



COMBAT AIRCRAFT *OF THE* **BATTLE OF BRITAIN**

NOEL & ANTHONY SHENNAN



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Cover:

Busy scene as Spitfire pilots frantically scramble during a simulated Luftwaffe attack on a British airfield during 1940; one of many interesting sequences from the film "The Battle of Britain". Photo per courtesy United Artists.

Combat Aircraft of the Battle of Britain

NOEL & ANTHONY SHENNAN

With scale drawings by Anthony Shennan.



Unsung stalwart of the Battle, the sturdy Hurricane which saw most of the action and which, in the opinion of many pilots, was a superior fighting machine to the faster and more famous Spitfire. These aircraft are of No. 245 Squadron. Photo, Ian Primmer.

INTRODUCTION

The years preceding World War II saw some of the most revolutionary and swift advances in aviation that the world had yet seen. Fighter speeds jumped from the 200 m.p.h. range to 300 m.p.h. plus. Even the bombers being built were able to travel at speeds approaching 300 m.p.h. while some were to exceed this figure. The biplane, so long the mainstay of the world's air forces, within the space of two years became obsolete. The monoplane had become the master of the air by the time the Battle of Britain began.

This era produced some most interesting, sometimes ugly, and sometimes aesthetically pleasing aircraft, and it is

the shape, form and use of these aircraft with which "Combat Aircraft of the Battle of Britain" deals, rather than the exploits of their pilots. By the end of the Battle, both sides had reached a point of exhaustion for there were no less determined or courageous airmen on both sides. Essentially, it was a war of attrition, won by the inability of the Luftwaffe to gain command of the air.

Here then, are the aircraft of the Battle, be they sparkling performers, or dismal failures—victims and victors of a struggle that was fought with mediaeval ferocity in the high clear air above a nation which would not concede defeat.

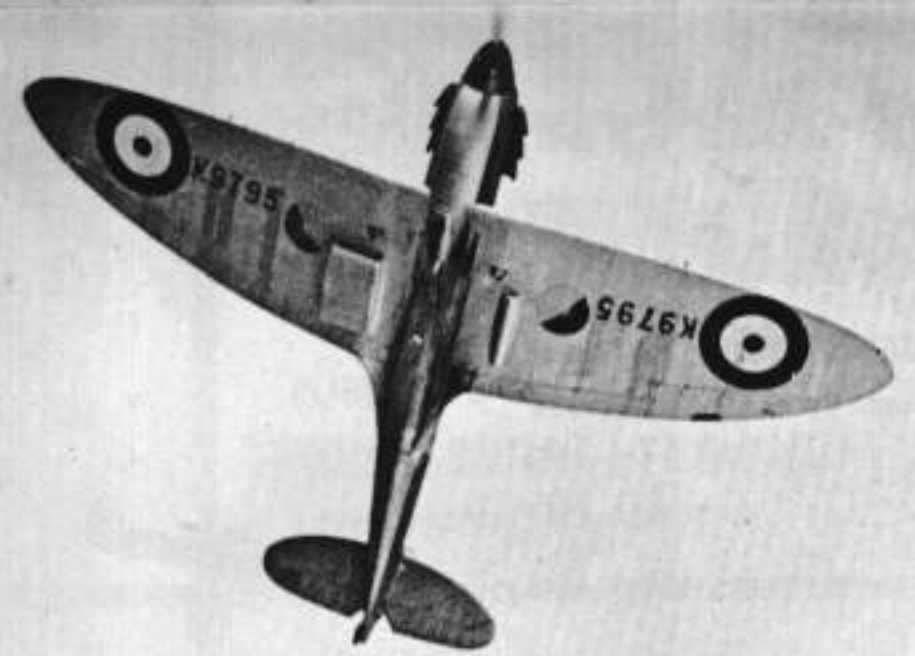
SUPERMARINE SPITFIRE 1

Most accounts of the Battle of Britain give pride of place to the graceful yet deadly Supermarine Spitfire. A certain reverence has grown around the name and shape of this machine, the only fighter the R.A.F. had that was capable of duelling with the Messerschmitt Bf 109E on equal terms. Spitfire squadrons at the start of the Battle of Britain numbered only 19, as compared to 28 Hurricane squadrons and although the number of Hurricane squadrons was actually increased by the end of the Battle, there were never more than the original 19 Spitfire squadrons. The Spitfire and the Hurricane made up a very necessary team, the Spitfires trying to concentrate on the German fighters and the Hurricanes tackling the bombers.

The standard armament of the Spitfire Mk. I during the Battle was eight 0.303 in. Browning machine guns with 300 rounds of ammunition per gun. These guns were harmonized to give a

scatter pattern of fire at the best effective range. This was not in the best destructive interests but was necessary due to the inadequate firing techniques of the general run-of-the-mill R.A.F. pilots. Many pilots too, tended to open fire at too great a range. Spitfires armed with 20 mm. cannon were used in trials and on operations by No. 19 Squadron, but the cannon feed mechanism was plagued with stoppages and the Battle was over before the snags were sorted out. Undoubtedly the greater destructive power and long range of the cannon would have been appreciated by the pilots if the function had been normal.

The first enemy aircraft destroyed from the British Isles by Fighter Command was a Spitfire victim. Patrols from No. 602 and 603 Squadrons based at Drem and Turnhouse in Scotland intercepted a bomber and a section of No. 603 Squadron attacked and shot it down near the Forth Bridge. Sqn. Ldr. E. Stevens was credited with



Upper. An early Spitfire I with silver undersurfaces and black serials. Upper surfaces were dark green and dark earth. The large underwing roundels are noteworthy. Lower. The 601st Spitfire, P9450 was completed in 1940. Right. An early Mk.I with black and sky undersurface fighter camouflage prevalent during the Battle.

the victory. Over England, another first for Spitfires occurred off Southend when No. 74 Squadron machines downed a Heinkel He 111. This squadron was later to be the one detailed to escort Queen Wilhelmina of the Netherlands and her family when she travelled to England aboard a destroyer after the capitulation of Holland.

A.C.M. Sir Hugh Dowding, C-in-C of Fighter Command, had four groups guarding England: No. 13 Group in the North, No. 12 Group covering the Midlands, No. 10 Group in the South-west and in the key position, No. 11 Group, the shield of London. By August 13th A.V.M. Keith Park's 11 Group fielded six Spitfire squadrons, Nos. 54, 65, 41 and 74 at Hornchurch, No. 610 at Biggin Hill, and No. 64 at Kenley. These were backed by 13 Hurricane squadrons and two of Blenheim IF fighters. In the South-west, No. 10 Group, commanded by A.V.M. Sir Quintin Brand were three Hurricane and, one Blenheim squadrons, a flight of Gladiators and four Spitfire squadrons, Nos. 92 at Pembrey, 234 at St. Eval (a Coastal Command station), 152 at Warmwell and 609 at Middle Wallop. Fighter strength at 100% serviceability was 176 Spitfires and 256 Hurricanes. A more reasonable figure of 75% serviceability would have shown 132 Spitfires and 192 Hurricanes available. Opposing them were the single and twin-engined fighters of *Luftflotten* 2 and 3, some 165 Bf 110s and 570 Bf 109s, assuming a similar 75% serviceability, though in the case of the *Luftwaffe* this figure could well have been higher.

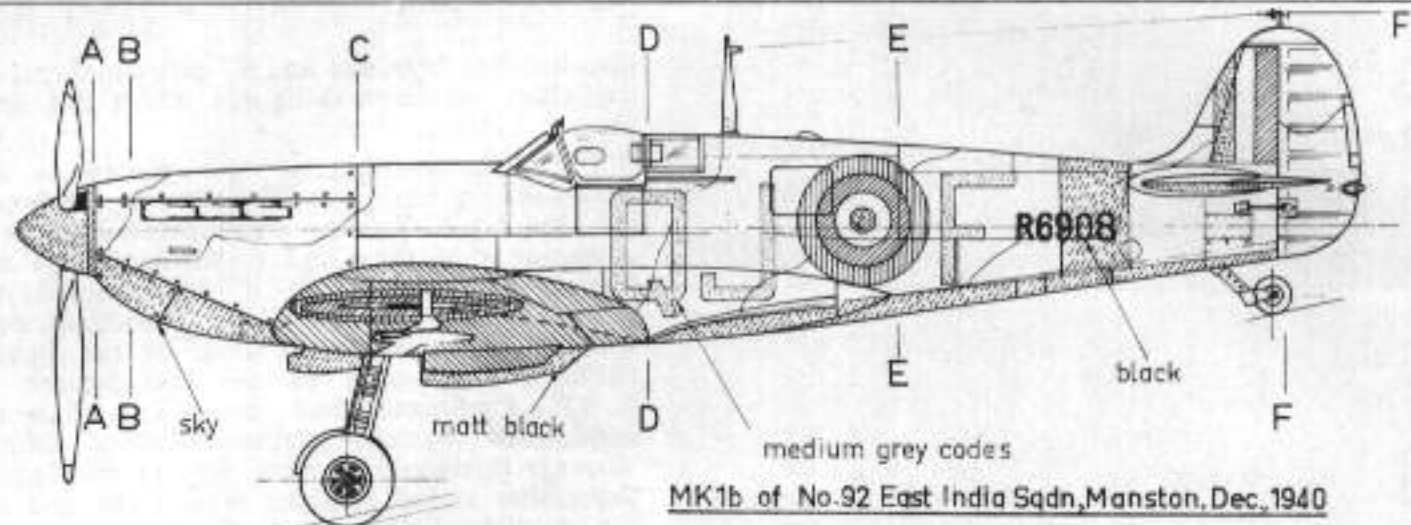
The Sector Stations of No. 11 Group lay in an arc across the approach to London, some of them in vulnerable positions near the coast, Manston, Hawkinge, Lympne, and Tangmere in particular. August 12th saw the first of many determined attacks on these airfields, Manston and Lympne being put out of action for a day. The Spitfires of No. 65 Squadron operating from

Manston by day were caught by Dornier Do 17s of KG 2 as they began their take-off runs and they scrambled into the air amid the bomb-bursts. The next day the Spitfires of No. 609 Squadron had a field day when they found a formation of Ju 87s with their escort busy elsewhere. Diving into the Stukas the Spitfires shot down nine of them. This no doubt had some effect on the orders of *Reichsmarschall* Göring on the 15th that escorting fighters should provide better protection for the Stukas, some even entering the bombing dive with them to give them an added safeguard.

The night of August 13th could have had grave consequences for Fighter Command had the bomb-aimers of KG 100 dropped their loads more accurately. As it was, they put 11 bombs across the Castle Bromwich Spitfire factory near Birmingham. Fortunately the damage was not enough to seriously delay Spitfire production as this target was not the main Spitfire assembly plant. Operating from Brittany, KG 100 was one of the few *Luftwaffe* units trained in night flying and carried out many precision night flights with their Heinkel 111s.

The pressure on Fighter Command eased on the 17th but during the previous ten days the R.A.F. had lost 218 aircraft, of which 183 were combat casualties. R.A.F. losses were lower than the German, but although aircraft could be replaced with effort, the Allied pilot casualties were cause for concern and many of the replacement aircraft were repaired machines, some with impaired performance.

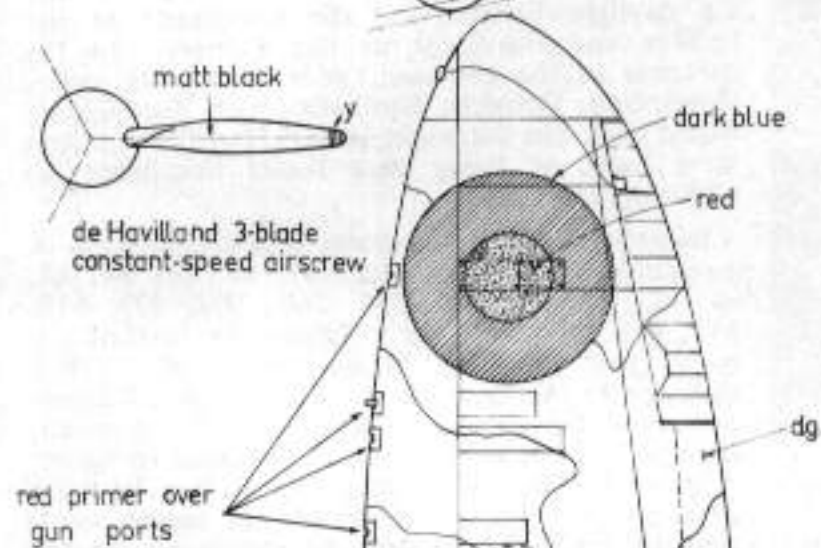
All Spitfires now were equipped with (either Rotol or de Havilland) controllable-pitch propellers, and together with fire-proofing of the fire-wall between pilot and fuel supply this now provided the R.A.F. with a machine that could meet the Bf 109E on equal terms. The greater experience in tactics of the *Luftwaffe*, learnt in the Spanish Civil War, stood them in good stead, and their



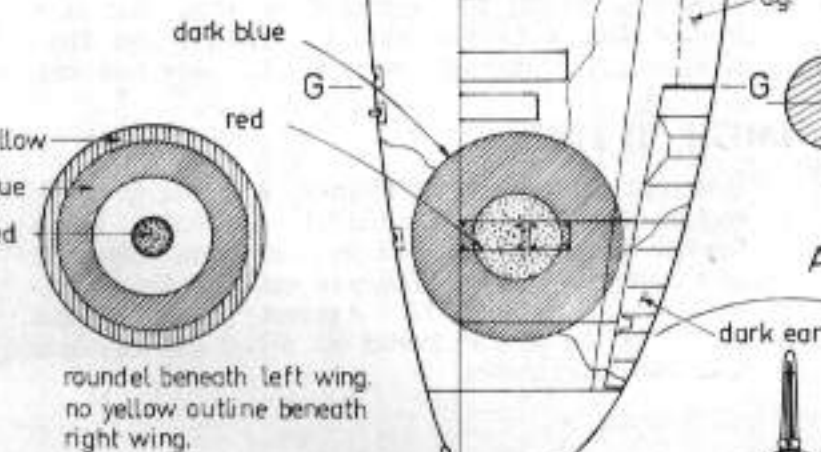
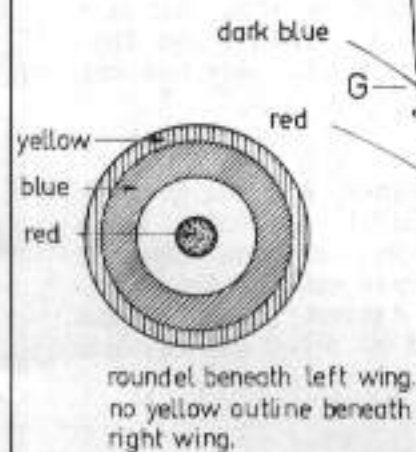
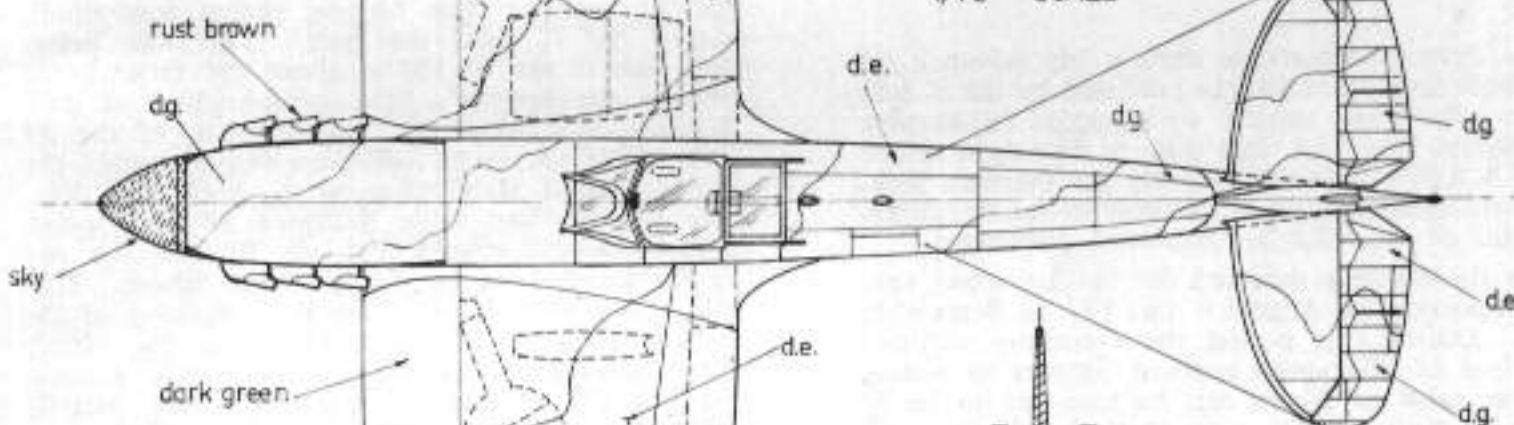
MK1b of No.92 East India Sqdn, Manston, Dec. 1940

SUPERMARINE SPITFIRE 1A

TYPE:	Fighter, single seater.
DIMENSIONS:	Span 36 ft. 10 in.; length 29 ft. 11 in.; height 11 ft. 5 in.; wing area 242 sq. ft.
POWER PLANT:	Rolls-Royce Merlin III 12-cylinder, liquid-cooled engine.
POWER:	Take-off 880 h.p.; 1,030 h.p. at 16,250 ft.
WEIGHTS:	Empty 4,810 lb.; loaded 5,820 lb. Engine weight 2,020 lb.
PERFORMANCE:	(At loaded weight) Max. speed 312 m.p.h. at 20,000 ft.; economical cruise 205 m.p.h.; max. range 575 miles; combat range 395 miles; rate of climb 2,500 ft./min. initial; 9.4 min. to 20,000 ft. Service ceiling 34,000 ft.
ARMAMENT:	8 x 0.303 in. Browning Mk. II machine guns; 350 r.p.g.



1/72 SCALE



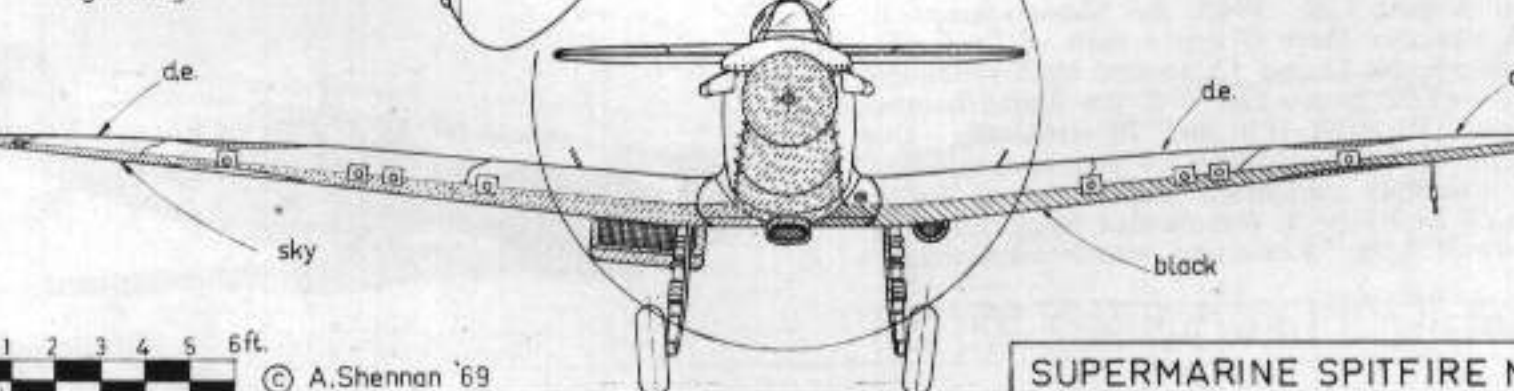
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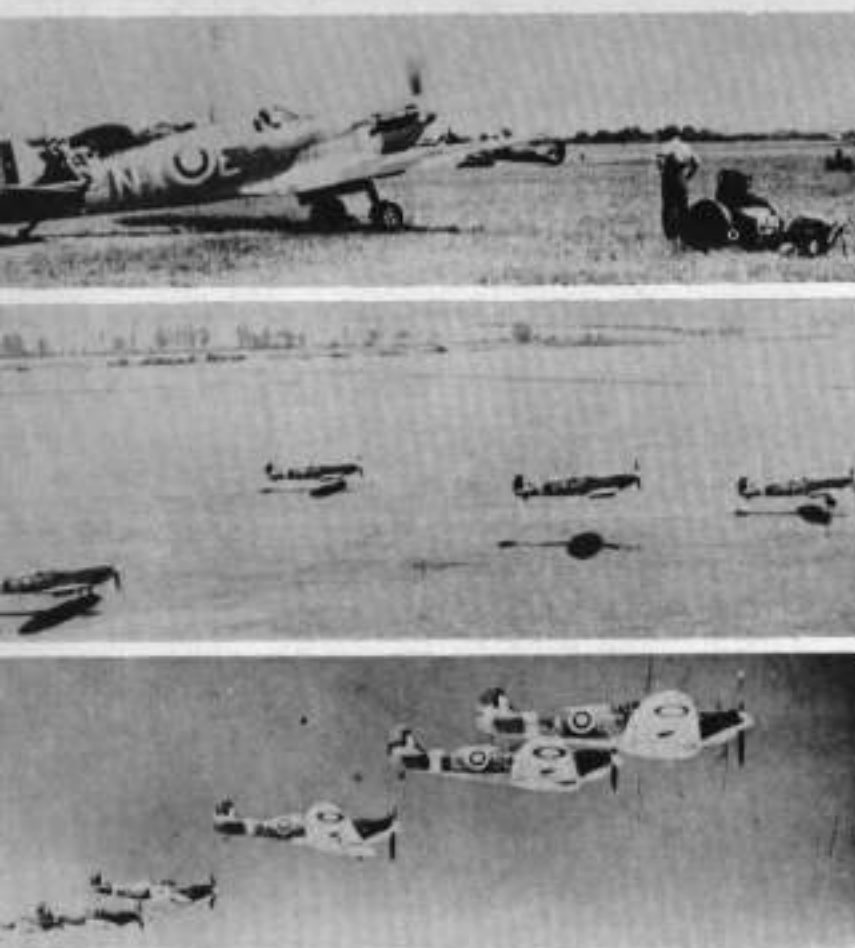
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SUPERMARINE SPITFIRE MK 1



Upper. Spitfire Is of No. 131 Squadron prepare for take-off. Centre. No. 122 Squadron scrambles to intercept. Lower. Late production Mk.I's of No. 501 (County of Gloucester) Squadron from Kenley. Codes A-SD, L-SD and M-SD. Photo, A. Innes-Ker.

loose fighter formations were a big advance on the tight formation attacks practised by the R.A.F. pilots who were usually so occupied in keeping formation they had little time to line up a target. The R.A.F. soon took to using the German four-aircraft formation, enabling them to use the potentialities of their fighters to better advantage.

As the Battle progressed the Spitfire losses rose in proportion; in August it was 137, in September 145. During this period the Germans admitted the loss of 364 single-engined fighters to enemy action, most of which can be assumed to be Bf 109s as well as 195 twin-engined fighters. Although this gives a total of 282 Spitfires against 364 Bf 109s, the R.A.F. lost as well in this period some 503 Hurricanes, making the total losses R.A.F. 785, and the *Luftwaffe* 559 Bf 109 and Bf 110 fighters. The *Luftwaffe* in this time

also lost 348 bombers and 47 dive-bombers; heavy casualties indeed and figures which did little to placate Göring.

The German fighters were placed at a disadvantage by having to stay close to the bombers, but the R.A.F. fighters also operated under difficulties in that they had to disregard the enemy fighters to some extent if they wanted to get a shot at the bombers. This division of concentration can account for some of the fighter-to-fighter discrepancies in the loss figures. The R.A.F. Command had no wish whatever to engage in wasteful fighter-to-fighter skirmishes whereas this was the prime aim of the *Luftwaffe*. September ended bringing with it the end of the big daylight battles, and the acceptance of the Spitfire and Hurricane as day fighters. In the darkness of the blackout, with inadequate radar, Hurricanes, Defiants, Blenheims and Beaufighters would seek out the night raiders, but few Spitfires were used, as these were found unsuitable for night-fighting.

Nineteen Spitfire squadrons actually engaged in the Battle of Britain; Nos. 19, 41, 54, 64, 65, 66, 72, 74, 92, 152, 234, 266, 602, 609, 610, 611, 616 and 222. As a fighter the Spitfire was on a par with the Messerschmitt Bf 109E-3, though the two aircraft were meant for different purposes—the German machine for air superiority fighting and the R.A.F. one as a defensive fighter. A good Spitfire pilot could stay with a Bf 109E in a dive or climb, but the Merlin engine would cut out under the sudden application of negative G. The controls of the Spitfire were light at low speed, lacking feel, but were very responsive at normal speeds. The turning radius was small, about 700 ft. near the stall. This was better than that of the Bf 109 at about 890 ft. and was due to the Spitfire's light wing-loading of 24.8 lb./sq.ft. as against the 32.2 lb./sq.ft. of the Bf 109. However, in a tight turn near the stall, the Spitfire could stall, turn on its back and dive. The ailerons had some heaviness at high speed, a characteristic shared with the Bf 109, but not as pronounced as on the German fighter. One minor annoying feature was the screening of the coolant radiator by one undercarriage leg. Hence there could be no swanning about on the ground, the take-off had to be arranged fairly smartly otherwise the glycol engine coolant boiled.

The story of the fight over Britain in August, September and October 1940 is one of the combined efforts of Fighter Command, but it is Park's No. 11 Group, with its Spitfires and Hurricanes, which should receive the primary honours.

MESSERSCHMITT Bf 109E

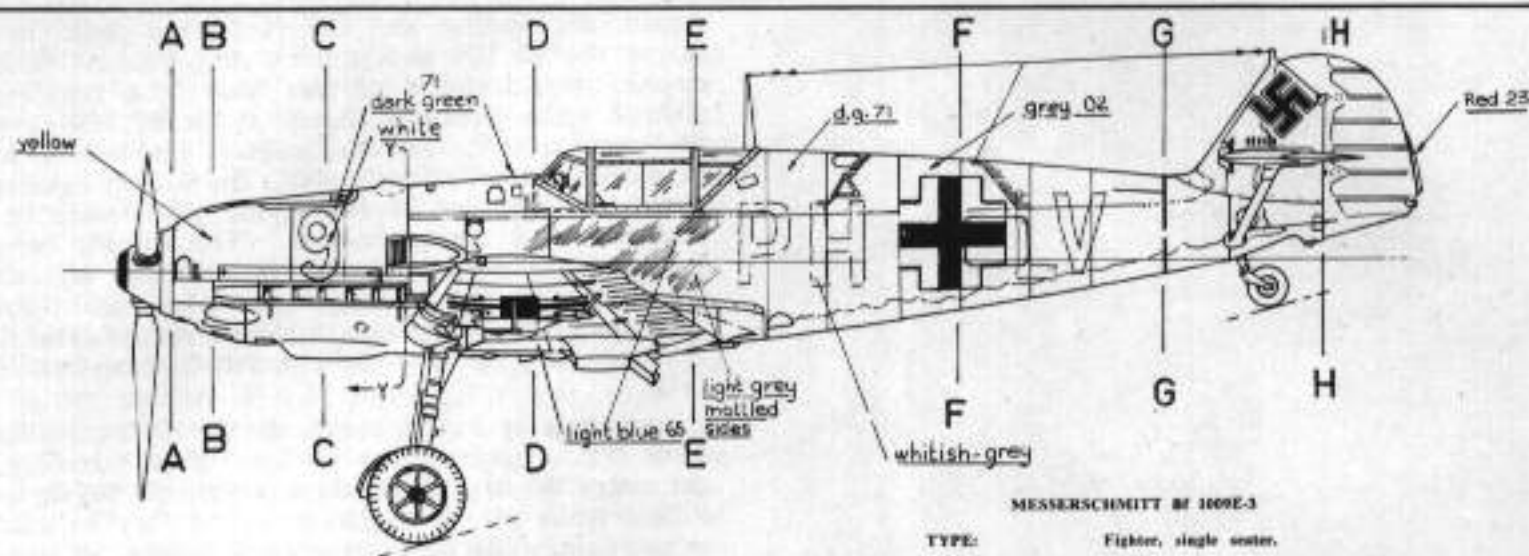
It should be explained that the official designation of the 109 was 'Bf', from the name of the manufacturers, *Bayerische Flugzeugwerke*, known as BFW to the German Air Ministry. All nameplates on products of the factory had this designation until the company became Messerschmitt AG and thus the prefix 'Me' was really only the name adopted by the press and public for what should rightly have been called the Bf 109.

On August 13th, 1940, the Messerschmitt Bf 109E equipped three *Gruppen* each of *Jagdgeschwader* 3, 26, 51 and 52, assisted by *Erprobungsgruppe* (Test Unit) 210 with the fighter-bomber versions, Bf 109E-1/B and Bf 109E-4B. One *Gruppe* of *Jagdgeschwader* 54 was also attached. This assembly comprised the single-seat fighter units of *Luftflotte* 2, commanded by *Generalfeldmarschall* Albert Kesselring with headquarters at

Brussels. In Northern France, was *Luftflotte* 3, commanded by *Generalfeldmarschall* Hugo Sperrle with his headquarters in Paris. His Bf 109 units were three *Gruppen* each of *Jagdgeschwader* 2, 27 and 53. Against these first-line machines the R.A.F. could pit about 240 Spitfires and 400 Hurricanes.



An early Bf 109E-1 in black-green 70 and blue-grey 65 finish.

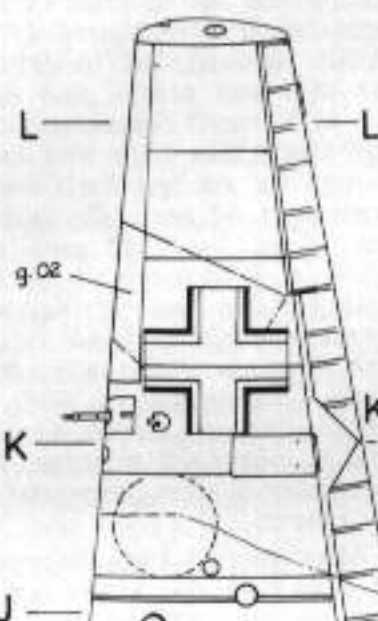


COLOUR SCHEME OF
Bf 109E- crashed in
Windsor Great Park
after misjudging
height during attack
on two Avro Ansons.

1/72 SCALE

MESSERSCHMITT Bf 109E-3

TYPE:	Fighter, single seater.
DIMENSIONS:	Span 32 ft. 4 1/2 in.; length 38 ft. 4 1/2 in.; height 8 ft. 2 1/2 in.; wing area 174.5 sq. ft.
POWER PLANT:	Daimler-Benz DB 601A 12-cylinder inverted Vee, liquid-cooled engine.
POWER:	Take-off 1,100 h.p.; 1,020 h.p. at 14,765 ft.
WEIGHTS:	Empty 4,485 lb.; loaded 5,875 lb.
ARMAMENT:	2 x 20 mm. MG FF cannons mounted in wings, 40 r.p.g.; 2 x 7.9 mm. MG 17 machine guns mounted in upper nose cowlings, 1,000 r.p.g.
PERFORMANCE:	(At loaded weight). Max. speed 283 m.p.h. at sea level; 307 m.p.h. at 3,280 ft.; 322 m.p.h. at 6,560 ft.; 348 m.p.h. at 14,560 ft.; 356 m.p.h. at 19,685 ft. Max. cruising speed 300 m.p.h. at 13,120 ft. Max. range 410 miles. Initial climb 3,280 ft./min. Time to 19,685 ft., 7.1 min. Service ceiling 34,450 ft.



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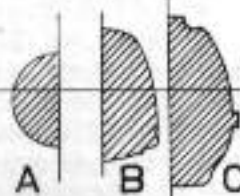
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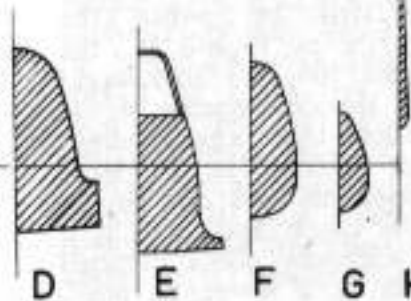
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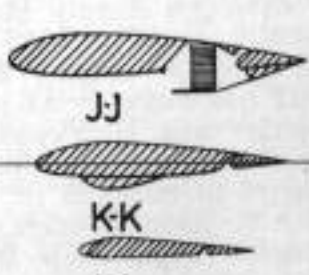
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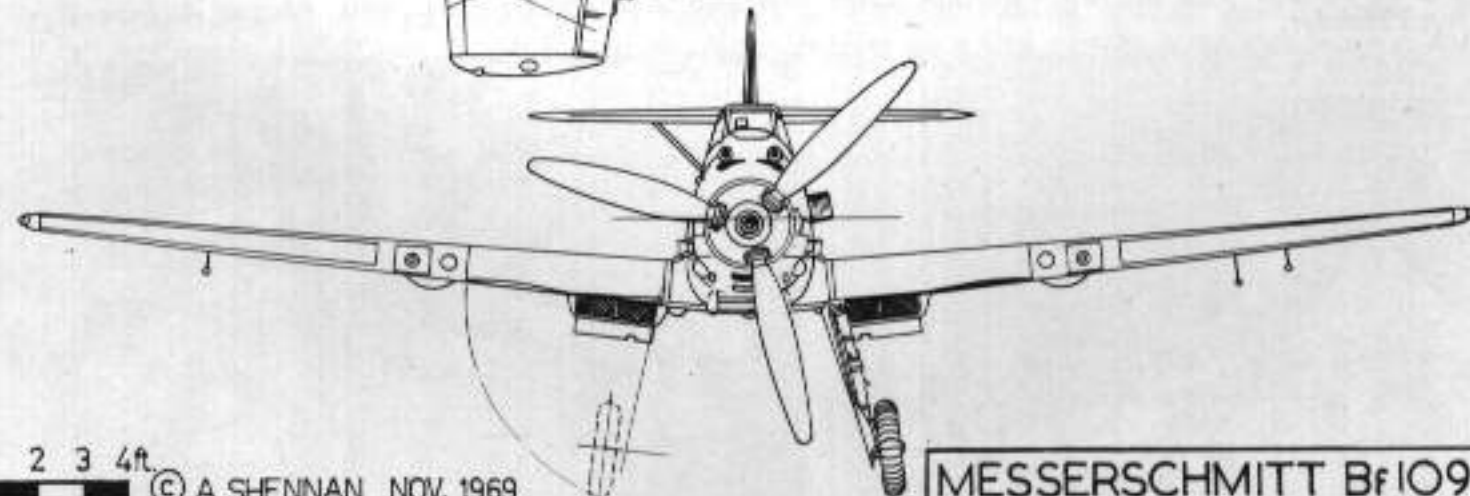
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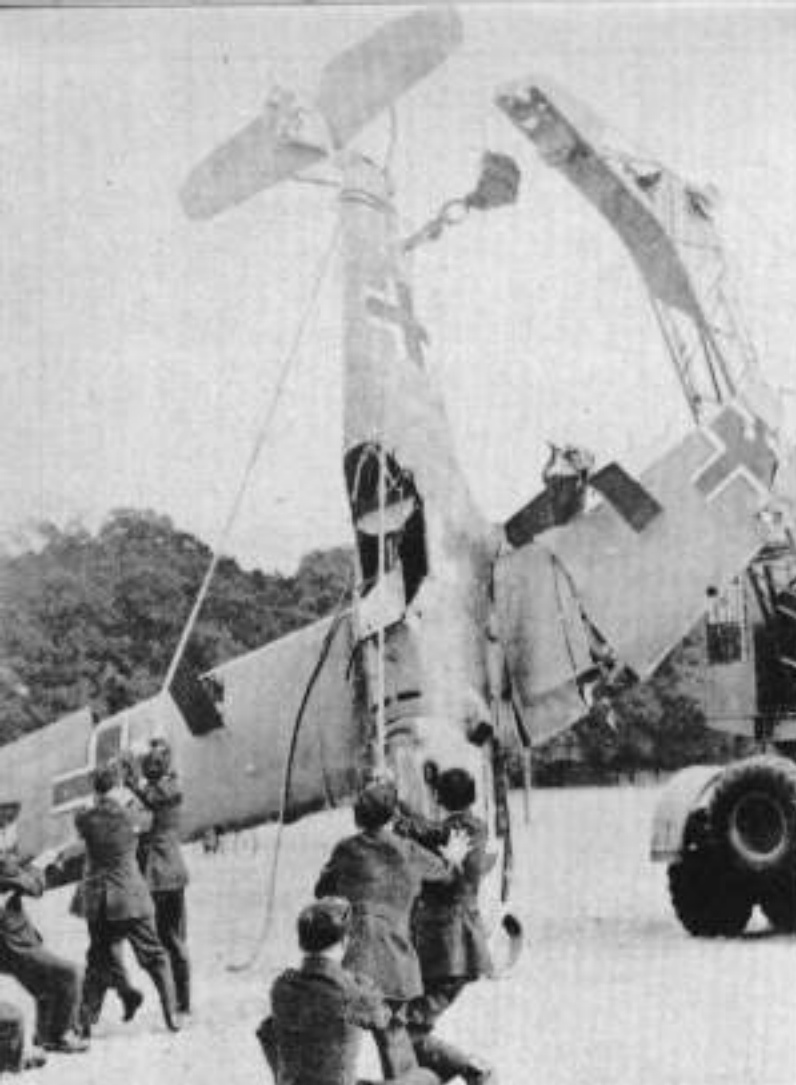
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MESSERSCHMITT Bf 109E-4



The Bf 109E of Oblt. Karl Fischer from VIII/JG 27 is recovered from Windsor Great Park on 30th September, 1940. Nose was yellow with white '9' on green background. See drawing for other details.

By 1939 the Bf 109E model had replaced all others in the *Luftwaffe*, forming the equipment of thirteen *Gruppen* at the outbreak of war. The engine used was a Daimler-Benz DB 601A of 1,100 h.p., with a variable-pitch three-blade VDM airscrew. Armament consisted of two 7.9mm. MG 17 machine guns in the upper part of the nose, with either two more MG 17s in the wings, or two 20 mm. MG FF drum-fed cannon. The range of 412 miles at economical cruising speed was to prove short, severely restricting the time the fighters could stay and protect the bombers over England.

Although slightly slower than the Spitfire (the Spitfire could do 355 m.p.h. at 19,000 ft., the Bf 109, 336 m.p.h.) the Bf 109 had advantages that had more to do with the deficiencies of the Spitfire and Hurricane pilots than any inherent superiority of the aircraft itself. The Bf 109's ability to outclimb its opponents was due to the R.A.F. pilots' tendency to climb fast and at a shallow angle while the German pilots climbed their machines steeply but at a lower airspeed.

Left. A line-up of Bf 109Es, 1940. Right. British airmen remove the Staffel emblem from the nose of a Bf 109E of JG 52. This aircraft was shot down over Sussex on August 12th, 1940. Photos, A. Innes-Ker and Ian Primmer.



Again, the Spitfire and the Hurricane could not follow the Bf 109 in a sudden dive because their engines would starve of fuel under the negative G-load. The injection system of the Bf 109 gave no such trouble and frequently enabled it to break off combat at will. Both the British fighters could out-turn the Bf 109 if the pilots were experienced and daring enough. The trouble here, for the Spitfire particularly, was that the aircraft was likely to stall and spin out of a tight turn and therefore pilots were understandably careful. A flick stall close to the ground was usually fatal.

At speeds up to 200 m.p.h. the Bf 109's controls were good, particularly the low speed handling, but over 200 m.p.h. the aileron controls began to stiffen, while at 400 m.p.h. in a dive they became immovable. The elevator control suffered at high speeds and the absence of rudder trim must have been an inconvenience at speed, restricting the ability to bank left quickly. On the credit side, the stall was gentle, and the controls, except for the high speed characteristics, were excellent. The top speed was high and the visibility was good, though the cockpit itself was rather cramped. The armament of two rifle-calibre machine guns and one (later, two) 20 mm. cannon outranged the 0.303 in. Brownings of the Spitfire and the Hurricane and the shell strikes were more destructive. A more positive disadvantage was the Bf 109's lack of range. Even operating from airfields close to the Channel the Bf 109E had a radius of action only as far as London, limiting its stay over England to about 20 minutes. Many were ditched in the Channel after desperately trying for a landfall in France.

After August 13th the operational losses of the Bf 109s rose, due to the activity in aid of "Operation Sealion" and to the wholehearted opposition of the defending fighters. As well, Göring's orders to stay close to the bombers they were escorting, prevented the *Luftwaffe* pilots from getting the most from their mounts. Previously, the Bf 109s had ranged ahead of their charges, clearing the way in the so-called "free-chase". This was a most effective method of fighter application, but Göring, hurt by his bomber losses and guided by a World War I mentality, ordered them to stay in close to the slow moving bombers, forcing the fighters to either throttle back or weave. The first manoeuvre was dangerous, the second wasted fuel. To add to the fighters' troubles, the long-range Bf 110 fighters proved unable to carry out their assigned mission of bomber-escort and the Bf 109s had to take over that duty as well.

About the middle of September, Test Unit 210 was transferred to the Pas de Calais area and was equipped with Bf 110 and Bf 109 fighter-bombers. The name notwithstanding, Test Unit 210 was fully operational. The fighter, in this role, became the Bf 109E-1/B or Bf 109E-4/B carrying a single 551 lb. (250 kg.) bomb. At this time the

fighter *Gruppen* of *Luftflotten* 2 and 3 received orders to so modify one *Staffel* of each *Gruppe*. At first the Bf 109E-4/B machines were flown in separate formations but due to their vulnerability they were soon dispersed into small units of several aircraft and scattered amongst the unladen fighters.

The day raids on London lasted until October 20th and after this date, the Bf 109 as fighter and fighter-bomber in large scale use, passed from the Battle of Britain. At first, used purely as a fighter against R.A.F. fighters, it had acquitted itself well, scoring heavily against the Spitfires and Hurricanes, which were trying to get at the bombers. Then charged with bomber escort, the Bf 109s were penalized with the necessity of staying with the big slower machines. The performance difference between the Bf 109E-3 and the Spitfire was so slight that the end result usually depended on any initial advantage and skill of the individual pilots.



The first Hurricane, K5083 in all-silver scheme. Photo, Flight.

HAWKER HURRICANE I

When the Battle opened in July 1940, 527 Hurricanes and 321 Spitfires, both operational and non-operational, were dispersed through 28 and 19 squadrons respectively, and were available for the defence of Britain. By August 30th, 709 Hurricanes and 372 Spitfires were available for operations. Because of this imbalance in favour of the Hurricanes, they were to become the mainstay of the defence by sheer weight of numbers. In July 1940, the *Luftwaffe* had some 2,700 aircraft available.

Praised by its pilots, and maligned by its enemies (Battle of Britain pilots praised its great strength, stability as a gun platform and excellent manoeuvrability, while *General Adolf Galland* is quoted as saying that the Hurricane was "a nice aeroplane to shoot down"), a balanced assessment would reveal that at its rated altitude, in the hands of a reasonably experienced and determined pilot, the Hurricane could hold its own with any enemy fighter provided that the enemy held no height advantage before joining battle. *Douglas Bader* described the Hurricane as his favourite fighter aircraft. Whatever has been said about the Hurricane, the results speak for themselves. Without the Hurricane, Hitler and *Göring* would have been celebrating in London in 1940.

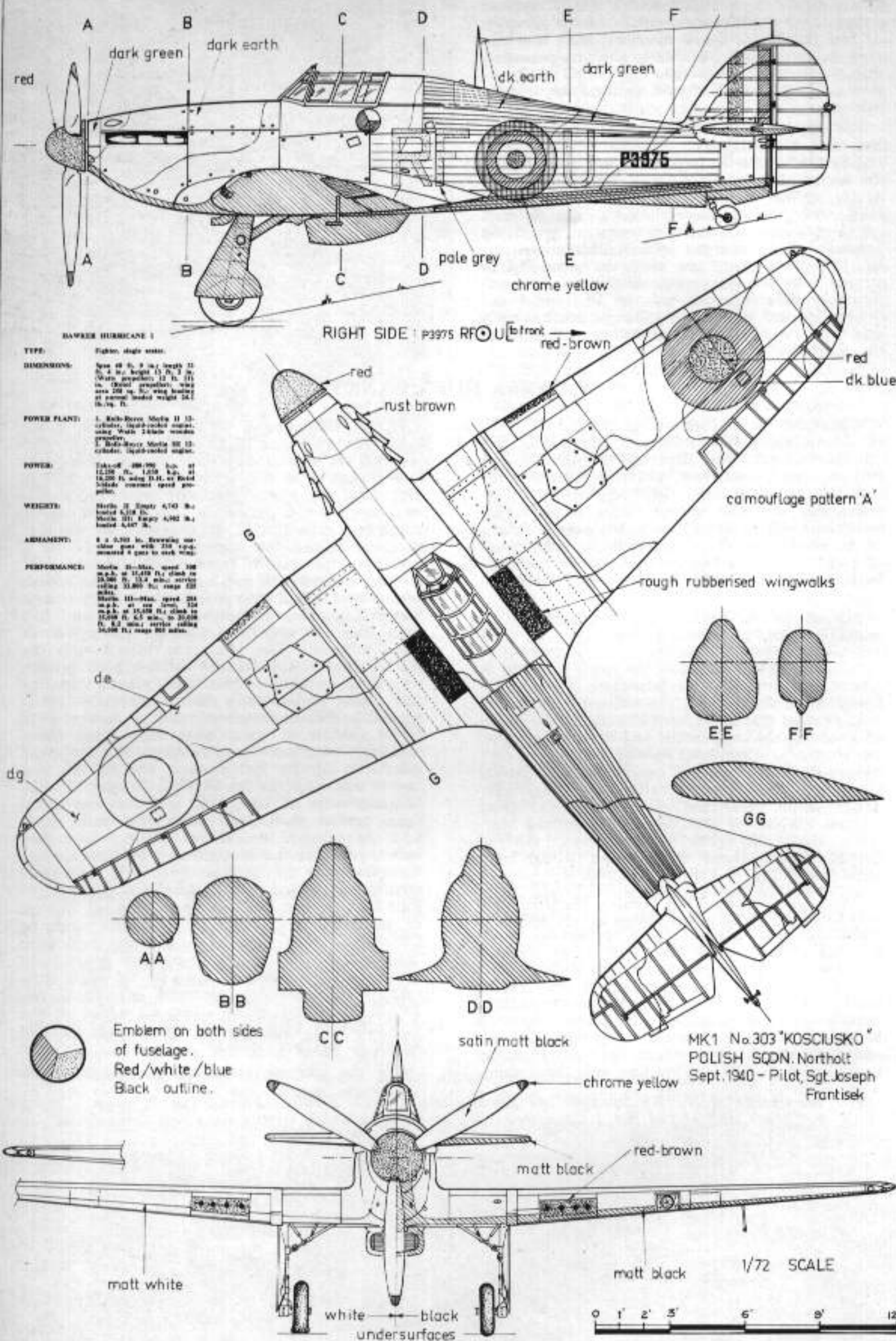
After the Battle for France, the Hurricane squadrons withdrew to England to re-arm, re-group and to be brought up to operational standard. Equipped with the later type Mk. I Hurricanes, replacing most of the early fabric-covered wing Mk. Is using the Merlin II and fixed-pitch Watts wooden propellers, the squadrons soon had aircraft which could achieve speeds of between 320 and 330 m.p.h. at 15,650 ft. when new from the factory. Much has been made of a statement by Lord Dowding that Hurricanes

averaged 305 m.p.h. (Note averaged, so some exceeded this figure.) Official figures from the Aircraft & Armament Experimental Establishments show that this figure is consistent with a Hurricane Mk. I with Merlin II engine and wooden propeller. A maximum speed of 318 m.p.h. could be attained at 17,400 ft. It is also possible that the stated low figure would apply to a machine after return from a maintenance unit, due to variations in trim and conditions of finish where unmatched components had to be used. Some Hurricanes straight from the factory had been tested at speeds as high as 330 m.p.h. at rated altitude. The Hurricane Mk. I with the Rolls-Royce Merlin III and variable pitch propeller, either Rotol or de Havilland, played a leading role in the Battle, but a few of the early fabric-winged machines were returned to service after repair. Most of these were later fitted retrospectively with metal-covered wings. The top speed inferiority of the Hurricane to the Bf 109 was known and accepted by Fighter Command. The Messerschmitt Bf 109 could outclimb and sometimes outdive particularly, those Hurricanes fitted with two-position propellers. Official strategists had hoped that the Hurricanes would pursue the bombers while the Spitfires attended to the fighter escorts. In practice, the Hurricane pilots often found their way blocked by swarms of fighters or, when about to attack the bombers, would be forced to break off the attack as they were 'bounced' by the escort flying 'top cover'. In addition, the aggression shown by the pilots from many Commonwealth countries as well as the British and their other allies, all added to the difficulties in keeping each type to the job for which it was best suited.

For the sake of the official record, the Battle

Left. Hurricanes of No. 85 Squadron on patrol from Church Fenton. Photo, Ian Primmer. Right. F.O. A. Clowes, D.F.M., of No. 1 Squadron. Note emblem on which victory score was painted, one per band.







Left. This pilot officer expended all his ammunition then deliberately cut off a Bf 109's tail with his wingtip. Right. Sqn. Ldr. R. Stanford-Tuck, D.S.O., D.F.C., showing score of 26 victories.

proper is stated by the Ministry of Defence to have begun on July 10th. On that day, the *Luftwaffe* sent a small force of some seventy bombers and fighters against a convoy moving in the Channel. In No. 11 Group's Sector, six Hurricanes of No. 32 Squadron were first on the scene. Seeing the attack was in progress, the Hurricanes attacked the combined force of Dornier Do 17s, Messerschmitt Bf 109s and Bf 110s, forcing them to adopt a protective cylinder extending to 12,000 ft. Help soon arrived from sections of Nos. 11, 74, 64 and 56 Squadrons, numbering some twenty aircraft in all, a mixture of Spitfires and Hurricanes. Eight of No. 74 Squadron's Spitfires climbed over the top layer to 13,000 ft. and dived to the attack. The convoy lost only one small ship to the bombers;

the Germans lost four fighters and the R.A.F. three. Next day, with odds of seven to one, Bf 109s shot down one of three defending Hurricanes and two of six Spitfires during a similar convoy attack by Ju 87s and Bf 109s. What was more important, the attacks were successfully broken up, and the attackers, short of fuel, were forced to return to base.

Many times Hurricanes returned shot up, with damage that would have brought down lesser machines. The very nature of the steel tube, stringer-and-fabric-covered structure meant that shells or bullets striking the rear fuselage and/or tail surfaces would have to strike a small vital spot before breaking up of the airframe could take place.

MESSERSCHMITT Bf 110C

Professor Willy Messerschmitt's first warplane design was the Bf 109 and his second the Bf 110. The idea behind the latter design was to produce a long-range fighter, heavily armed for the protection of bombers on their missions involving deep penetration into enemy territory. The machine he produced, considering the difficulties in such an aircraft design, proved quite a capable aircraft within its limitations. Unfortunately for the *Luftwaffe* these limitations were frequently reached, indeed overstepped, resulting in losses that gave the Bf 110 a bad name. The Bf 110 was designed around the Daimler-Benz DB 600, an engine then in process of development with a promised 1,000 h.p. output. In the event the power was 910 h.p. but this was still better than that of the only other engine available, the Junkers Jumo 210A of 610 h.p. Test flights started on May 12th, 1936, and its top speed of

314 m.p.h. was as high as that of the Hawker Hurricane which first flew on November 6th 1935. Test pilots were unenthusiastic about the manoeuvrability and acceleration of the Bf 110 but the high speed was impressive and faster even than the Bf 109B-1.

By the time of the start of the Channel actions in July 1940 the number of versions had increased so that there were the Bf 110C-3 and -4, with improved cannon and armour for the crew, the Bf 110C-4/B fighter-bomber and the Bf 110C-5 reconnaissance and photo machines. This last model had the 20 mm. cannon removed. Another version was the Bf 110D-1 with a belly slipper-tank of 264 gallons and these equipped 1 Gruppe of *Zerstörergeschwader* 76 of *Luftflotte* 5 at Stavanger, Norway. 1/ZG 76 participated in Stumpff's only raid in strength on August 15th

This Bf 110C-5 of IV/F14 piloted by Olbt. Friedrich Runde, was shot down intact at Goodwood on 21st July, 1940. Photos, Ian Primmer.





Left. A Bf 110 of ZG 76, the 'Haifisch' Gruppe. These aircraft carried a shark's mouth emblem on the nose. Code was M8 + 1P. Photo, Ian Primmer. Right. Bf 110 of III/JG 26, U8 + H1 with all-white nose and white bands around spinners and rear fuselage.

flying as escort to the Heinkel 111s of KG 26, also from Stavanger. Intercepted over the sea by No. 72 Squadron's Spitfires, six of the Bf 110s and eight bombers were lost.

At the time of the Germans' reckoning of the start of the Battle of Britain, August 13th, the two *Luftflotten* in immediate opposition had on strength four *Zerstörergeschwaderen* as well as Test Group 210 of *Luftflotte* 2, equipped with both Bf 109 and Bf 110 fighter-bombers. These amounted to about 300 aircraft. The previous day, *Hauptmann* Walter Rubensdorffer's Bf 110s and Bf 109s had hit at the radar sites and one station (Pevensey) suffered a cut in the main power cable, putting it off the air. Rye was off the air for three hours and Dover and Dunkirk (Kent) were all damaged but operating. Ventnor (Isle of Wight) was attacked by Junkers Ju 88s of *Luftflotte* 3, either KG 51 or KG 54.

The early morning of Eagle Day provided interest more by the absence of Messerschmitt Bf 110s than their presence. Cloudy weather and light rain caused a postponement but the Dorniers of KG 2 had already taken off and met their escort. The Bf 110s of ZG 26 (*Oberstleutnant* Joachim Huth) received the AB cancel signal though, and departed. Fink carried on to Eastchurch, bombed successfully and was intercepted by Hurricanes of No. 111 Squadron on the way out, losing five aircraft. In the confusion resulting from the cancellation earlier, a raid by Ju 88s of KG 54 on Portland was called off, but the escort, Bf 110s of ZG 2 turned up off the target on their own and lost five machines in interceptions by no less than three squadrons of fighters. More attacks followed as the day passed

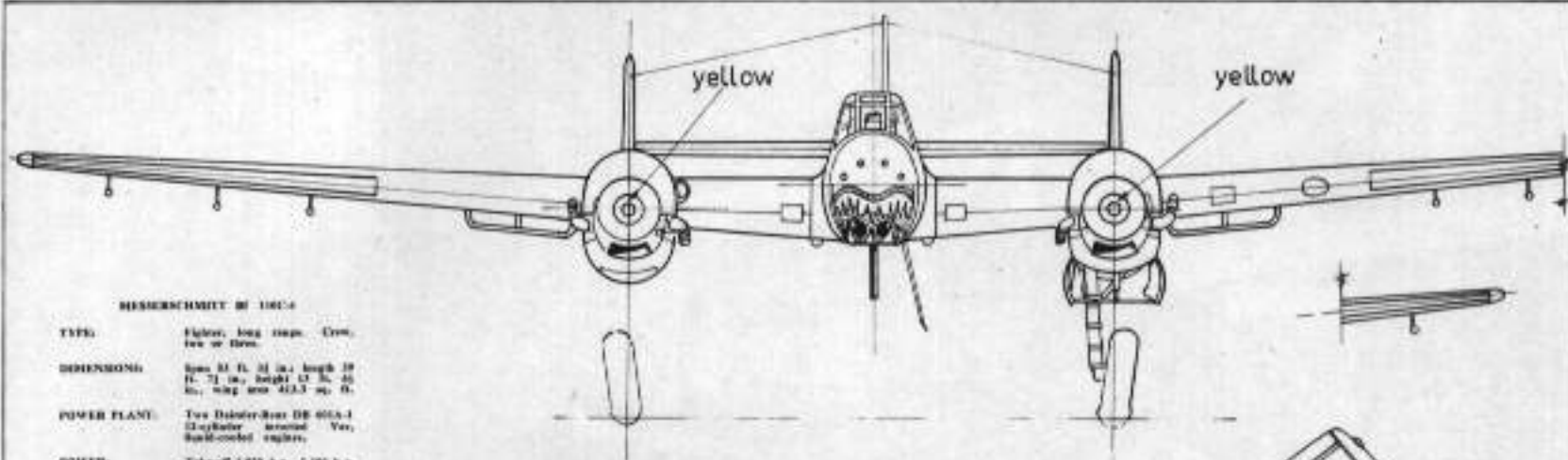
and the score for the day came to nine 110s, not a large number but significant. The total R.A.F. fighter losses were 13 for some 45 German aircraft brought down.

Operations of the Bf 110s and the fighter-bomber versions continued, with mixed groups of aircraft, Junkers Ju 88s high up with Bf 110s, and lower down the Dornier Do 17s with Bf 109 escort. The fighter-bombers rarely operated on their own as by the end of August they were considered too vulnerable to risk without escort. Sorties in September were considerably curtailed, and the Bf 109 escorts improved so that while the Bf 110 losses for August were 114 on operations, those for September were only 81.

The firepower of two 20 mm. cannons and four machine-guns placed the Bf 110 to the forefront in the armament category, but the loaded weight of over 13,000 lb., and a wingspan of 53 feet handicapped the manoeuvrability to such an extent that the heavy armament could not be brought to bear. If the Bf 110 had been a more sprightly aircraft the story would have been vastly different as witness the devastating damage inflicted on those Hurricanes and Spitfires who were caught in front of the *Zerstörer*. The Messerschmitt Bf 110 went on after the Battle of Britain to become a successful night-fighter over France and Germany, where the six-gun armament ran up a big score on British bombers. On the Eastern Front they were used for ground attack. They also became involved with the Americans in 1943, the Bf 110G being used in attacks on bomber formations where the massed heavy calibre machine guns of the big U.S.A.A.F. bombers caused them heavy losses.

Left. Bf 110 of I/JG 52. Dragon emblem was black and white. Right. Bf 110D with "dackelbauch" (dachund belly) auxiliary fuel tank. Photos, Gerhard Ebers.





MESSERSCHMITT Bf 110C-3

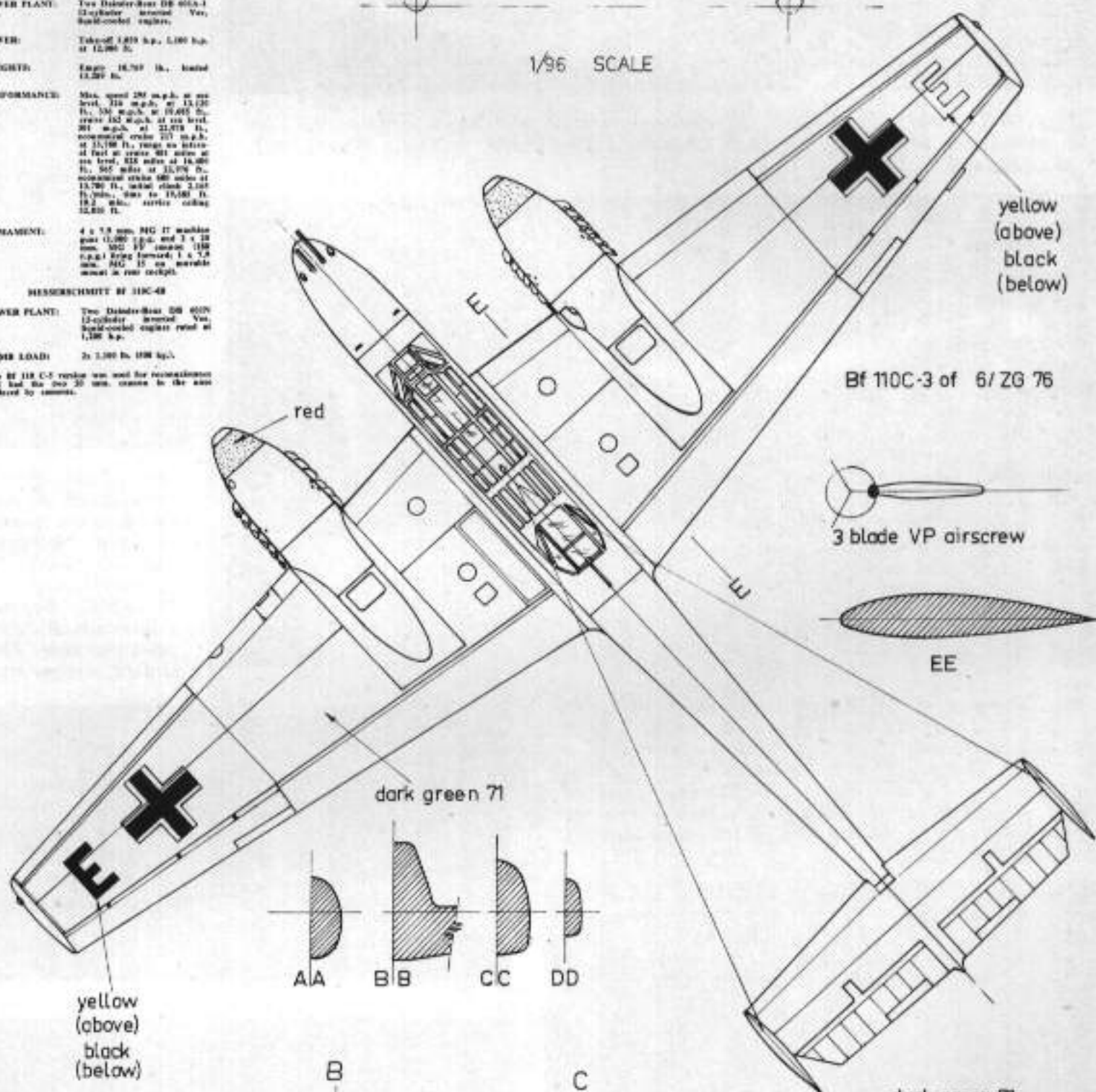
TYPE:	Fighter, long range. Crew: two or three.
DIMENSIONS:	Span 31 ft. 3 in.; length 38 ft. 7 in.; height 12 ft. 6 in.; wing area 413.3 sq. ft.
POWER PLANT:	Two Daimler-Benz DB 601A-1 12-cylinder inverted Vee, liquid-cooled engines.
POWER:	Take-off 1,815 h.p.; 1,190 h.p. at 12,000 ft.
WEIGHTS:	Empty 16,767 lb.; loaded 17,200 lb.
PERFORMANCE:	Max. speed 287 m.p.h. at sea level; 218 m.p.h. at 13,120 ft.; 134 m.p.h. at 19,405 ft.; cruise 182 m.p.h. at sea level; 201 m.p.h. at 12,075 ft.; economical cruise 217 m.p.h. at 15,100 ft.; range on internal fuel at cruise 401 miles at sea level; 828 miles at 16,400 ft.; 545 miles at 15,170 ft.; economical cruise 680 miles at 13,700 ft.; initial climb 3,167 ft./min.; time to 15,000 ft. 19.2 min.; service ceiling 22,850 ft.
ARMAMENT:	4 x 7.5 mm. MG 17 machine guns (1,000 r.p.m.) and 3 x 18 mm. MG 15 machine guns (1,100 r.p.m.) firing forward; 1 x 7.5 mm. MG 15 on movable mount in rear cockpit.

MESSERSCHMITT Bf 110C-4B

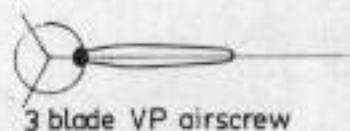
POWER PLANT:	Two Daimler-Benz DB 601N 12-cylinder inverted Vee, liquid-cooled engines rated at 1,190 h.p.
WEIGHT LOAD:	2x 1,100 lb. 100 h.p.

The Bf 110 C-3 version was used for reconnaissance and had the two 30 mm. cannons in the nose replaced by machine guns.

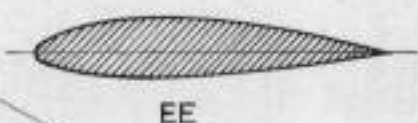
1/96 SCALE



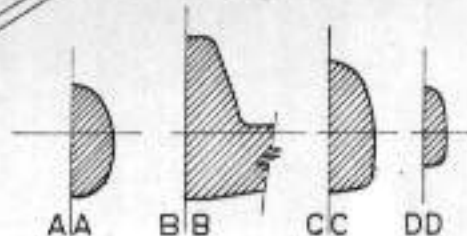
Bf 110C-3 of 6/ ZG 76



3 blade VP airscrew



EE



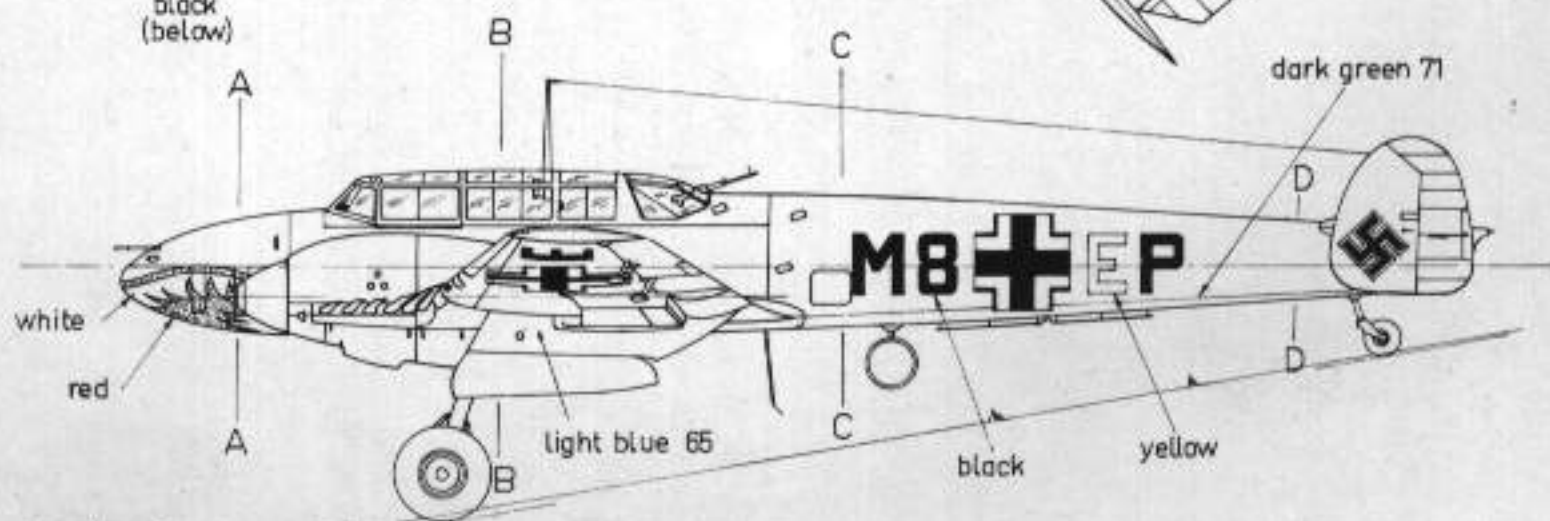
AA

BB

CC

DD

yellow (above)
black (below)



A

B

C

dark green 71

D

D

white

red

A

light blue 65

C

black

yellow

2 4 6 8 ft.



Huntcraft AF-T, P2617, in No. 857 Squadron markings with high armor and Royal Air Force insignia, displayed outside the Ministry of Defence, London, during Battle of Britain Week, 1963. Photo: G. Penland.



Osprey. The aircraft the Luftwaffe came to fear, the deadly Spitfire. Red doped patches and cordite marks covered gun ports are of interest. Last aircraft is a Spitfire IX. Below, Hawking selected their victim, Spitfires shot in on a lone He 111 for the kill. Lack of accurate World War II aircraft provided a more representative recreation in the film of the combat types involved in the Battle.



Left, Looking for all the construction model, the Spitfire was also on display near the site No. 73 Squadron at C. and was flown by P.O. Lt. Fighter Command's only 7. Photo: G. Penland. Also, police-named Messerschmitt from the film 'The Battle of the United States and Spitfire'.



Above and below. Typical battle scene from the film, involving Messerschmitts, Spitfires and He 111s, the latter being, in fact, CATA 2-111s fitted with Merlin engines.

the world like a Spitfire I, PR-T, R3942 of the Hurricane. It arrived at Church Fenton in 1940 at J. B. Nicholson, V.C., a V.C. winner of the war. Above. Spitfire ducks a shot. All action photos by of British' per courtesy of Productions.



Below. Spitfire ducks in on a stricken He 111 heading towards over the English Channel. Below left. Five flying shot of a modified He 111 in damaged condition of 71/92 and 83 Luftwaffe fighter finish.





Upper left. Emblems of He 111 Staffeln. Left, Gruppe 122; centre, unknown; right, KG 26. Lower. A British airman sits in the pilot's seat of a captured He 111. Right. At the scene of the landing. Photos, A. Innes-Ker.

HEINKEL He 111

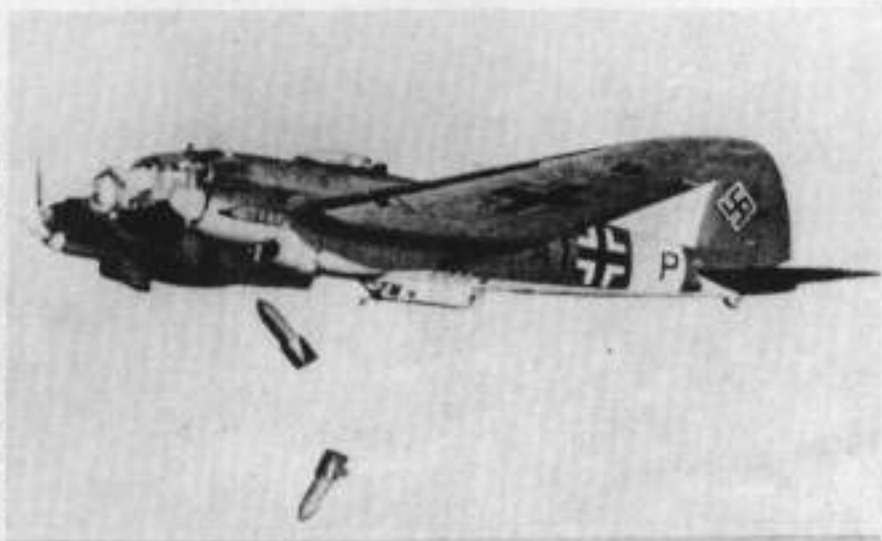
The *Luftwaffe* considered the He 111 was a machine which should be used until the units could equip with the newer Ju 88, and on Eagle Day only KG 26, KG 27, KG 53 and KG 55 were completely equipped with the He 111. The first of the big raids by the Heinkel 111s was made on August 15th by *Luftflotte* 5, with a combined force of 65 He 111s of KG 26, and 34 Messerschmitt Bf 110 escort fighters of ZG 76 from Stavanger. A second group of Junkers Ju 88 bombers of KG 30 also from Stavanger came through the defences to bomb the airfield at Driffield. *Luftflotte* 5's losses for the day were eight He 111s, seven Bf 110s and eight Ju 88s. The Ju 88 sortie was unescorted, whereas the He 111 had the doubtful benefit of the long-range escort fighters. Considering the small number of No. 12 Group fighter interceptions (two squadrons) the Ju 88s were punished severely, and the He 111s and Bf 110s intercepted by No. 13 Group and engaged successively by three Spitfire squadrons and two of Hurricanes, were no more severely mauled. Either the Bf 110 escort that remained with the Heinkels had an effect or the 50 m.p.h. speed margin of the Ju 88 held no advantage for that aircraft.

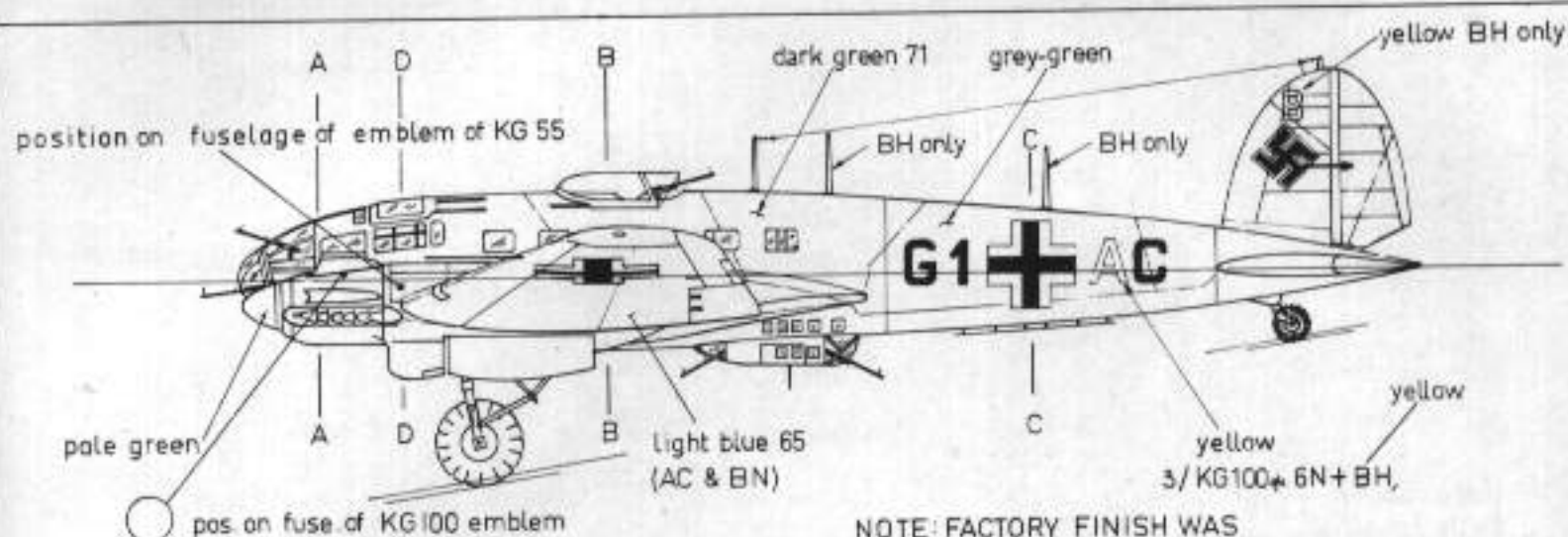
German bombers generally could not take care of themselves and the Heinkel 111 was no exception. Whenever separated from their escorts their losses were heavy and after the middle of September 1940, were put on to night bombing, a much

safer mode of operation at that time. Heinkels added their bomb loads to the infernos of London, Coventry and other cities, and their losses were small as night interceptions were rare.

The models with which the *Luftwaffe* entered the War in 1939 were the He 111 P and H series, the P employing the Daimler-Benz DB 601A and the H the Junkers Jumo 211. This last was standardised in 1940. The bomb load was eight 551 lb. (250 kg.) bombs, carried in internal cells, and the armament was still only three 7.9 mm. MG 15 machine-guns, one in the nose, one firing from the dorsal position in the centre section and one from a ventral gondola. Losses over Poland at the outbreak of war led to armour for the crew and two more 7.9 mm. machine-guns mounted to fire through side windows to cover beam attacks. Some machines had an extra gun in the ventral gondola, firing forward. To extend the range the port bomb bay positions were used as additional fuel space and bomb racks were fitted beneath the remaining space. Later in the War, after the failure of the German aircraft industry to produce a better medium bomber, or a long-range one for that matter, the He 111 was put back into production and appeared in various guises, even proving a good torpedo-bomber, and was in many actions operating from Scandinavian bases against convoys to Russia.

Left. An He 111P which crashed on Lammermoor Hill after being shot down by Spitfires. Right. An He 111 of KG 53 unloads its bombs. The bombs were stacked vertically, nose up.





HEINKEL He 111P-4

TYPE: Medium bomber, crew five.

DIMENSIONS: Span 74 ft. 11 in., length 53 ft. 9 1/2 in., height 13 ft. 11 in., wing area 942.9 sq. ft.

POWER PLANT: Two Daimler-Benz DB 601A-1 12-cylinder inverted Vee, liquid-cooled engines.

POWER: Take-off, 1,100 h.p. (each), 1,105 h.p. at 14,765 ft.

WEIGHTS: Empty 17,670 lb., max. loaded 29,762 lb.

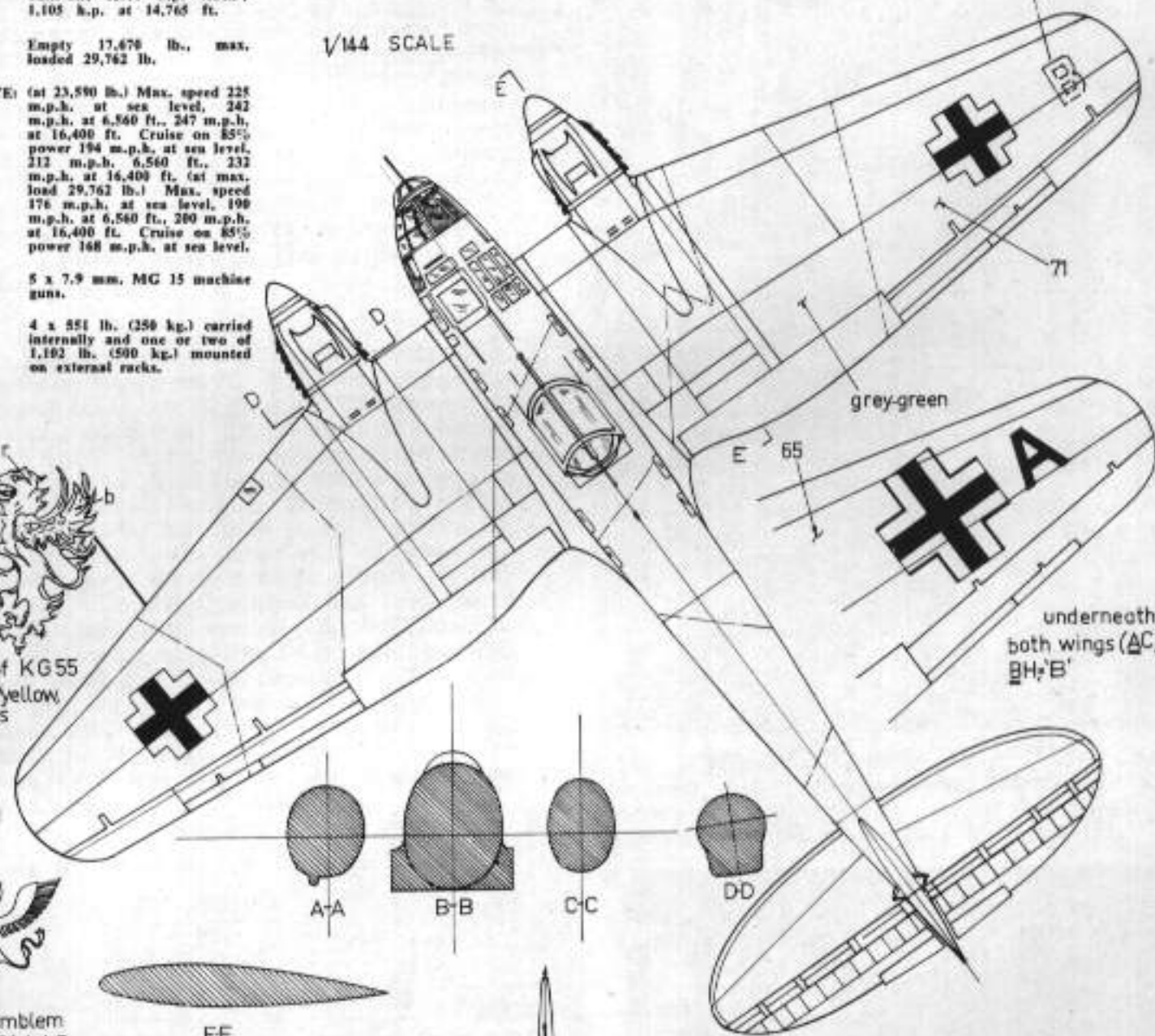
PERFORMANCE: (at 23,590 lb.) Max. speed 225 m.p.h. at sea level, 242 m.p.h. at 6,560 ft., 247 m.p.h. at 16,400 ft. Cruise on 85% power 194 m.p.h. at sea level, 212 m.p.h. at 6,560 ft., 232 m.p.h. at 16,400 ft. (at max. load 29,762 lb.) Max. speed 176 m.p.h. at sea level, 190 m.p.h. at 6,560 ft., 200 m.p.h. at 16,400 ft. Cruise on 85% power 168 m.p.h. at sea level.

ARMAMENT: 5 x 7.9 mm. MG 15 machine guns.

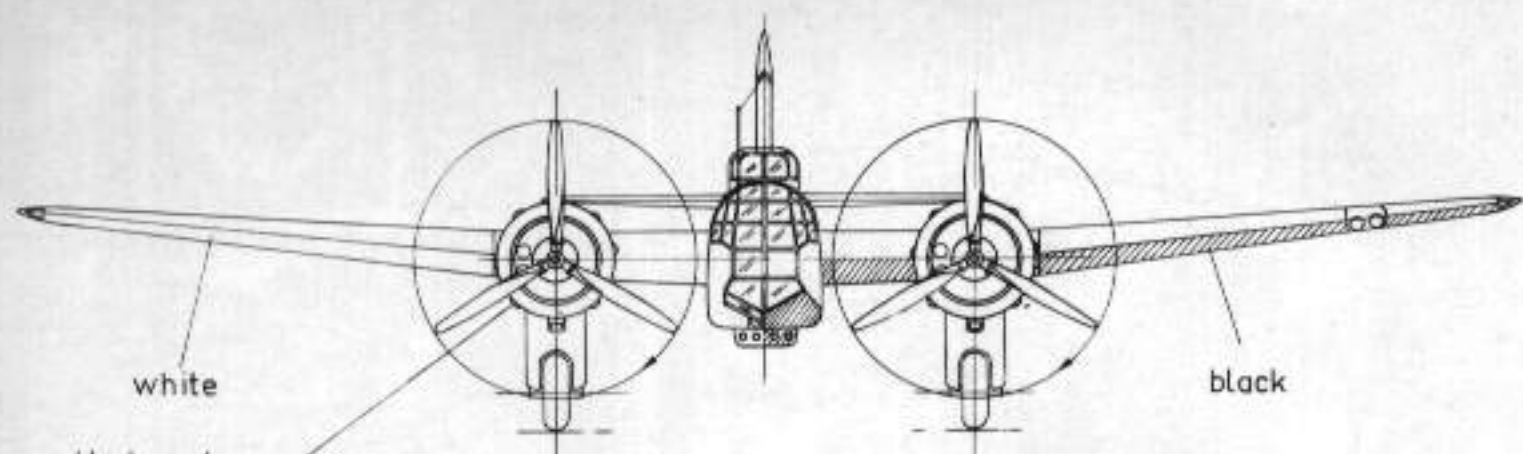
BOMB LOAD: 4 x 851 lb. (350 kg.) carried internally and one or two of 1,192 lb. (500 kg.) mounted on external racks.

NOTE: FACTORY FINISH WAS BLACK GREEN 70/ DARK GREEN 71. 71 AND LT. OLIVE GREEN WAS FIELD REPAINT FOR SUMMER, "WOODS AND MEADOWS" COLOURS WHEN AIRCRAFT HAD TO BE DISPERSED IN OPEN FIELDS.

1/144 SCALE



sky blue
red
black
white



black under both cowlings

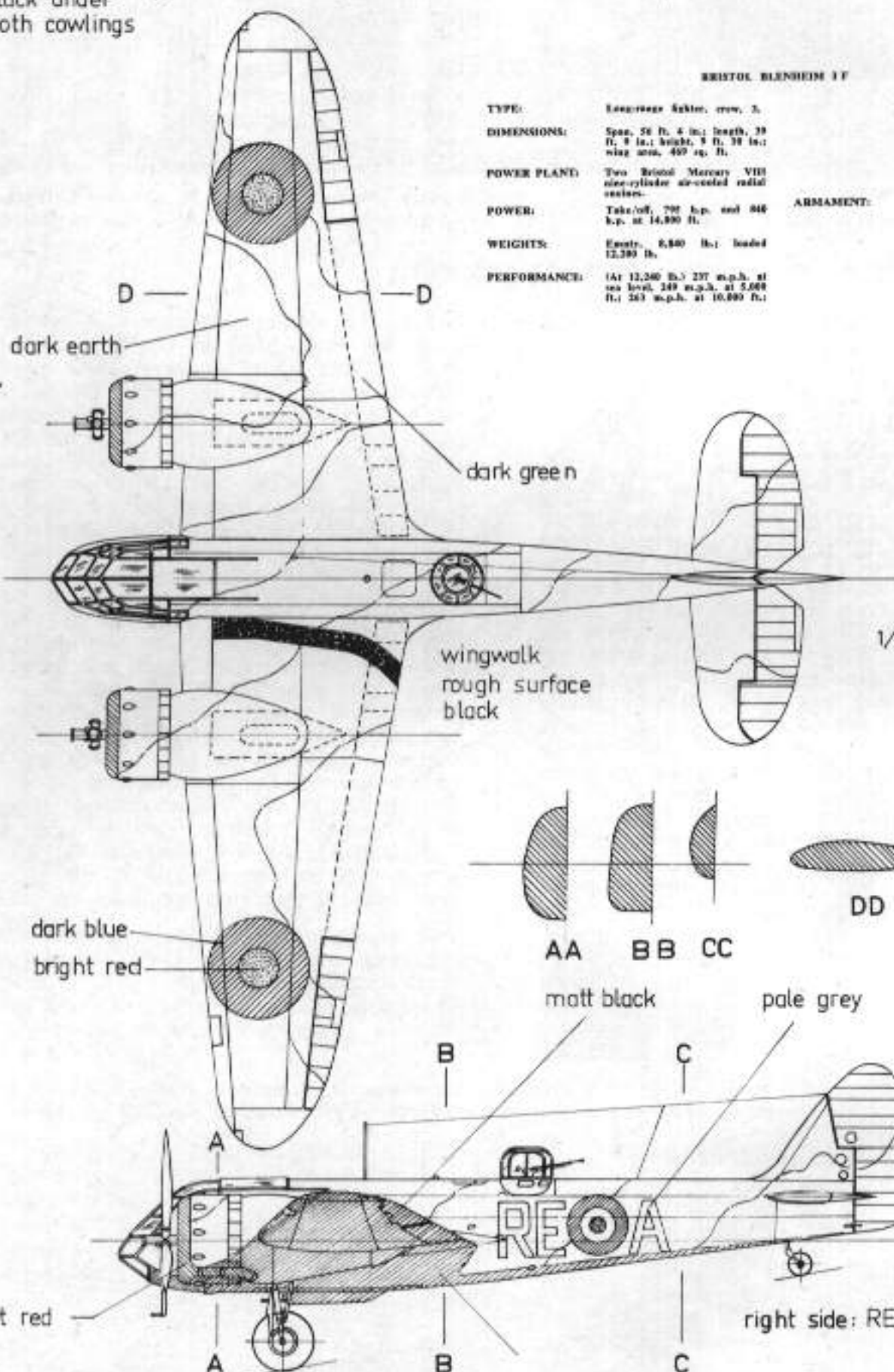
BRISTOL BLENHEIM IF

TYPE:	Long-range fighter, crew, 2.
DIMENSIONS:	Span, 56 ft. 4 in.; length, 39 ft. 9 in.; height, 9 ft. 10 in.; wing area, 467 sq. ft.
POWER PLANT:	Two Bristol Mercury VIII nine-cylinder air-cooled radial engines.
POWER:	Take-off, 795 h.p. and 846 h.p. at 14,000 ft.
WEIGHTS:	Empty, 8,840 lb.; loaded 12,280 lb.
PERFORMANCE:	(A) 12,240 ft.: 237 m.p.h. at sea level, 249 m.p.h. at 5,669 ft.; 363 m.p.h. at 10,000 ft.

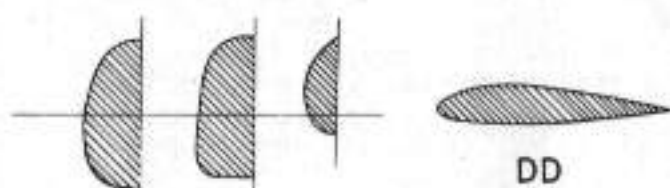
278 m.p.h. at 15,000 ft.; cruising speed, 218 m.p.h. at 15,000 ft.; range, 1,000 miles; rate of climb, sea level, 1,400 ft./min.; time to 8,000 ft., 5.9 min.; to 15,000 ft., 8.1 min.; service ceiling, 24,000 ft.

ARMAMENT:

4 x 8.363 in. Colt-Browning machine guns with 250 rounds per gun in ventral pack carried beneath the fuselage, one 8.363 in. Colt-Browning with 400 r.p.m. mounted in wing, and one 8.363 in. Vickers "K" gun in Bristol B.I. 50s. 10 hydraulically operated dorsal turret.



1/120 SCALE



AA BB CC

matt black

pale grey

B

C

A

B

C

right side: REOA





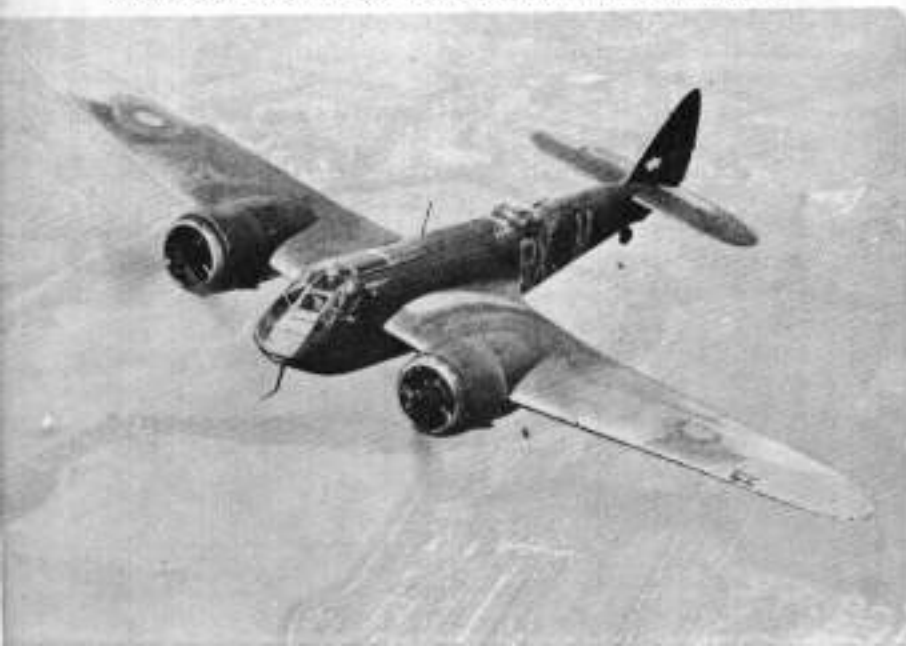
The original Bristol 152, "Britain First", financed by Lord Rothmere as a private venture and donated to the nation, was a forerunner of the Blenheim. Photo, A. Shennan.

BRISTOL BLENHEIM IF

In 1936, the Bristol Type 142M Blenheim was hailed as one of the fastest twin-engine medium bombers in the world. When introduced into service, it proved to be faster than many of its contemporaries. The first Blenheims delivered went to No. 114 Squadron at Wyton in March 1937. However, in the early months of the War, it was soon revealed that its armament and armour protection was inadequate for defence. In this respect it must be considered to be in the same category as the Dornier Do 17E and the Junkers Ju 88A-1. Blenheim bombers were no match for Bf 109s, but nevertheless they proved indispensable in the initial phases of the War as a useful 'stop-gap' heavy fighter.

On August 15th, when *Luftflotte 5* sent its Ju 88s against Driffield, two squadrons of Blenheim IFs on loan from No. 12 Group chased the Ju 88s but could not catch them. Blenheim IFs were also used for the development of airborne Intercept radar (A.I.), No. 600 Squadron, flying trials of the A.I. Mk. III sets with considerable success. When it became generally available, A.I. Mk. III radar was fitted to the Blenheim IF serving throughout the latter part of 1940 into 1941 and scored the first night victory on July 22nd, 1940. Coastal Command had been issued with the long-nosed version of the Blenheim fighter, designated Blenheim IV F and fitted with a ventral gunpack. While these IV Fs were used in anti-shipping strikes, some, like the Coastal Command pilot in the accompanying photo, could not resist 'having a go' at enemy aircraft. The Blenheim IV F was also used by squadrons of Fighter Command for a short time.

Blenheim RX-M of No. 25 Squadron in flight.



Upper. A pilot of a Blenheim IVF of Coastal Command, who with two other Blenheims, attacked 40 Bf 110s, shooting down two for no loss to themselves. Lower. Thumb on the gun button of a Blenheim IF.





KG 51

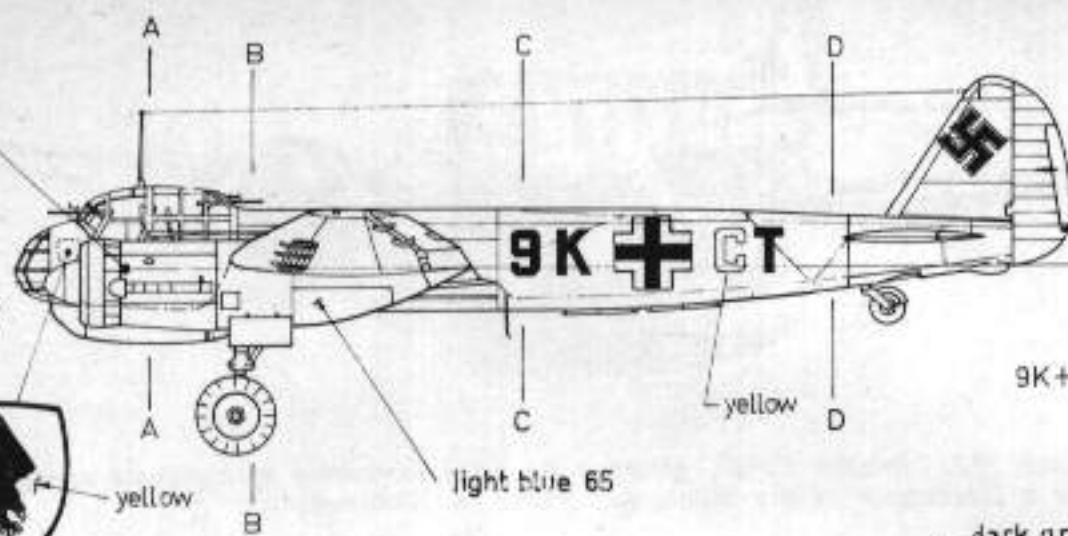
- cobalt
- red
- grey
- black/yellow

III KG 30-
emblem
faced for-
wards, left
and right

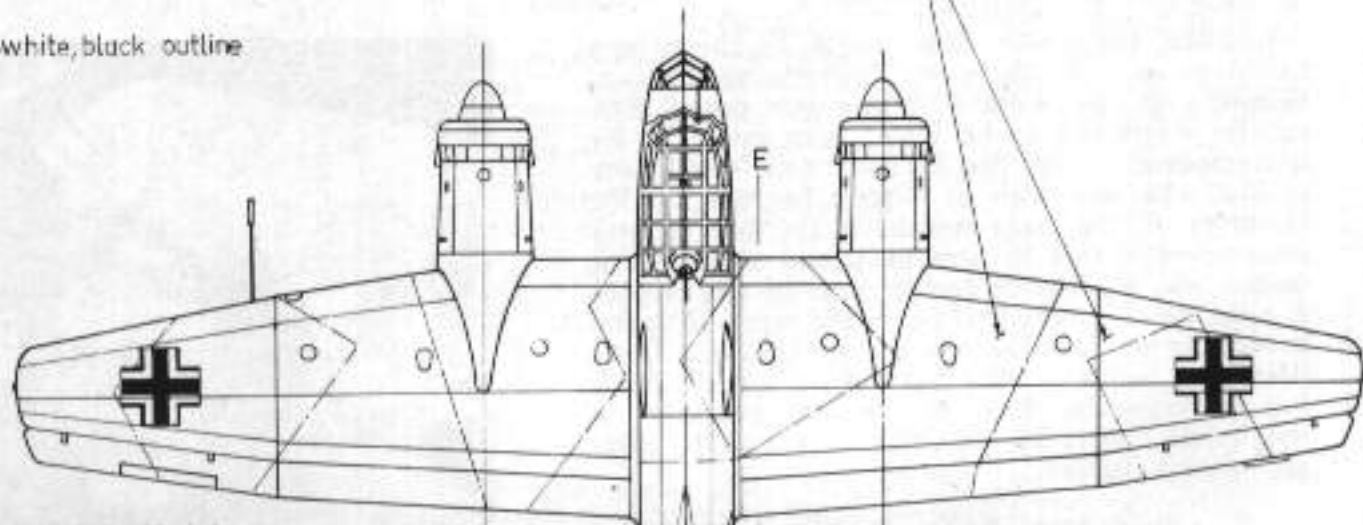


codes 4D + AR

white, black outline

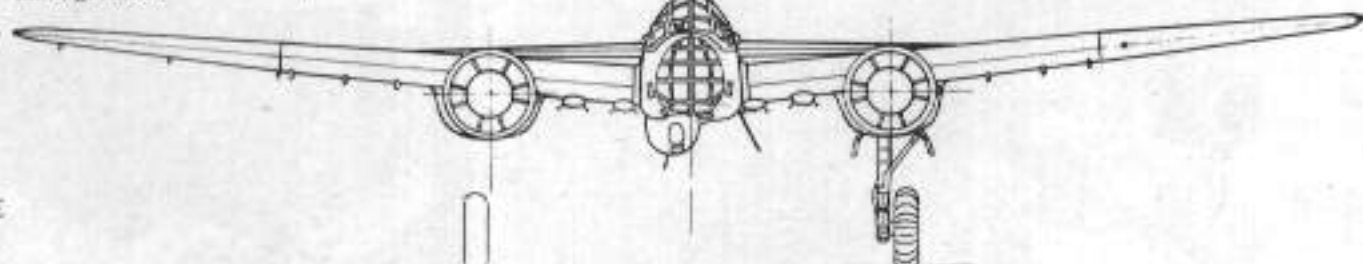
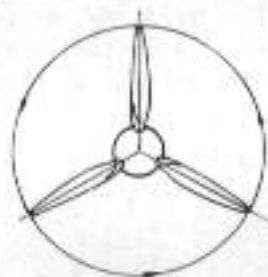
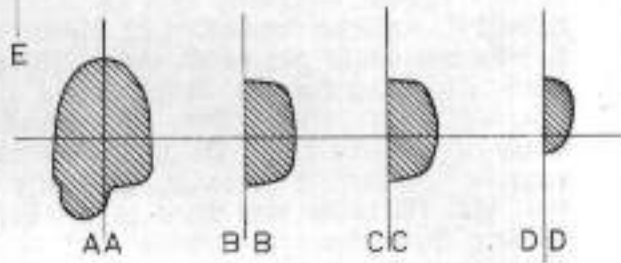


9K + CT was from 9 Staffel



JUNKERS Ju 88 A-1

- TYPE:** Medium bomber, crew 4.
- DIMENSIONS:** Span 60 ft. 3 1/2 in.; length 47 ft. 1-1/3 in.; height 17 ft. 5 1/2 in.; wing area 565 sq. ft.
- WEIGHTS:** Empty 16,975 lb.; loaded 22,840 lb.
- POWER PLANT:** Two Junkers Jumo 211 B-1 12-cylinder inverted Vee, liquid-cooled engines.
- POWER:** Take-off, 1,200 h.p. (each).
- PERFORMANCE:** (at 19,750 lb.) 280 m.p.h. at 18,050 ft., 272 m.p.h. at 19,685 ft.; (at 22,840 lb.) 227 m.p.h. at sea level, 258 m.p.h. at 18,050 ft., 250 m.p.h. at 19,685 ft. Cruising speed 217 m.p.h. at 18,050 ft., range 620 miles (with aux. tank plus internal, 1,055 miles), service ceiling at 19,750 lb., 26,250 ft.
- ARMAMENT:** 3 (later 5) 7.9 mm. MG 15 machine guns. Bomb load: Normal 3,960 lb. (28 x 110 lb. and 4 x 220 lb.). Max. 5,510 lb. (10 x 110 lb. and 4 x 550 lb.).
- CREW:** Pilot, bombardier/gunner, radio-operator/gunner, mechanic/gunner.

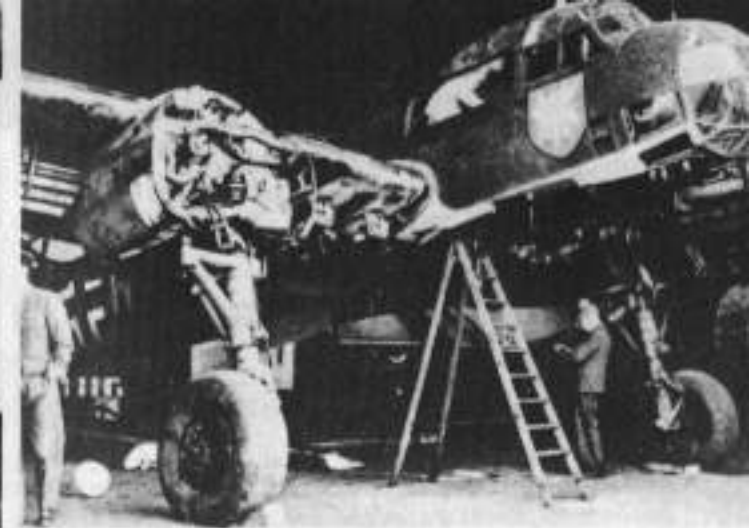


1/144 SCALE



© A. SHENNAN NOV. 1969

JUNKERS Ju 88A-1



Left. Looking for trouble. Ju 88s of the "Eidelweiss" Geschwader, KG 51, in tight formation. Right. A Ju 88A-3 of the same unit being restored by R.A.E. technicians after being forced down over Britain.

JUNKERS Ju 88A-1

The Junkers Ju 88 was unquestionably the best of the *Luftwaffe's* bombers during the Battle of Britain. Nevertheless, it was considered to be fairly easy prey for the British fighters due to its poor defensive armament and the lack of adequate armour protection. The Ju 88 was tough, fast, and despite early troubles with airbrakes and bomb racks that would not jettison when required, eventually became a versatile and most valuable work-horse.

I Gruppe of *Kampfgeschwader* 30, a unit of four aircraft, was first into service, becoming operational in 1939 from *Westerland/Sylt*. The Ju 88A-1s of KG 30 attacked a British Naval Force, claiming a possible hit on an aircraft carrier. The German High Command reported for the first of many times, the destruction of the *Ark Royal*. In fact, the attack had been ineffective.

When the German attack on France and the Low Countries began, KG 4, KG 30, KG 51 and LG 1 played only a small part. LG 1 and KG 30 were used against shipping off Dunkirk, and on May 29th, Defiants of No. 264 Squadron included in their claims one Ju 88 destroyed. On August 12th, 63 Ju 88As of KG 51 and KG 54 attacked Portsmouth while fifteen Ju 88s attacked and destroyed the radar station at Ventnor, Isle of Wight. On that day, the *Luftwaffe* lost thirty-one aircraft, the R.A.F., twenty-two. On August 15th, while Fink's Dorniers attacked Eastchurch, Ju 88s of KG 54, with escorting fighters, were searching in heavy weather for Odiham and Farnborough. Failing to find these relatively unimportant targets, the Ju 88s ran into Nos. 43, 64 and 601 Squadrons. A force of Ju 88s attacked Southampton also that day, damaging the docks and starting serious fires, but no airfields of any importance were hit.

The same day the *Luftwaffe* sent all three air fleets against Britain—fifty Ju 88s of KG 30 from Aalborg in northern Denmark approached *Flamborough Head*, unescorted, to be met by twelve Spitfires of No. 616 Squadron and six Hurricanes of No. 73 Squadron, losing six bombers in the resulting engagement. Thirty Ju 88s proceeded on to *Driffield Airfield*, a bomber station, where they destroyed ten Whitleys on the ground, a big blow to the R.A.F. but not as serious as it would have been had the losses been fighters. Also on the 15th, twelve Ju 88s of I/LG 1 attacked *Middle Wallop*, and 15 from II/LG 1 attacked *Worthy Down*. I/LG 1 destroyed a number of Spitfires on the ground, but II/LG 1 lost five aircraft, only three of the fifteen finding the target.

The Battle of Britain version of the Ju 88 was the Ju 88A-1 with the short span wing. This

version was appreciably faster than the later A-5 and A-4 versions, the A-5 preceding the A-4 on the assembly lines. A total of 2,208 Ju 88s had been delivered by 1940. In the many differing versions the extreme versatility of the Ju 88 became apparent, the development of the design culminating in the Ju 188, Ju 388 and Ju 488V-1 of later years.

Upper. A Ju 88A-5 of KG 30 from Aalborg, Denmark. Centre. A Ju 88 of III/KG 3. Lower. Battle damage on a Ju 88 which returned safely. Photos, Heinz Nowarra.





Left. Ju 87s and crews of II/StG 1. Kommandeur of this Gruppe was Hauptmann Anton Keil who was awarded the "Ritterkreuz" on 9th August, 1940. Photo, Ian Primmer. Right. An almost intact crash-landed Ju 87 is repaired by R.A.F. technicians.

JUNKERS Ju 87

A pleasant machine to fly, efficient in operation and ugly as well, the Junkers Ju 87 was all the German Air Staff believed it was—up to the time of the Battle of Britain. In Polish and French skies, with escorting fighters to care for it, its diving attack was a model of accuracy and destruction, the fuselage 500 kg. bomb being big enough for most targets. This 1102 lb. bomb load was carried by the Ju 87B model powered by a Junkers Jumo 211Da engine of 1,200 h.p. for take-off and was an improvement on the Ju 87A where a load of this size could be carried only if the gunner was left behind. The maximum speed was 211 m.p.h. at sea level, with a range of 370 miles with a 500 kg. bomb. The armament was two forward-firing 7.9 mm. machine guns and one in the rear cockpit. On the eve of the invasion of Poland, 335 Ju 87Bs equipped nine Stuka Gruppen.

Poland fell to the Panzers and the Stukas, France followed, and by the end of June 1940 the Luftwaffe had its orders to stop English shipping using the Channel. For this purpose two

Fleigerkorps were selected, II Fleigerkorps in the Pas de Calais area, and VIII Fleigerkorps near Le Havre. General Loerzer, commander of II Fleigerkorps, assigned only a part of his available force, Dornier Do 17s of KG 2 (placing their commander Oberst Johannes Fink in charge of the operation), two Stuka Gruppen and two Messerschmitt Bf 109 units, JG 26 and JG 53, members of which were respectively Major Galland and Major Mölders. This force, some 75 bombers, 65 Ju 87s and 200 fighters was to attack shipping and attain air superiority in the Dover region of the Channel. To the West, von Richthofen's VIII Fliegerkorps was charged with a similar task in the area between Portsmouth and Plymouth.

Opposing this attack force were the squadrons of A.V.M. Keith Park's No. 11 Group, the primary defending group. Fink began operations on July 3rd, sending off small groups of bombers with a free roving fighter escort looking for stray shipping. Bad weather hindered these sorties for some days, but the Stukas of von Richthofen's force had a more active and successful time. An Atlantic convoy off Portland on July 4th was mauled by two Stuka Gruppen. Four ships were lost and nine others damaged. Another Stuka Gruppe bombed and damaged two ships in Portland itself. The three Gruppen had lost only one aircraft, and that to the convoy guns. There was no R.A.F. fighter opposition and the Ju 87s were free to concentrate on their work.

Convoy CW 8, on July 25th consisted of 21 ships with two escorting trawlers. By the afternoon they were in view of Fink's observation post on Cap Blanc Nez and within easy range of the Ju 87s and Bf 109s of JG 26. A dogfight developed over the convoy, a whirling mixture of Hurricanes, Messerschmitts, Spitfires and Ju 87s. A flight of No. 54 Squadron opened proceedings with Hurricanes of No. 111 Squadron from Hawkinge joining in later, after climbing desperately for altitude from their airfield which was much too close for comfort to the scene of action. The convoy was scattered now and S-boats emerged from Calais to add to the damage, only to be driven off by the Dover destroyers H.M.S. *Boreas* and *Brilliant*. In turn the destroyers were attacked by Ju 87s, the first time *Boreas* was near-missed, in the second attack she was hit by two bombs and suffered 50 casualties. *Brilliant*, too, was hit twice, but luckily the bombs failed to explode. The score for the day was five ships sunk, six badly damaged and two destroyers damaged, one being out of action. To add to the havoc the S-boats came out again, sinking three more ships. This signalled the end of the coastal convoys, at least for some time. More destroyers were lost on the 27th. *Wren*

Upper. A mechanic assists a Ju 87 crewman with his parachute before take-off from a French airfield during the Battle. Lower. Ju 87B-1s in France during 1940. Bomb awaiting loading is an SC 500. Photos, Heinz Nowarra.





Two fine shots of the sinister looking Stuka which emitted a terrifying shriek when diving upon a target. Machine on right is of 1 Gruppe of StG 2.

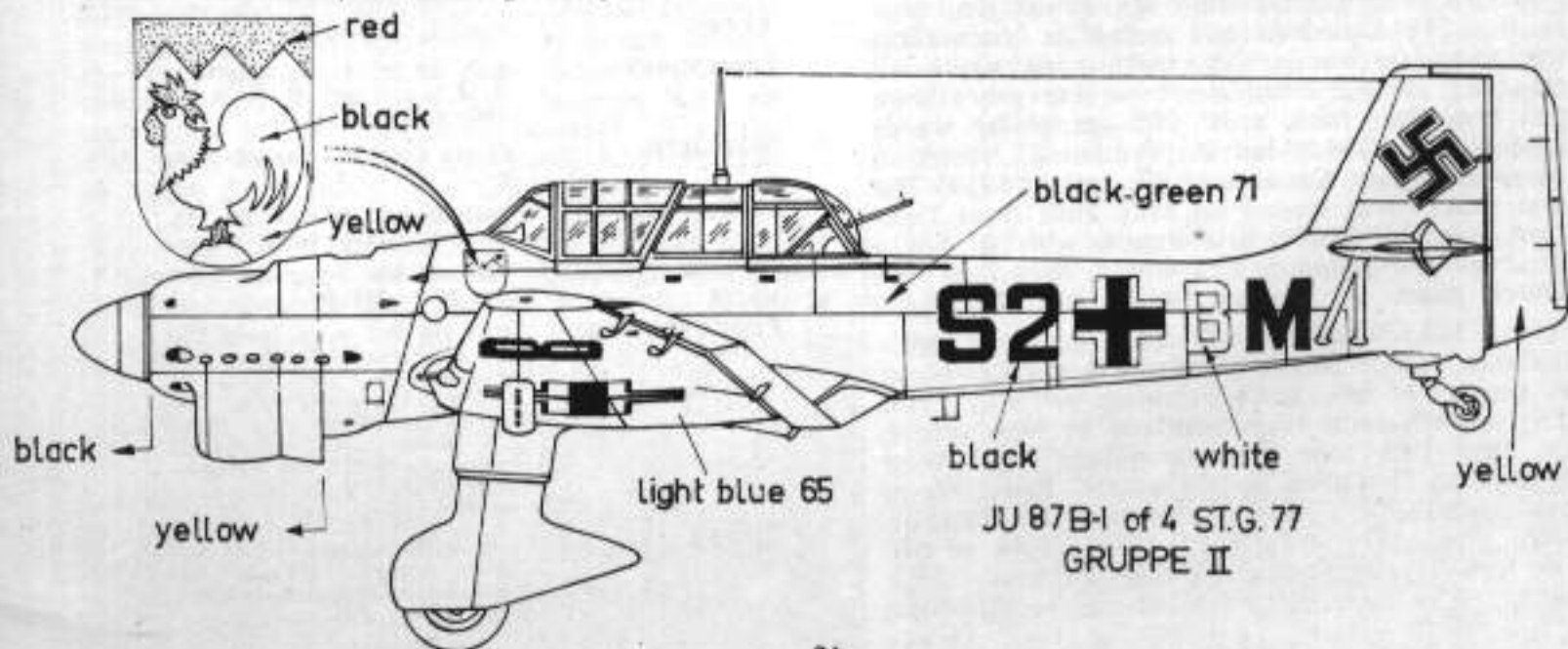
was sunk off Lowestoft, *Codrington* went down swiftly in the Channel off Dover, and inside the harbour bombs damaged the *Walpole*. On the 29th von Richthofen's Ju 87s attacked the destroyed *Delight*; she sank some hours later. In this period many of the small ships of the Navy suffered, armed trawlers, minesweepers and rescue boats. Among them were *Staunton*, *Campina* (mined), *Rodino*, *Kingston*, *Galena* and *Fleming*. The latter was sunk by four Stukas. The next day saw R.N. destroyers ordered out of the Channel by day, and the first part of the "clear the Channel" directive had been attained. But Fink and von Richthofen had not secured air superiority, by night the Channel could still be used by the Royal Navy. In these and other operations the *Luftwaffe* in July had lost 16 Ju 87s and 93 bombers, but the Stuka losses were small compared with the 51 for the following month.

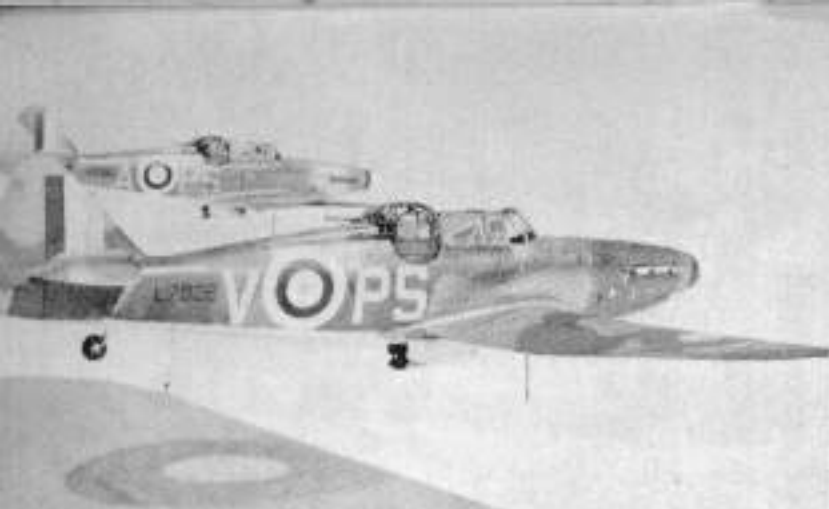
The heavy losses suffered by the Stuka *Gruppen* were due to the inability of the escorting fighters to protect them owing to the slowness of the dive-bomber itself. The dive was long, sometimes starting from 15,000 feet and the speed in the dive with the drag of the bomb and carrying mechanism was only about 150 m.p.h. The Bf 109s, being aerodynamically cleaner, could not stay with them at this speed (but this did not stop Göring ordering them to do just that after the first losses), and on recovering at the bottom of the dive, at low altitude and right in amongst the anti-aircraft fire, their formations were broken and they were easy prey for the waiting enemy fighters. The withdrawal of the Ju 87s to the Pas de Calais area in late August did not signal the demise of the type. On the contrary, production continued, terminating finally in 1944.

The Ju 87B was also used by the *Regia Aeronautica* under the name *Picchiatello* (Ju 87B-1 Trop.). Hungary and Rumania were also supplied in quantity. The name 'Stuka' comes from the German word *Sturzkampfflugzeug*, meaning dive-bomber. It applied to any machine of that type but came to be applied solely by the Allies to the Ju 87. When too much was asked of it the losses became prohibitive, and it was withdrawn from the actions over the Channel and England after only ten days of forays in strength.

JUNKERS Ju 87B-1

TYPE:	Dive bomber, crew two.
DIMENSIONS:	Span 45 ft. 3-1/3 in., length 36 ft. 5 in., height 13 ft. 2 in., wing area 343.2 sq. ft.
WEIGHTS:	Empty 6,090 lb., loaded 9,560 lb.
POWER PLANT:	Junkers Jumo 211Da 12-cylinder inverted Vee, liquid-cooled engine.
POWER:	Take-off 1,200 h.p. and 1,100 h.p. at 4,920 ft.
PERFORMANCE:	Max. speed 211 m.p.h. at sea level, 238 m.p.h. at 13,410 ft., cruise 209 m.p.h. at 12,140 ft., economical cruise 175 m.p.h. at 15,090 ft., landing speed 67 m.p.h., range with 1,102 lb. bomb 370 miles, time to 12,190 ft. 12 min., service ceiling 26,250 ft.
ARMAMENT:	2 x 7.9 mm. MG 17 machine guns firing forward, 1 x 7.9 mm. MG 15 machine gun in rear cockpit. Bombs: 1 x 1,102 lb. (500 kg.), 1 x 551 lb. (250 kg.) under fuselage and 4 x 110 lb. mounted on racks outboard of the dive brakes.





Left. Defiant Is of No. 264 Squadron with four-gun turrets clearly visible. Photo, Ministry of Defence. Right. The prototype Defiant, K8310. Photo, A. Shennan.

BOULTON-PAUL DEFIANT I

It is an established fact that the Boulton-Paul Defiant had already been proven unsuccessful before July 10th and the start of the Battle. The Defiants' 'day of glory' which had given an impression of success had been on May 29th over the beaches of Dunkirk. The Defiants of No. 264 Squadron with three squadrons of Hurricanes were patrolling over the beaches with orders to seek the bombers, leaving the fighters to the Hurricanes. In the event, the Hurricanes missed the Bf 110 escorts and the free-ranging Bf 109s. Six Bf 109s 'bounced' the twelve Defiants to be met by a withering hail of fire from forty-eight 0.303 in. Browning machine guns in the Defiants' power turrets. Two Bf 109s were destroyed. Soon afterwards, twenty-one Bf 110s attacked. The squadron claimed fifteen Bf 110s and a Ju 87 destroyed but these figures were greatly exaggerated in the heat of battle, where aircraft seen to be destroyed were often claimed by more than one attacker. The German Quartermaster General's Returns for May 29th show fourteen aircraft lost for the day. It has been stated by a Defiant pilot that "the enemy mistook us for Hurricanes". By May 31st, the Germans must have learnt their aircraft recognition, for on that day they shot down seven Defiants. The lack of forward-firing guns for the pilot and the blind spot below and directly behind had been detected. During the Battle proper, the Defiant squadrons took a severe mauling from the German fighters despite the great gallantry and determination of their crews.

Heavier than a Hurricane, carrying a 600 lb. turret, four machine guns and ammunition, the Defiant actually had less wing area than a Hurricane! Because of the drag of the turret the maximum speed did not exceed 302 m.p.h. while the manoeuvrability and rate of climb suffered also. In 1939 a production Mk. I was sent over to No. 111 Squadron and tested in comparison with their Hurricanes. The opinion was expressed that the Defiant would not survive more than one encounter with a Bf 109—prophetic words indeed! No. 264 (Madras Presidency) Squadron received its first Defiants in December 1939. The first victory was scored on May 10th from Duxford when 'A' Flight, in company with 'B' Flight of No. 66 Squadron's Spitfires, patrolled the Dutch coast. A Junkers Ju 88 was destroyed.

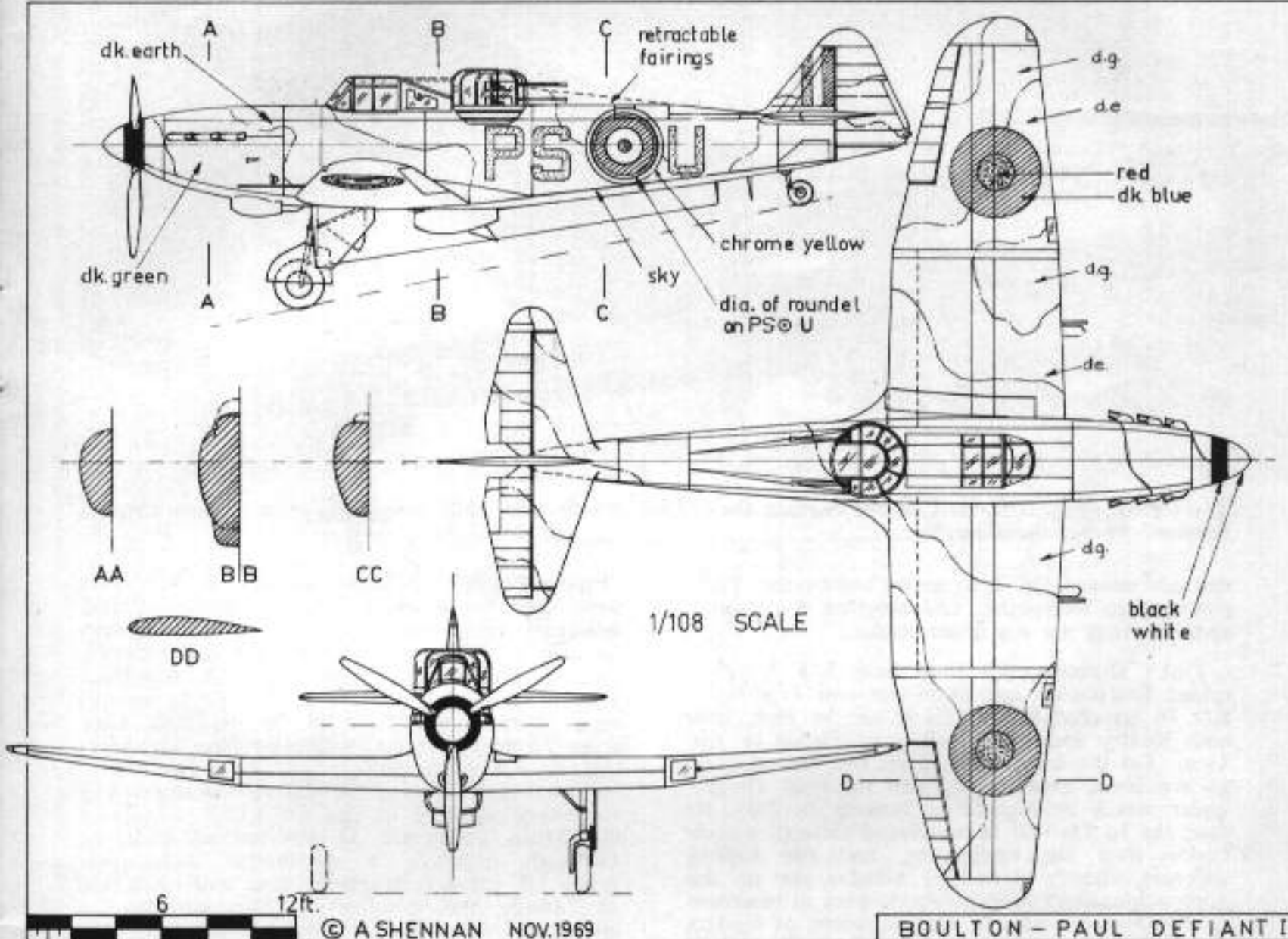
No. 141 Squadron was also equipped with Defiants. Eager to join the Battle and encouraged by reports of No. 264's successes on May 29th, they moved south from Scotland in high spirits. On July 19th nine Defiants moved from West Malling to Hawkinge on the coast. Patrolling at five thousand feet over Folkestone, the Defiants were jumped by twenty Bf 109s. Five of the two-seaters crashed into the sea and one on the land. The following day seven replacements

arrived; however there were now no crews to fly them all.

August 24th found No. 11 Group heavily committed, flying several squadrons on standing patrol and by mid-morning, the Defiants of No. 264 were back at Manston, having been diverted earlier to Hornchurch. Three Defiants patrolled overhead while the remaining nine landed to refuel. Seven were ready for take-off when twenty Ju 88s with escorting fighters swooped on the taxiing fighters. Bombs burst amongst them as they clawed their way into the air and three Defiants were destroyed in the attack. The survivors made their way back to Hornchurch only to become involved in another attack there. As they took off again, another Defiant was lost, the fourth for the day. On August 27th, only three Defiants were serviceable and after one last patrol the next day, No. 264 Squadron was withdrawn north, out of range of the Bf 109s. Fourteen Defiants had been lost during August, six during July, one was lost in September and two in October. Faced with the obvious inability of the Defiants to defend themselves from enemy fighters the R.A.F. withdrew the aircraft of both squadrons from the Battle. The production lines were still producing aircraft in quantity and a new role had to be found for such embarrassing numbers of aircraft. The night operations flown by No. 264 from Kirton-in-Lindsey prior to August 15th had shown that the Defiant was adaptable to such use and accordingly, flame damper exhausts were fitted and other minor modifications were made. Painted with night black finish the Defiants were transferred to airfields around London where they participated in defending the city against the *Luftwaffe's* night offensive.

BOULTON-PAUL DEFIANT I

TYPE:	Fighter, two seater.
DIMENSIONS:	Span 39 ft. 4 in.; length 35 ft. 4 in.; height 11 ft. 4 in.; wing area 250 sq. ft.
WEIGHTS:	Empty 6,078 lb., loaded 8,318 lb.
POWER PLANT:	Rolls-Royce Merlin III 12-cylinder, liquid-cooled engine.
POWER:	Take-off 880 h.p. and 1,030 h.p. at 16,250 ft.
PERFORMANCE:	(at 8,318 lb.) max. speed 250 m.p.h. at sea level, 298 m.p.h. at 12,000 ft., 304 m.p.h. at 17,000 ft.; cruising speed 259 m.p.h. at 15,000 ft.; range 465 miles at 259 m.p.h.; initial climbing 1,900 ft./min.; time to 15,750 ft. 8.5 min.; service ceiling 30,350 ft.
ARMAMENT:	4 x 0.303 in. Browning machine guns in hydraulically-operated Boulton Paul A Mk. IID turret, with 600 r.p.g.



DORNIER Do 17E, Do 17Z and Do 215B

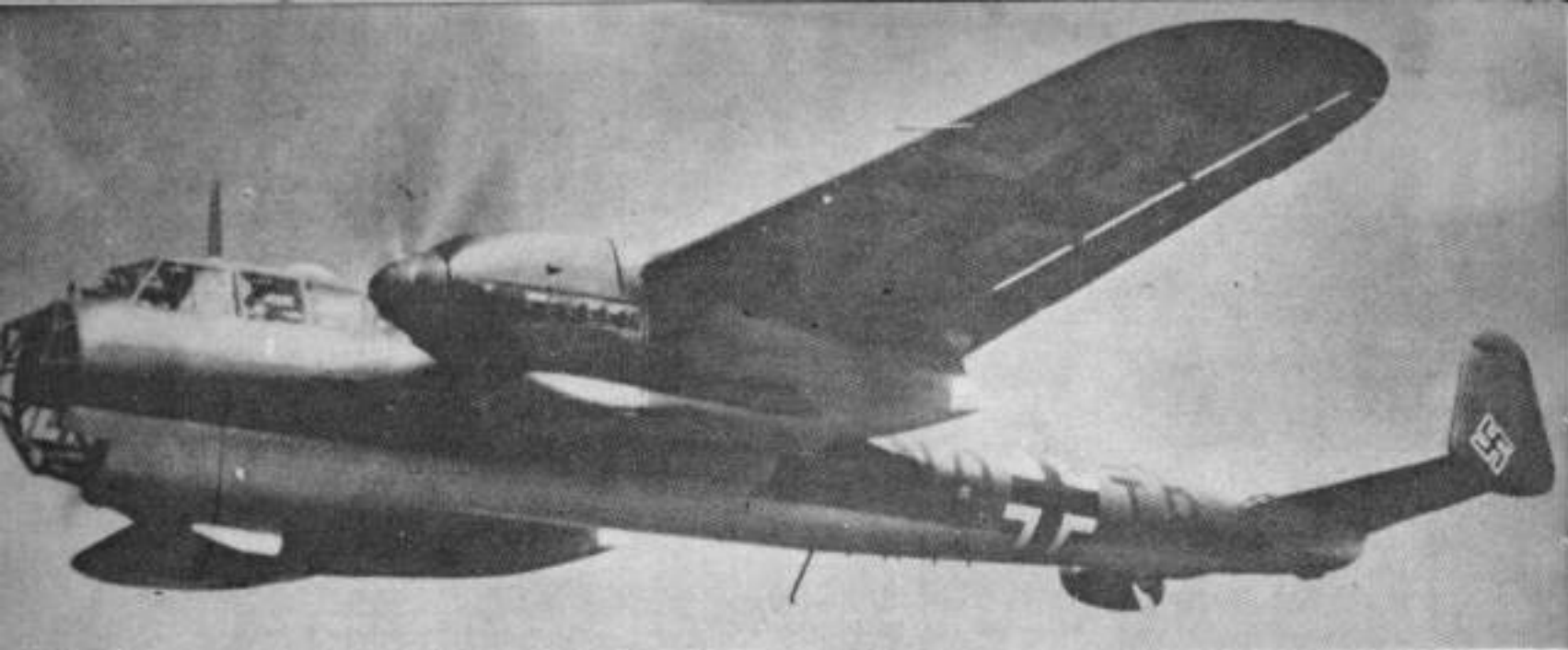
From July 1940 the distinctive shape of the Dornier Do 17 became all-too-familiar to Allied shipping using the English Channel. *Kampfgeschwaden* 2, KG 3, KG 76 and KG 77 were equipped with Do 17Zs and under the command of the *Kommodore* of KG 2, *Oberst* Johannes Fink, whose title was *Kanalkampfführer*, or Channel Battle Leader, they made numerous attacks in their attempts to clear the Channel of Allied shipping.

On *Adlertag*, August 13th, the all-out German offensive began abortively. In the morning, the weather over Britain according to British weather stations, was inclement for flying operations. The *Luftwaffe* also had access to this weather information, since the Germans had previously broken the code used by the British. *Reichsmarschall* Göring ordered the missions delayed, and all operations for the morning cancelled. The Do 17Z-2s of the KG 2 had previously been ordered to bomb Eastchurch, a Coastal Command air-

field. Having failed to receive the message to delay the mission, the Dorniers proceeded to rendezvous with their escort fighters. Fink's radio was unserviceable, and to make matters worse, an urgent message from Kesselring's H.Q. to abort the mission was mistakenly interpreted by one of the radio operators in an accompanying Dornier as confirmation to proceed. The fighter escort leader, *Oberstleutnant* Joachim Hoth desperately tried to signal Fink that the mission had been called off, and engaged in wild aerobatics before returning to base. Fink, however, did not understand the significance of the manoeuvres and distressed and angry at being deprived of his escort, proceeded on. Despite heavy cloud most of the way, the Dorniers broke out through light cloud right over Eastchurch, a brilliant piece of navigation. They bombed the target, aircraft neatly drawn up in rows, and turned for home. Over Folkestone they were intercepted by Hurricanes of No. 111 Squadron which shot down five of the bombers. Furious at the comedy of errors

Left. Part of a formation of Do 17Es of KG 255 in 1937. The "Alps Geschwader" was based at Memmingen near Munich. Camouflage was splinter pattern of dark brown, green and light grey, with blue-grey undersurfaces and red fin bands. Right. A sleek-looking Do 17P-1.





The Daimler-Benz DB 601A in-line engined Do 215B-1 which was built primarily as a reconnaissance bomber. Photo, Bundesarchiv.

that had caused KG 2 to go on unescorted, Fink protested to Kesselring, and received a personal apology from the Air Fleet leader.

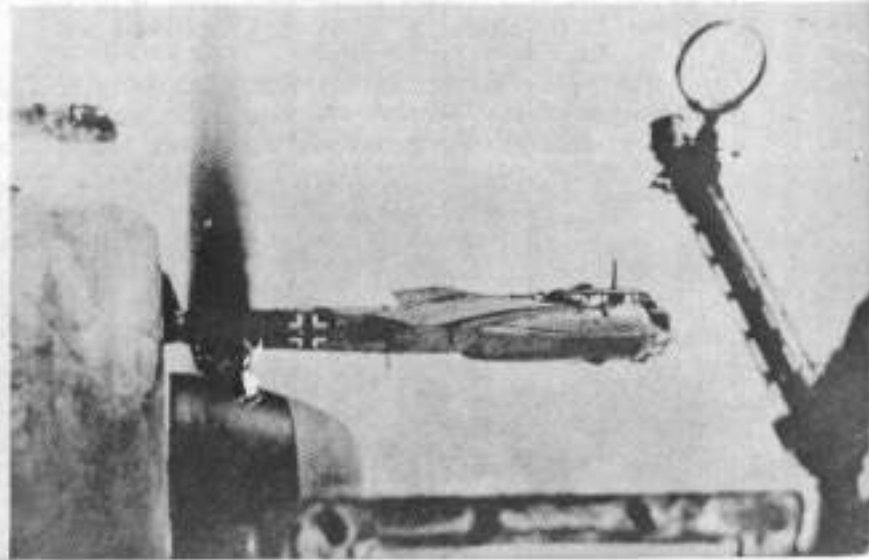
Fink's Dorniers, this time from KG 3, again raided Eastchurch and Rochester two days later. KG 76 attacked West Malling on the 16th, and both Kenley and Biggin Hill were raided on the 18th. On the latter raid, seven Do 17s attacked at low level, expecting to find the field already under attack by high-flying Junkers Ju 88s. In fact, the Ju 88s had been delayed through a confusion over the rendezvous, and the airfield defences, already alerted by a radar plot on the approaching high level bombers, were at readiness as the Dorniers came in. One squadron of fighters attacked the bombers from high above the airfield and only one Do 17 returned to base. At Kenley, the Dorniers dropped 100 bombs, destroying six Hurricanes, a valuable gain for the attackers. Kenley was left a smoking, bomb-pitted shambles.

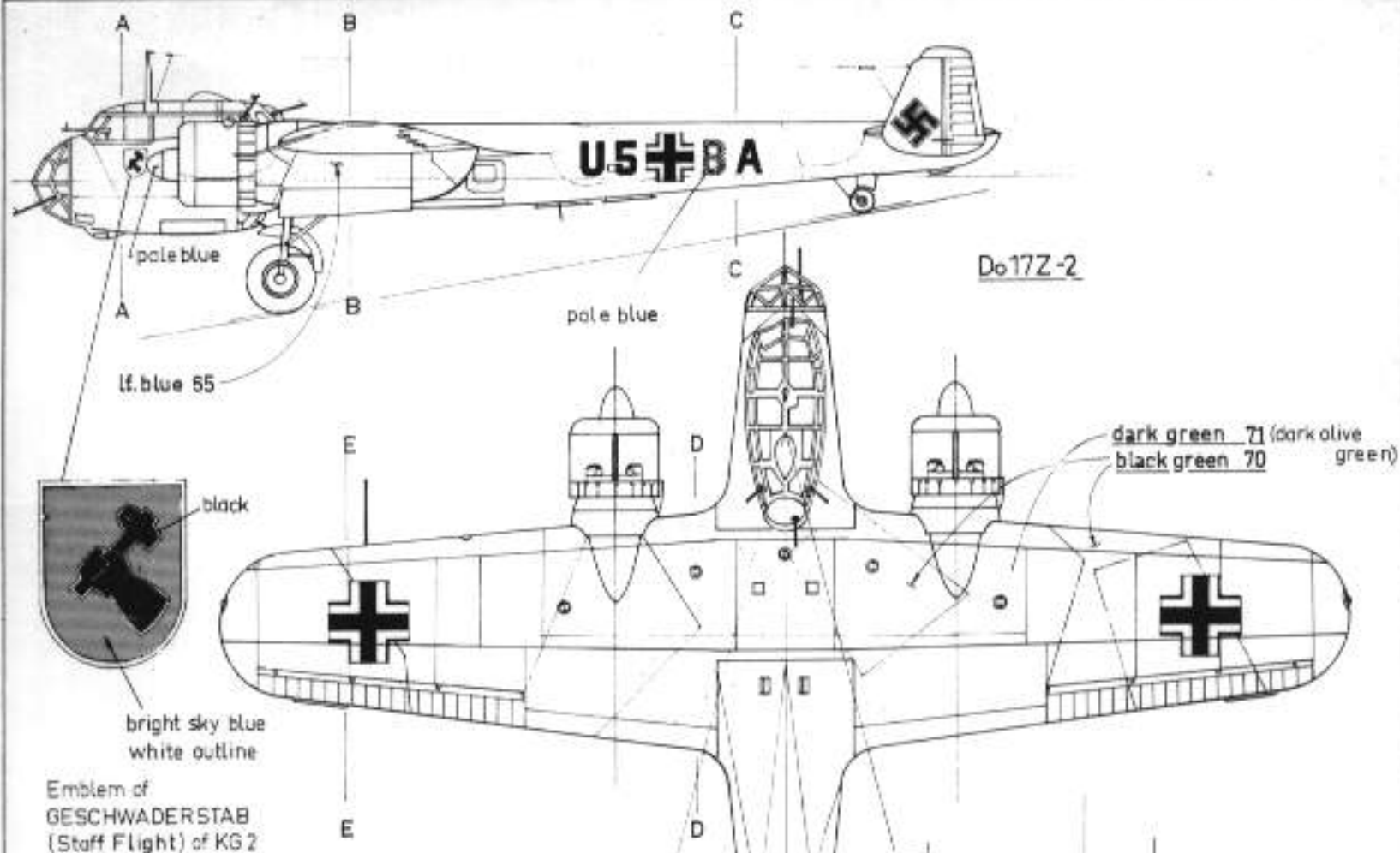
The Do 17s proved relatively successful in the Battle, for their attack speed was in excess of 365 m.p.h. in a shallow dive. Coupled with their high speed and manoeuvrability, the low-level tactics adopted by the Dorniers made them difficult to intercept. However, once in range of the guns of the fighters, their weak defensive armament made them easy victims. Numerous variants of the Do 17 were built, and the airframe proved very versatile, being adaptable to the installation of either in-line or radial engines. Nevertheless, only a few basic versions were in service with the *Luftwaffe* by mid-1940. Early versions such as the Do 17E and Do 17P were gracefully slim, and quickly earned the title of

"Flying Pencil". A small number of Do 17P-1s were used for reconnaissance during the Battle, examples being *Aukfl. Gruppe 4/F 14 Muenchhausen Staffel* based at Cherbourg in September. Do 17P-1s were also used by 1/F 123 flying from France between 1940 and 1941. These aircraft were painted in black-green 70 and dark olive green 71 uppersurfaces, with light blue 65 undersurfaces. The camouflage was the now-familiar "splinter" pattern as shown on the accompanying three-view drawing of the Do 17Z-3. Later in the Battle, light-green 25 was noticed on some *Luftwaffe* bombers in conjunction with dark-green 71, colours previously described elsewhere as "woods and meadows". This scheme was introduced when the *Gruppen* were dispersed in the open in France and the north. The code for 4/F 14 was 5F+ and that of 1/F123 was 4U+.

The Dornier Do 215A stemmed from a foreign export version of the Do 17, powered by two Daimler-Benz DB 601A liquid-cooled engines. The first eighteen for Sweden were on the assembly line, when at the outbreak of war an embargo was placed on exports. These aircraft then became Do 215B-1s for the *Luftwaffe*. Do 215B-1s and Do 215B-2s appeared over Britain in small numbers during the Battle. Designed as a fast airliner, adapted as a fast lightly-armed bomber, the Dorniers were forced to do a job that was unsuited to their design requirements. They, like so many other promising aircraft, had been outstripped by the rapid technological advances of their times. The development of the fast heavily armed interceptor-fighter had made them obsolete even before World War II had begun.

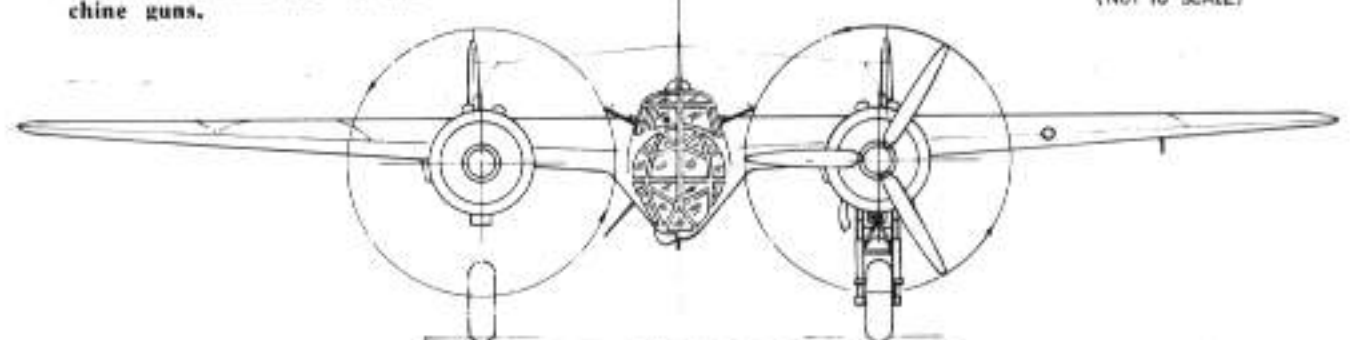
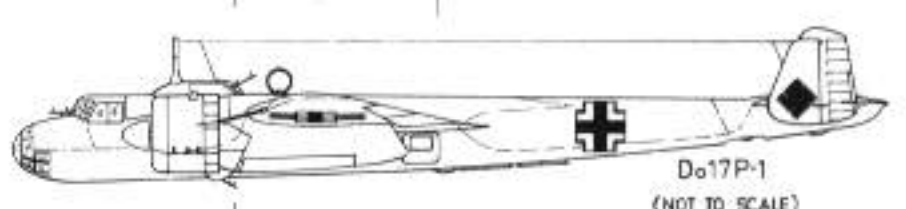
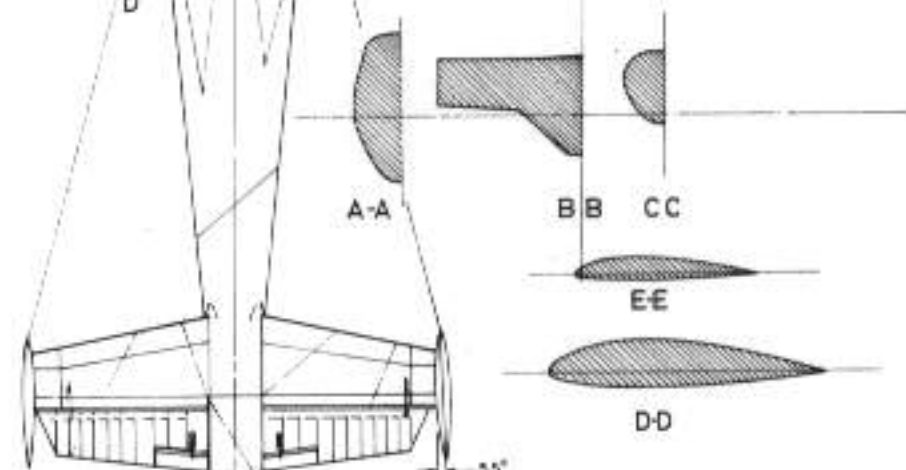
Left. A Dornier Do 17Z-2 banks to port. Right. Part of a section of Do 17Z-2s of an unknown Geschwader seen from an accompanying aircraft. Photos, Ian Primmer.



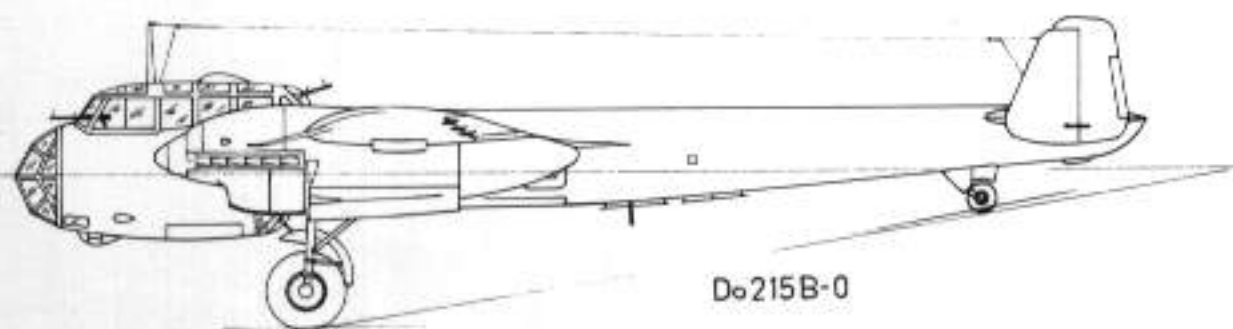


DORNIER Do 17Z

- TYPE:** Medium bomber, crew 4.
- DIMENSIONS:** Span 59 ft. 0-1/3 in.; length 51 ft. 9-2/3 in.; height 14 ft. 11 in.; wing area 592 sq. ft.
- POWER PLANT:** Two Bramo Fafnir 323P 9-cylinder radial engines.
- POWER:** Take-off, 1,000 h.p. and 940 h.p. at 13,120 ft.
- WEIGHTS:** Empty 13,145 lb., loaded 18,931 lb. Normal bomb load 2,205 lb. (1,000 kg.).
- PERFORMANCE:** (at 18,931 lb.) Max. speed 186 m.p.h. at sea level, 224 m.p.h. at 13,120 ft., cruise 186 m.p.h. at 13,120 ft., service ceiling 22,965 ft. Service ceiling at 17,730 lb., 26,900 ft., range with standard fuel and bomb load 410 miles, with aux. tank and 1,102 lb. bomb load 720 miles.
- ARMAMENT:** 4 or 6 7.9 mm. MG 15 machine guns.



1/144 SCALE



Do 215B-0





A formation of Russian Bf 109s were being converted to resemble Messerschmitt Bf 109Es by the fitting of clipped wings, the addition of tail streamers, and alterations to the colour scheme. Photos are courtesy Spitfire Productions and British Airline.



Above: One of the three Hurricanes which flew regularly for the film carrying Spitfires across and over bridges. The painted Spitfire looks particularly authentic. Right: Spitfire IX, A1-A, W3317, seen from a He 111 under attack.

