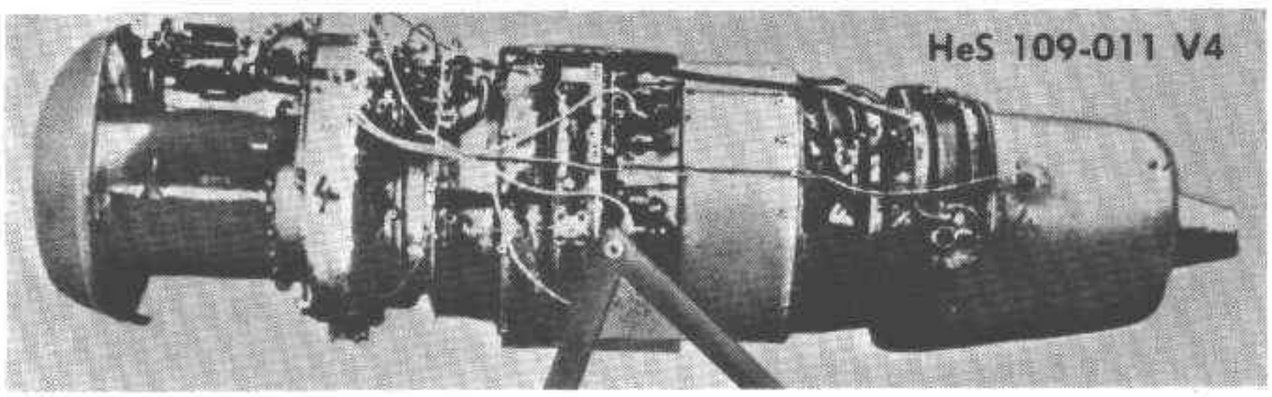
He 343 A-2 (Zerstorer) 4xJumo 004C*

He 343 A-3 (Reconnaissance) 4xJumo 004C

He 343 B-1 (Zerstorer) 4x HeS 011 A-1*

He 343 B-2 (Reconnaissance) 4x HeS 011 A-1

*Additional weapons: 4x MK103 under fuselage



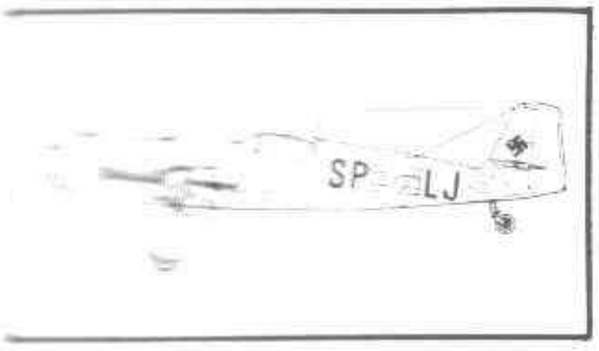
HEINKEL-HIRTH HeS 011 (Intially He S 11)

Type	3 Stage flow
Static Thrust	2975 lb (1350 kg)
Turbines	2
Length	13 ft 1 in (4000 mm)
Diameter	31 ft 6½ in (1080 mm)
Weight	2072 lb (940 kg)
Fuel	J2 (K1 if J2 unavailable)

WEIGHTS AND PERFORMANCE CHART PREPARED BY HEINKEL - VIENNA, 15 June 1944

			HEINKEL 343 A-1	JUNKERS 287 A-1	
Area		sq m	42.3	58	
Engines			4 x Jumo 004C	6 x BMW 003	
	Stand thrust	kg	4 x 1015	6 x 800	
Weights	Airframe	kg	5,260	7,070	
	Engines	kg	3,190	3,800	
	Protected tanks	kg	618	750	
	Equipment without arms	kg	847	950	
	Weapons	kg	150	365	
	Type		2 x MG 151 fixed	2 x MG 151 remotely controlled	
	Ammunition	kg	90	175	
	Crew	kg	200	300	
	Armor	kg	100	145	
	Fuel	kg	5,490	7,000	6,000
	Bombs	kg	2,000	3,000	2,000
Takeoff Weight		kg	17,945	23,555	21,555
Maximum speed without armament	at 0 altitude	km/h	825	820	820
	at 6 km altitude	km/h	835	855	860
Maximum Speed with armament at 6 km altitude		km/h	835	835	840
Maximum range		km	1,600	1,700	1,500
Takeoff run		m	1,450	1,900	1,550
Takeoff angle after liftoff		deg	3.5	2.2	3

Note about takeoff of Ju 287: At 23.5 tons takeoff weight and without takeoff assistance the climbing angle after liftoff is 2.2 degrees. This angle is too small, since even small control errors of the pilot will greatly question a successful takeoff. Experience with heavily loaded aircraft shows that a minimum of 3 degrees has to be insisted on. Takeoff weight must thus be reduced by 2 tons to 21.5 tons.
Vienna, 15 June 1944.



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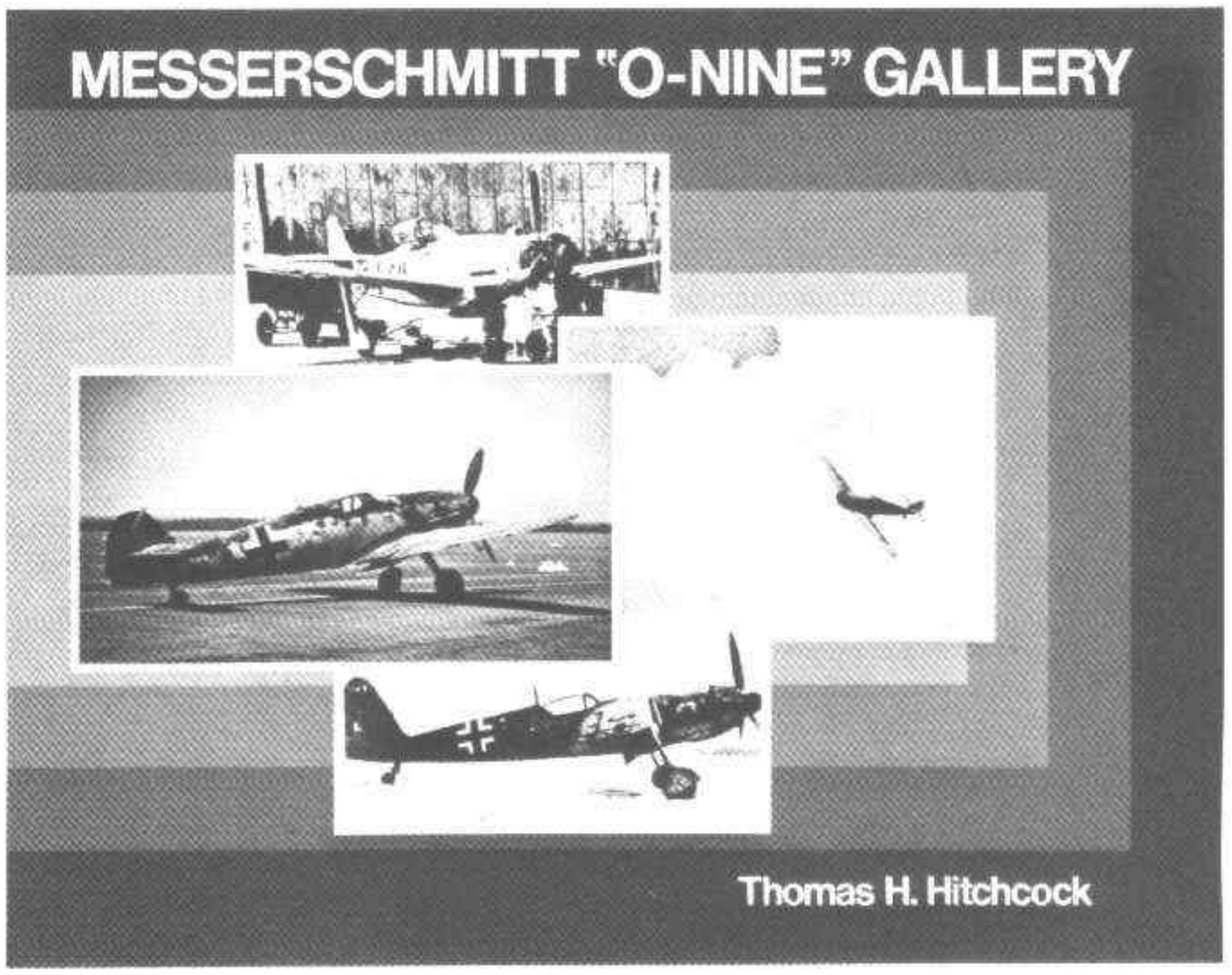

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by Thomas H. Hitchcock

It contains a new approach and format which is not only unique and informative, but most well prove it to be the finest treatise yet published on the Me 109, fighter workhorse of the Luftwaffe.

Robert Grinsell WINGS

. . . About the only thing missing is that ever-present smell that permeated every cubic inch of every 109 one inspected in the war years—resulting it is said, from the use of vegetable-based hydraulic fluid. I wonder if Mr. Hitchcock confirms this somewhere in his book? . . . Must have another look.

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