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THE BASES [?] FOR THE EMPLOYMENT OF THE GERMAN LUFTWAFFE [AIR FORCES] IN THE MEDITERRANEAN THEATER AFTER THE ALLIED LANDING IN FRENCH NORTH AFRICA IN 1942

By: Paul Deichmann, General Air Force

Done at Garmisch, 17 April 1947

Sources: Memory

Annexes: Two

Maps and Overlays: None

List of Abbreviations: Ju - Junkers
He - Heinkel
Me - Messerschmidt
BF - Bayerische Flugzeugwerke
FW - Focke-Wulff
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A. Introductory Considerations

1.) The purpose of this study is to record the technical and tactical premises in their reciprocal dependance, forming the basis for the employment of the German Luftwaffe in its clash with the American Air Force in the Mediterranean Theater from the close of 1942.

2.) The study is written from the standpoint of the higher command.

3.) Consequently, it goes into technique only to the extent that the tactical and strategic employment of the air arm was influenced thereby. The question is left open, how far technical reasons are responsible that tactical knowledge was not realized in a technical way or could not be so realized.

4.) Operating experiences are treated to the extent that they were still in force after the Allied landing in the Mediterranean Theater.

5.) The study represents a first comprehensive attempt. To improve it, it requires supplementing from British and American source material.

B. Technical and Personnel development of the Luftwaffe up to November 1942.

I. Presentation of the technical development.

1.) Demands of the General Staff of the Luftwaffe for technical development.

The General Staff of the Luftwaffe was clear in its own mind in the year 1935 that the plane models then on hand constituted only a transitional solution and that an early start must be made on new planning of modern airplane types, experience having shown that between [illegible] and the actual equipping of organizations with a new

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a. The tactical-technical requirements of the Command in the year 1935 for the development of a bomber.

From the general premise that operational considerations and tactical viewpoints must be the point of departure in the construction of a plane, a group known as the "Tactical-technical Requirements of the High Command" was attached to the General Staff of the Luftwaffe.

The then Chef des Generalstabes [Chief of the General Staff] of the Luftwaffe, General Wever [name illegible], demanded a long-range bomber, capable of being employed at very great distances with an adequate load of bombs. Because of the constant intermeddling of Communism with the help of the Comintern in domestic German affairs the apprehension existed at that timethat sooner or later a war with Russia was bound to come. The bomber should be in a position to reach the Russian munitions industry, which was in process of being shifted behind the Urals. The required bomber consequently received the designation: The "Uralbomber."

On the basis of careful examination of the work of research and development inside Germany and in foreign countries, the conviction was reached that this objective could only be attained by a 4-engined bomber. Only a plane of that type could deliver the requisite performance in range, altitude, speed, carrying capacity (crew, bomb-load, fuel, armament and armor).

The demand of the General Staff of the Luftwaffe led to the examination of the question whether the 4-engined Ju-89 and Do-19 that had been developed in the Junker and Dornier plants as experimental jobs could be converted to heavy bombers. The decision whether they should be incorporated into the Lutwaffe lay in the hands of the Oberbefehlshaber [Commander-in-Chief] of the Luftwaffe.

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Considerations that led to the demand for a 4-engined bomber, such as greater speed and altitude, better defensive armament and armor,

inevitably led to the demand for building a new Jaeger [fighter plane], which would be capable of handling the enemy's bombers of equal value. The greatest current weakness of the German fighter plane was its limited range, amounting practically to only 45 minutes flight. The principal requirement therefore was: Increase in flight range, combined with increase in speed and climbing ability, as well as better armament. In addition, it was important that fighters of this type could be gotten into production on a large scale for speedy delivery to the organizations.

3.) Demand for a long-range fighter.

As a single-engined fighter at maximum speed can always have only a limited range, a multi-engine pursuit ship was asked for by the High Command, that could pursue for great distances and, furthermore, afford cover for bombers deep into enemy territory. At the same time the strongest armament was required. These demands led to the construction of the so-called Zerstoerer [fighter] Me 110 (Messerschmidt 110). As the construction of a single-engine fighter is naturally easier and capable of more rapid production than that of a twin-engine fighter and as it was important that the plane be produced rapidly in great quantity, the development of the Me 110 was somewhat held up. Moreover, it was entirely clear to everyone that a twin-engine ship developing the same power and having great range is inferior to a single-engine airplane in maneuverability, speed and diving capacity.

While spatially limited defensive missions at the front and missions tied in locally with some feature requiring defense back in Germany were to be assigned the single-engine fighter, the pursuit of enemy bomber formations over wide areas was intended for the Zerstoerer [Me 110].

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2.) The Reichsmarschall decides against building 4-engine bombers.

Meantime, the experimental flights with 4-engine planes following the concept of the General Staff of the Luftwaffe had showed that

developments in this direction were to be pushed. Naturally enough the first experimental models still showed many deficiences and were a long way from the required goal. In particular the power of the engines available was inadequate.

The time had now arrived when a decision had to be made whether this course should be followed any further. At this juncture events arose which may not be passed over, as they were to exercise special influence on the technical development of the Luftwaffe.

As a result of essential differences of opinion between the Chief of the General Staff of the Luftwaffe and the Staatssekretaer der Luftfahrt [State Secretary for Aeronautics], the General Staff was removed from the control of the Staatssekretaer in the year 1936.

Staatssekretaer Milch, who was responsible for technical development, now presented the argument that the General Staff of the Luftwaffe was not sufficiently trained to entrust to it the influence, admittedly powerful to this time, in further technical development. Thus it came about that the General Staff was not represented to the necessary extent in the preliminary discussions concerning the now burning question of the 4-engine bomber. In the decisive recommendation to the Reichsmarschall the Staatssekretaer stated that German industrial capacity was inadequate for the building of 4-engine bombers in sufficiently large numbers. The rapid arming [of Germany] made it impossible for industry to develop such capacity that it could keep step with the demands for turning out [these planes] in sufficient numbers. Furthermore, he stressed the fact that this bomber was uneconomical. The Reichsmarschall confirmed the statement that Germany's industry would permit maintaining 1,000 4-engine bombers at the most and made the decision in favor of the two-engine bomber. On the part of the operations section of the General Staff every effort was made in the follow-

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to cause the Reichsmarschall to modify this basic decision to the extent that at least the experimental work on a 4-engine bomber model should continue. It was pointed out that 1,000 bombers that could reach their objective with an adequate bomb-load were better than several thousand 2-engine bombers that woudl succumb to the enemy defenses and thus be unable to carry out their mission. (By way of confirmation it should be mentioned that the greatest bomber strength of the German Luftwaffe in the war amounted to about 1,600 ships). The General Staff of the Luftwaffe was unable to make its viewpoint prevail and the 4-engine bomber consequently was dropped from the program in the year 1936 in favor of building 2-engine bombers. Also the further development of the 4-engine Do-19 and Ju 89 [Dornier and Junker] was stopped.

3.) <u>The idea of the heavy dive-bomber blocks the way for the 4-engine bomber for once and all</u>.

In the winter of 1937-1938 the question of turning out a 4-engine bomber was reopened and the Heinkel firm was commissioned with building it. Using the motor and accessories industry as it existed at that time and giving consideration to the experience in training and at the front that had been gained in the meantime, this firm developed the He-177, which had completed its tests in 1939 and, starting some time around 1941, was ready to go into mass production.

In 1937 Oberst [Colonel] Jeschonnek was designated Chef der Fuehrungsabteilung [Chief of the Operations Section] and in February 1939, Chef des Generalstabs der Luftwaffe [Chief of the General Staff of the Luftwaffe].

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Oberst Jeschonnek had formerly been commander of the training and test squadron in Greifswald in which capacity he had measurably contributed to the technical development of the Luftwaffe. In the further development of the German dive-bomber, the Ju-87, he represented the

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viewpoint that it must be the objective of the technical arts to develop a heavy bomber that could dive with its bomb load on its target with maximum accuracy. So it could not turn out otherwise that any targets concerned could be wiped out with a few bombers. In the winter of 1938/39 he put this requirement also up to He-177, which was then in process of development. The construction of this type of plane was therefore delayed, to the extent that the construction of the He-177 had to take a secondary position in favor of the 2-engine bomber, because of the problems of materials that were then beginning to arise. The continued construction of the He-177 consequently was stopped.

The diving idea then led to the development of the Ju-88, the type of plane with which German organizations later on were equipped at the time of the Allied landing in the Mediterranean Theater.

For the sake of completeness mention must be made of the 4-engine plane FW-200 (Condor) that appeared during the war on the Atlantic. This was a ship developed solely for long-range flights, that was turned out in small numbers. Recourse was not had to the Condor until the military situation demanded planes capable of long flights over the Atlantic. Like the transport plane Ju-52 it was given temporary armament.

Similarly, it should be stated that in the case of the bomber group that appeared temporarily in front of Stalingrad and in the case of the bomber squadron equipped with He-177's that appeared for a time on the East front in the summer of 1944, the planes in question were those that had already been completed when the He-177 was developped from the construction program and were later on put into shape for employment at the front.

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III) The Numerical Strength of Front Line Organizations of the German Luftwaffe.

1.) Total strength in November 1942.

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At the time of the Allied landing in French North Africa the German Luftwaffe had at its command the organizations listed in Annex No. 1.

With America's entrance into the war the numerical strength of the Luftwaffe, in comparison with the American, British and Russian air forces, took a numerically very inferior relative position.

The General Staff of the German Luftwaffe (I c), long before America's entrance into the war, had furnished very good data to the responsible German authorities concerning America's production potential in the field of aviation. Its information received no credence.

2.) Events intensifying the numerical inferiority.

a. The unsatisfactory personnel situation in the German Luftwaffe at the outbreak of war.

The German Luftwaffe was still in process of being built up when war began in 1939. Flying organizations could only fill about 75% of the posts for flying personnel that were authorized by the T/O at the outbreak of the war. Also there were not enough ground crews to be had. The chief of training who was responsible for training personnel was only able to cover the normal requirements incident to building up personnel on the basis of a set program. To meet a heavy demand for personnel all of a sudden - as is necessary at the beginning of a war - would have necessitated anticipatory measures looking far into the future. Even if it had been known long in advance that a war was being planned, the procurement of this additional trained personnel would have encountered very great difficulties exactly during the period when the personnel was being increased.

Losses and casualties during the Polish campaign further complicated the personnel problem. Despite the low losses in this campaign as a result of enemy action, the personnel level of the Luftwaffe fell off

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Losses and casualties during the Polish campaign further complicated the personnel problem. Despite the low losses in this campaign as a result of enemy action, the personnel level of the Luftwaffe fell off another 15% from every kind of losses, such as accidents, relief of officers from front-line units, etc., so that the combat efficiency

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of the Luftwaffe before fighting with France began was considerably reduced.

b. Difficulties in the Matter of Training.

In assuming only a war of brief duration, the Luftflottenkommandos [Air Fleet Headquarters] at the beginning of the war had practically shut down pilot schools, this contrary to the mobilization plan, by taking away flight instructors and planes in order to create Kurier-staffeln [liaison squadrons], flying aircraft warning echelons, etc. When the war did not end with the close of the Polish campaign, the Chief of Training of the Luftwaffe consequently saw himself confronted with the wearisome task of first putting these schools back in a condition where they could function and organizing new flight schools to meet personnel requirements. A comparatively short time was sufficient to enable this to be accomplished. To prevent further inroads, the schools of the Luftflottenkommandos - in whose hands lay the conduct of operations at the front - were removed from their control and were placed under the higher air force training commandos.

The personnel needed for flight training was assured. It sufficed to keep the German Luftwaffe ready for action even when losses were heavy. In the spring of 1940 some 24,000 men were taking flight training all the time. From this each month 90-100 bomber crews were turned out, completely trained even to blind flying.

Bomber crew training is crippled by taking training planes for transport purposes.

The 3-engine Lufthansa plane Ju-52 was used detrimentally as a training plane for bomber pilots and blind flying. By its very nature it was out of the question that a 3-engine plane, using an entirely different lay-out from a 2-engine bomber (steering wheel instead of a stick, different instruments) could work out satisfactorily

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The disastrous part of it all, however, was that the planes with their irreplaceable instruction crews were taken away from the chief of training all the time for military transport missions. The planes frequently were gone for weeks and then some of them came back because of heavy casualties and in a condition sadly in need of overhauling. A large part of the instructor crews never did return.

This sort of procedure almost reduced the training of bomber crews and in blind flying to a standstill.

An existing model is adapted as a bomber trainer.

Attempts on the part of the chief of training to find a suitable training plane for training bomber crews in place of the Ju-52 (Transport), showed that the Ju-86, with which several formations of the Luftwaffe had formerly been equipped, represented an ideal bomber trainer, once dual steering had been installed. It was expedient to install available gasoline engines in place of the none too reliable crude oil engines. The resultant flight radius of only 1 1/2 hours that could be obtained on account of the smaller fuel tanks (crude oil is more economical in use than light gasoline) was an immaterial factor in training on the spot; for cross-country flights additional tanks could be built into the wings.

Reichsmarschall refuses introduction of the Ju-86 as a training-bomber.

On the occasion of a conference with the Reichsmarschall at Karinhall, the Chief of Training asked that the Ju-86 be introduced as a bomber-trainer. In order to carry this out, a small plane plant would have to be made available to complete the work on the Ju-86's, whose construction was to be stopped. All the facilities needed to complete them were to be had in ample amount. Material for several hundred

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A small airplane plant would have sufficed, as 30 planes a month were all that were necessary to cover requirements.

To ensure transport crew requirements, the Chief of Training stated he was prepared in 3-5 months to turn over the number of transport crews considered necessary (about 180) from the block of the personnel being trained for bombers who would be three-fourth way through their training.

Staatssekretaer M i l c h opposed this recommendation and declared that in the interest of the manufacture of the Ju-88 he was unable to forego even the smallest aviation plant. On the other hand, he said, the production of the Ju-52 was moving along at such a pace (about 80 planes a month) that not only the needs of the Chief of Training for his training purposes but also for transport requirements could be covered.

The Reichsmarschall decided in favor of the Staatssekretaer. The great need for transport planes later on far exceeded the actual numbers available so that the training of bomber crews could not be carried out as planned. This led then to insufficient numbers of bomber crews being available for use later on. Thus, by the time the air battle over England began, several hundred crews could have been ready from the great block of personnel with 3/4 of their flying training already completed, if the requests of the Chief of Training had been granted.

Other limitations imposed on the training of flying personnel, as for example, the occasional shortage of gasoline during major operations, intensified the training situation.

So the problem of replacing flying personnel for bombers remained a critical one throughout the entire war and had a decisive effect on the operation of the Luftwaffe.

C. Experiences in the Employment of the German Luftwaffe in 1939-1942

A small airplane plant would have sufficed, as 30 planes a month were all that were necessary to cover requirements.

To ensure transport crew requirements, the Chief of Training stated he was prepared in 3-5 months to turn over the number of transport crews considered necessary (about 180) from the block of the personnel being trained for bombers who would be three-fourth way through their training.

Staatssekretaer M i l c h opposed this recommendation and declared that in the interest of the manufacture of the Ju-88 he was unable to forego even the smallest aviation plant. On the other hand, he said, the production of the Ju-52 was moving along at such a pace (about 80 planes a month) that not only the needs of the Chief of Training for his training purposes but also for transport requirements could be covered.

The Reichsmarschall decided in favor of the Staatssekretaer. The great need for transport planes later on far exceeded the actual numbers available so that the training of bomber crews could not be carried out as planned. This led then to insufficient numbers of bomber crews being available for use later on. Thus, by the time the air battle over England began, several hundred crews could have been ready from the great block of personnel with 3/4 of their flying training already completed, if the requests of the Chief of Training had been granted.

Other limitations imposed on the training of flying personnel, as for example, the occasional shortage of gasoline during major operations, intensified the training situation.

So the problem of replacing flying personnel for bombers remained a critical one throughout the entire war and had a decisive effect on the operation of the Luftwaffe.

C. Experiences in the Employment of the German Luftwaffe in 1939-1942 show its capabilities and limitations.

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Development of the principles of command and employment in 1942.

1.) Employment against Poland and France.

The battles against Poland and France gave full opportunity for demonstrating the effectiveness of the German Luftwaffe, in consequence of its greater technical and numerical superiority over its opponents. In these battles the German dive bomber Ju-87 displayed its effectiveness that in some instances was decisive in action. In Tunisia too it was to prove effective.

2.) Employment in the battle of England.

The air battle for England for the first time reveals the weaknesses of the German bomber plane and the limited capabilities of the German fighter plane.

The following plan lay at the bottom of the air battle for England:

To make England inclined toward peace , it was the mission of the German Luftwaffe to smash the English armament industry and in this manner take away from her the means of continuing the struggle. This objective could only be gained by daytime attacks of the German bomber formations. To accomplish this, it was of decisive importance that the British fighter defense first be materially weakened by large scale employment of the German fighter formations, and in order to bring this about, the British fighters had to be compelled to stand up to the German Luftwaffe.

In this situation a very important circumstance came to the help of the German Luftwaffe. England could not get along without the especially important harbor and transshipping installations of London to bring in supplies for the country. However, London lay within the radius of action of the German fighters. If the German Luftwaffe attacked these installations in London, the British fighter defense

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In this situation a very important circumstance came to the help of the German Luftwaffe. England could not get along without the especially important harbor and transshipping installations of London to bring in supplies for the country. However, London lay within the radius of action of the German fighters. If the German Luftwaffe attacked these installations in London, the British fighter defense would be forced to bring up all fighter organizations to oppose it. From this set-up two phases were developed for the plan of the air battle for Britain.

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a. Employment of the German fighters over London to destroy the British fighters. Bombers were used only to the extent necessary to smash the enmy fighter organizations on the ground and knock out all their installations for handling personnel and material. Moreover, bombers could be used to the smallest extent necessary to force the British fighters to take the air against the German fighters. (Bombers used as decoys).

b. Full-scale attack of the German bomber formations against objectives that were vital to England in carrying on the war, starting with targets located in the region of London.

Experiences in the use of the German fighters.

After waiting a rather long while for better weather, the attack on England began in the first days of August 1940 with the neutralization of the airdromes in southern England by bomber formations with very powerful fighter cover.

Thereupon the British fighter formations shifted the bulk of their forces from the region south of London to airdromes north of the city, where the German bomber formations were unable to reach them because of the limited radius of the fighter formations necessary for cover. As anticipated, the British fighters took the air for battle. Their losses mounted daily.

The protection of bomber planes, including the Ju-88, highly sensitive to enemy fire, imposed ever higher demands on our fighter cover, in measure as the British fighters gained experience. More and more German fighters were taken off free pursuit missions in the region over London and used for passive escort. Moreover, a bomber formation required high echeloned fighter cover over it, and, in addition, fighters behind and under it.

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To protect diving Ju-87 formations, some fighters also had to accompany the Ju-87 in the dive, while others had to be kept at the

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levelling-off altitude of the diving formation, to prevent British fighters from successfully taking advantage of this moment of weakness. Consequently, more and more frequently fighters were taken off their normal missions of shooting down enemy planes in free pursuit, for passive defensive missions. As the fighter escort was not permitted to leave its place with the bomber formation, it had scant opportunity to shoot down enemy fighters. During these attacks the situation arose that British fighter organizations stopped sending all their planes aloft for combat.

From the radio traffic between the British ground control stations and the fighter formations aloft, it was disclosed that fighter formations that had taken off were called upon to land, as London itself was not being attacked.

At the start of the air battle for Britain Hitler had for political reasons forbidden that targets within the limits of greater London be bombed. It was not until so much later on that authorization to attack military targets in this area was given, so that the British fighters held in reserve for the protection of the city proper could not be sufficiently weakened before the great German bombing attacks began. Even though the Croydon airdrome was bombed twice on the day the attack began, this fact is attributable to a mistake. The formation was to attack an airdrome located south of London which apparently did not exist. The weather being very foggy, the attacks were made against Croydon by mistake. An investigation of the incident was directed by the Führer's headquarters.

The Me-110 in the role of a long-range fighter.

In both instances cited above the attacks were executed by an organization equipped with twin-engine Me-110's serving as long-range fighters. It was shown that this type of plane, even after releasing

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Me-110 formation, had dropped out of the flight. After dropping its bomb, the Me-110 formation was attacked by British fighters, suffering considerable losses. It succeeded in protecting itself only by forming a defensive circle. The Me-110 in this manner showed itself superior to the twin-engine bomber or torpedo plane but could not be used without additional fighter cover, except when there were no enemy fighters involved, as for example, when protecting ship convoys in the Mediterranean beyond the range of British fighters. A group of Me-110's was used in this way after the Allied landing in the Mediterranean theater.

Experiences in employment of the German bombardment plane.

The German bombardment organizations were at that time equipped with the twin-engine bomber He-111 and Do-17. The Ju-88 came out after fighting started.

It had become increasingly apparent in the first phase of the fighting that the German bomber showed considerable weakness. Because of its low ceiling the bombers had to fly in the zone of effective fire of the British Flak where losses were heavy. The poor speed of the German bomber, its weak armament and armor (only the pilot's seat showed armored protection), and its power plant of only two engines highly vulnerable to gun-fire made it an easy prey to the British fighter.

The full-scale use of bombers against England begins.

On 6 September, despite serious misgivings, phase 2 of the plan of attack was opened with this bomber, much inferior to the British fighter, and full-scale attacks launched against the port of London. The wretched fall weather soon to be expected urged haste. Bomber losses in three full-scale attacks which were extraordinarily effective (as confirmed by aerial photography), were tolerable, due to the strong

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However, it began to be apparent after several attacks that even these relatively low losses, in a region where the bombers could be assured of cover by German fighters, were already causing anxiety in view of the insufficient numbers of replacements of flying personnel. The reasons for this shortage, which lay in the training department, have already been discussed above..

Nevertheless, the German High Command could at least count on being able to knock out the targets lying in the region around London that were important to the war effort. Possibly in the course of these actions still further success was attained in weakening the British fighters to such an extent as to render possible the use of the German bomber formations even in the regions where our fighters could not fly cover because of their limited range.

Another target to be knocked out then was the English plants that produced fighters, in order to prevent the British arm from recovering its strength.

Weather conditions hinder fighter cover of German bomber formations over London. Growing losses.

A factor now intervened, the consequences of which upset all calculations. The weather became variable. There were no more days when there was just enough cloudiness; the sky now became heavily covered with clouds.

The task confronting the bomber formations that took off from the region around Lille and Antwerp, that of rendezvous-ing on time with their fighter cover, now became one of great difficulty.

The bomber formations which first had to fly around great banks of clouds in their approach flight were no longer able accurately to reckon their arrival at the rendezvous point with the fighters on the channel coast in the region of Calais. However, because of their limited flight radius, the fighters could not wait for the bombers

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Furthermore, it now became clear that when the clouds were rather heavy and broken, the fighters were not able to protect the task forces over England adequately. British fighters came out suddenly from behind the cloud banks, dove through the bomber force in the so-called "shaving" flight, shooting down one or more bombers before the German fighters could attack. Bomber losses mounted seriously.

The higher German Command declined to interrupt the attacks while the weather was of this sort, as it feared that all advantages gained so far would be lost by so doing.

Experiences in the Employment of Jagd-bomber [fighter-bombers].

In order to limit the losses in bombers that were arising in the manner described above, and to force the British fighters to accept battle with German fighters over London, a German fighter group was now used with bombs for the first time, as a fighter-bomber group against military targets in London. It was equipped with Me-109's. Up to this time Feldmarschall Kesselring had refused to release the group as not yet being sufficiently trained in bombing and not accurate enough to employ against targets in London. After numerous attacks against isolated targets on the lower Thames, this group now had acquired sufficient experience in bombing.

The radio traffic of the ground installations of the London air defenses disclosed that these bombings by fighters caused extreme excitement. After dropping their bombs, these planes were fully utilizable as fighters. The purpose of using them was fulfilled. The British fighters again had to accept battle with the Germans. Naturally these fighters with their small bomb load could not replace the bombers.

The experience gained in this manner later led to all German fighter planes being equipped with the technical facilities for bombing.

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Change in method of attack in order to cut down bomber losses.

In the ensuing period, the weather continuing more unfavorable, bomber losses over London mounted to such a degree that they could not be made up, replacements being so low.

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Moreover, it was demonstrated as an impossibility to employ the bomber formations in daytime exclusively [?] against targets beyond the radius of action of our fighters. On the other hand, it was possible to launch attacks at evening twilight against targets near the coast, that is, to attack at times when the bomber force could still distinguish the target in the fading light but when it was too late for the British fighters to take off.

Experiences with attacks for harassing and for destruction.

In order to be able to attack still other objectives important to the war effort and located more deeply in the interior of the country, a new method of attack in addition to the others was developed, in which the blind flight training of the German bomber crews was used to advantage. When cloud cover was favorable, single planes flew to the target by blind flying, dove suddenly from the clouds and released their bombs. The basic idea behind this method was the same as the one that led to the construction of the heavy dive-bomber, the Ju-88: destruction of the targets by single planes.

This method was attended by an extremely good record of hits. However it was shown that, despite this record of attacks made at low levels, the effect of the bombs dropped by single planes was insufficient to attain a destructive character. The English armament industry, to be sure, could be harassed in this manner but could not be knocked out.

The failure of this procedure rendered dubious the prospect of success for the Ju-88's that were shortly to appear at the front in increased numbers.

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Losses which were held within tolerable limits arose from the breaking up of the continuous cloud canopy behind the planes making their approach flight, affording them no cloud cover on their return. As a result the planes would be shot down.

Moreover, at the most important objectives the British succeeded more and more in picking up the approach flight of these planes with their radar and directing British fighters with the help of this instrument, so that the German plane would be caught and attacked as it flew out of the clouds, before it could pick up the target and bomb it.

After this type of attack had demonstrated its absence of any decisive military effect, either the plan to force England to make peace by the Luftwaffe had to be given up or changed in some way.

The Change to Night Attacks

Cognizant of the circumstances influencing the effectiveness of night attacks, as, for example, difficult navigation at night, the problems involved in accurately making out the target and the reduced probability of hits, the German High Command had completely rejected the change to night operations up to this time.

The development of the situation, however, admitted of no other alternative now. The order was given to start night attacks.

There followed the series of massed, very effective night attacks against targets in England (like Coventry). Despite all the measures taken by the German High Command for using direction beam instruments and "pathfinders," *) there arose a considerable dispersion in releasing the bomb which seriously influenced effectiveness against the targets proper and made it impossible to set a time-table for a thorough execution of the job [of knocking out the British fighter plane plants]. As a result of improvements in the British defense, particularly by the employment of night fighters, our bomber losses mounted, but on the whole did not exceed the capacity of the German replacement system.

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*) Translator's note: According "German-English Dictionary for Aircraft Power Plant Engineering and Related Subjects," by U.S.A. Air Forces, August 1945, "Beleuchter," the German word involved, is a "pathfinder." Officers in A-2 explain this as a system of dropping flares to the ground on the route into the target to illuminate the "path" into the target and make it easier for following planes to "find." In other words, "beacons."

their vulnerability to gun-fire which was similar to that of the two other types, the Do-17 and He-111, these too could only be used at night. Consequently, they could not provide any proof of their greater accuracy in bombing at this time.

The altered political situation in the spring of 1941.

In the meantime the German High Command had decided on war against Russia. This led to reduction of the air attacks and later on to stopping them entirely.

In consequence, the German plan to strengthen the Luftwaffe at the expense of the German Army, so as to accomplish the defeat of England, was never carried out.

Closing Operation

The German plan underlying the air battle for England, was condemned to failure from the outset by the high vulnerability of the German bomber to gun-fire and its low defensive powers. Even when flying in formation the defensive power of its firearms demonstrated its inadequacy.

Despite the smashing of its fighters over London, England still had enough fighters left or went on producing others which would have inflicted heavy losses on German bomber forces, any time these forces flew in the daytime beyond the range of their own fighter cover. However, because of the limitations imposed on training, these losses could not be made up. If in drawing up the first plan of attack against England these points were not given sufficient attention, it is simply due to the fact that the necessary experience was not yet at hand. At that time it was still figured that a well closed-up flying formation could adequately protect itself against fighter attacks that were not too strong.

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On the other hand, the mass night attacks showed themselves to be the tactically strongest form of attack these bombers could make, although this type of attack demanded a substantially stronger force and greater time than daytime attacks.

The question whether England could have been brought to make peace, by keeping up these attacks and without a German invasion, never was cleared up as a result of discontinuing them. However, in view of the expected American aid, it can be assumed that England would have been as little likely to be brought by bomber attacks to quitting the war as Germany was later on.

3.) Employment in the Battle against Russia

The battle against Russia claimed the attention of the entire German Luftwaffe. This force had a decisive part in the successes of the first year.

In training and technical ability the German Luftwaffe showed itself to be superior to the Russian air force which was numerically far stronger.

Here it became quite apparent that the question of technical efficiency plays a far greater part than numerical strength. Technical quality can compensate for numerical inferiority.

Though to a lesser degree, still it was shown in these battles too that German bombers could not be employed in daytime without fighter cover, if they had to fly through fighter-protected regions or attack targets in such areas. Although the extent of the Russian theater often afforded opportunity to employ evasive tactics in the run to the objective and on the return flight, nevertheless the bomber forces could execute their primary operational mission - that of knocking out the Russian airplane industry deep in enemy territory and cutting communications facilities only to a limited degree, because of the small radius of the German fighter.

On the other hand, the Russian bomber forces were able to fulfill their real mission as good as not at all, in view of their great technical inferiority as compared to the German fighters.

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The standard type bomber of the Russians on the battle field consequently became more and more the single-ergine, armored Ju 2 [2d letter, double-printed on "J", is illegible], its operational

capacity being limited.

In building a ground attack plane, Russia deliberately went a different road from Germany. Germany sought protection of planes, participating in the low level fighting in the main defensive zone of the ground battle, in their speed and so came to use the ground attack plane. Russia sought this protection in the armor of the plane.

4.) Employment in the Mediterranean Theater 1941/42.

After initially employing only rather weak elements of the German Luftwaffe in the Mediterranean Theater to support the German-Italian Panzer Armee in Africa and to protect sea communications to that area, these forces were considerably reinforced in the beginning of January 1942 with the objective in view of making Malta ripe for conquest. In April 1942 the big attacks against Malta start.

The same plan was followed here as had led to failure in the air battle for England's destruction of the British fighters in order to ensure undisturbed use of the German bombers.

The British fighters knocked out.

What did not succeed in the air battle for England, won out here with surprising speed because of a British mistake. The British had concentrated all their fighters on a single air-drome. By putting some of their bomber forces into an attack at evening twilight, immediately followed by others in a night attack, with still a third attack at dawn, the German Luftwaffe succeeded in damaging or destroying the British fighter planes to such an extent that Malta's fighter defense was crippled for several hours. These twilight attacks had been staged at such hours that the British fighters were unable to take off on account of the darkness and stood helpless on the ground.

Close on the heels of these attacks, there now followed the massed

capacity being limited.

In building a ground attack plane, Russia deliberately went a different road from Germany. Germany sought protection of planes, participating in the low level fighting in the main defensive zone of the ground battle, in their speed and so came to use the ground attack plane. Russia sought this protection in the armor of the plane.

4.) Employment in the Mediterranean Theater 1941/42.

After initially employing only rather weak elements of the German Luftwaffe in the Mediterranean Theater to support the German-Italian Panzer Armee in Africa and to protect sea communications to that area, these forces were considerably reinforced in the beginning of January 1942 with the objective in view of making Malta ripe for conquest. In April 1942 the big attacks against Malta start.

The same plan was followed here as had led to failure in the air battle for England's destruction of the British fighters in order to ensure undisturbed use of the German bombers.

The British fighters knocked out.

What did not succeed in the air battle for England, won out here with surprising speed because of a British mistake. The British had concentrated all their fighters on a single air-drome. By putting some of their bomber forces into an attack at evening twilight, immediately followed by others in a night attack, with still a third attack at dawn, the German Luftwaffe succeeded in damaging or destroying the British fighter planes to such an extent that Malta's fighter defense was crippled for several hours. These twilight attacks had been staged at such hours that the British fighters were unable to take off on account of the darkness and stood helpless on the ground.

Close on the heels of these attacks, there now followed the massed annihilating day-bombing of the English fighter drome. It was questionable whether it would succeed in destroying the fighter planes located in the great underground hangars. Consequently, special armored

bombs were used against the rock cover over them. According to tests conducted beforehand in southern Italy, these bombs penetrated 8 meters into the rock before exploding. The hope arose that the underground hangars would then collapse due to the shattering of the rock ceiling. Moreover, heavy bombs loaded with incendiary chemicals (flame-bombs) were dropped in front of the hangar gates in the expectation that the burning liquid would flow into the hangars on the inclined ramp leading down into them.

As a matter of fact these measures succeeded in eliminating the fighter defense of Malta for a rather long time.

To be sure, England constantly sought to replace its fighters. To do so they were placed on carriers in Gibraltar. These steamed as far as the 4th degree of longitude, that is, to the flight radius of the German bombers based in Sardinia. From this point the British fighters took off at dawn for Malta which, because of their flight range, they could just make. Then they were immediately knocked out by German bombers, while they still stood on the runway out of gas. In this manner on 20 April 1942 we succeeded in destroying 40 new fighter planes that had only just arrived. And this was only one of several such instances.

Attempts by German fighters to intercept in the air west of Malta, new fighters just arriving, met with only partial success.

Experiences in the Employment of Bomber Forces against Malta.

German bomber formations that got into action were all equipped with the heavy dive-bomber Ju-88. Differences of opinion arose between the German High Command and the Fliegerkorps carrying out the attacks, concerning the method of employment.

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The German Higher Command desired that the attacks rest on the basis of the idea that had led to the creation of the heavy dive bomber (Ju-88) that was to be used here. Consequestly, a small number (not more than 6) of bombers with strong fighter cover was to be used

continuously at approximately half-hour intervals. These were to destroy the various targets one after another in well aimed diving attacks. From this style of attack which was also to be executed during the night, it was anticipated that the Flak too would be eliminated most quickly, that it would shoot up all its ammunition.

On the other hand, the Fliegerkorps feared that the initial bomber losses from Flak would be too high, since most of the targets were located in such a manner in the range of the British Flak batteries that 30 or more batteries could be concentrated over the target. Similar attacks in March 1942 had already led to the loss of 37 bombers against substantially less Flak and those losses were attributable in part to Flak artillery. In addition, many planes were disabled by Flak hits.

On the basis of earlier experiences the Fliegerkorps did not have the confidence either, that a destructive effect could be attained by individual attacks. To accomplish that, the employment of masses of bombs was considered necessary, as the effect of individual bombs had not shown itself to be sufficient. Moreover, it had been observed that with the simultaneous release of many bombs the destructive effect was greater than that of the same number of bombs dropped at intervals in time. Evidently the pressure waves colliding with each other on the ground from several bombs have an especially destructuve effect.

As a result, bombers were used daily in 2 or 3 great attack waves with up to 180 bombers covered by all available fighters. Because of these tactics, the Flak artillery was extensively knocked out, for, as a practical proposition, it was unable to concentrate its fire by appropriate target designation when so great a number of planes were attacking simultanoously.

Moreover, 1/3 of the attacking bombers directed their attacks

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Moreover, 1/3 of the attacking bombers directed their attacks against the Flak artillery. Actually, the effect of the Flak artillery was now extraordinarily small. The number of planes shot down scarcely

counted. The number of planes disabled by Flak hits was inconsequential. Only 11 bombers were lost in 11,000 sorties.

Experiences with the Ju-88, operating as a Dive-bomber.

The basic principle that the Ju-88 must dive on its targets, was firmly adhered to. In making their dives, so as not to interfere with each other, the forces had a great number of targets assigned to them for simultaneous attack. In principle a unit was always assigned the same targets, until the aerial photograph showed they had been destroyed.

Experience indicated that to destroy the targets required approximately the same number of sorties employing diving tactics as would have been necessary to accomplish the result using bomber forces flying horizontally, for the reason that the great majority of the crews in the Ju-88's could not dive vertically but only at a sharp diving angle. As a result bombing accuracy was not much better than in horizontal flying.

The Ju-88 therefore had not measured up to all that had been expected of it. It had the same weaknesses as the other German bomber types, without exhibiting any characteristics to prove their superiority to the others.

Malta Ripe for Conquest.

Aerial photographs disclosed that the attacks had succeeded at last in smashing all important military installations. The Flak artillery plainly suffered from shortage of ammunition and worn-out barrels.

The Projected Conquest of Malta is Dropped

At this juncture Feldmarschall Rommel, contrary to previous plans, decided to limit the advance on Egypt to the so-called "border" position at Sollum-Halfaya Pass. The determining factors in this decision [illegible] that his forces had been only slightly weakened in the preceding

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receiving ample supplies up to this time as a result of having kept Malta down. Objections registered by Oberbefehlshaber Süd, that supplies for the drive to Egypt were not available in Africa in sufficient quantity and, moreover, could not be brought up at the proper time, could not dissuade Rommel from his decision. Rommel believed, even without having to wait until Malta was conquered, he could carry out the drive with the forces and supplies then at his disposal.. Furthermore, he turned a deaf ear to the scruples of Ob. Süd who stated that in case Rommel advanced toward Egypt, Malta could not be taken, as the German Luftwaffe and the Italian Navy in that case would have to leave Malta alone and support him. On Rommel's recommendation, Hitler and Mussolini, influenced by the latter, approved Rommel's proposal. It can be assumed that the systematic refusal of Goering to re-engage the parachute group (that was then in process of reconstruction after the conquest of Crete) in the present stage of its reorganization, played an influential role in the decision.

Malta Again Becomes an English Luft-Stuetzpunkt [Air base]

When the bomber forces of the German Luftwaffe had been shifted to Crete to support Rommel, the British succeeded in reestablishing the fighter arm in Malta. Not until after the loss of the battle of El Alemein was the German Luftwaffe again available to resume the fighting against Malta.

As the British did not commit a second time the mistake made initially of placing their fighters on a single field and now parked them in "Boxen"*) well away from the flying fields, a fresh attempt undertaken in the fall of 1942 to crush Malta failed. The British fighters could not be knocked out by the German bomber forces available. In addition, the German bombs then in use failed to strike the plane "boxes" that were widely separated from [illegible]

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*) Translator's note: "Boxen" probably enclosures partially surrounded with earthwork revetments, separating planes from each other and limiting damage due to dispersion of bomb fragments; "boxes"

which could be dropped in great quantities and thickly cover whole areas. The bomb release containers [Bombenabwurfbehaelter] with 10, 23, 180 or 400 bombs, weighing from 1 - 2 kg., which distributed bombs thickly over the target, came out too late for the fighting in the Mediterranean Theater.

Thus, every time German bombers were used in the daytime, English fighters appeared on the scene. Now it was that the high vulnerability to gun fire of the German bombers became evident. Despite strong fighter cover, bomber losses were so high that the attacks could not be pursued to a conclusion, because of the situation resulting from insufficient replacement personnel. The number of German fighters available was not high enough to protect the supersensitive German bomber against the English fighter attacks. The renewed attempt to overwhelm Malta had to be abandoned for the reasons given, a fact that was of decisive significance in the subsequent course of the war in the Mediterranean.

D. Comparison of Opposing Forces in the Mediterranean Theater after the Landing.

1.) Numerical Comparison of the Axis and Allied Air Forces at the time of the Allied Landing.

When the Allied invasion was taking place in the Mediterranean Theater, Germany was locked in a struggle in Russia for a decision. That necessitated the bulk of the German flying forces being employed in the East.

German flying forces likewise had to remain in the west against England and in the far north for use against American supplies moving to Russia .

So it was that for the missions in the Mediterranean Theater there were available on the German side approximately:

10 - 12% of the German fighter forces

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10 - 12% of the German fighter forces

20% of the German bomber forces

14% of the close-combat units[Nahkampfverbaende].

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Consequently there were on hand, according to the authorized allotment of units (that is, the number of planes actually on hand was constantly changing and was substantially less):

Bombers	243	
Dive bombers	54	
Fighters	160	[Jagdflugzeuge]
Twin-engine fighters	72	[Zerstoererflugzeuge]
Night fighters	36	
Torpedo planes	108	(because of technical difficulties during the transfer from North Norway, the actual strength was materially less)
Long range reconnaissance	18	
Close range reconnaissance	9	
Total	700	

This figure of the authorized strength changed only immaterially during the fighting in Africa.

The majority of the organizations were employed alternately from Sicily, Sardinia and southern Italy. The bases changed according to the situation and the missions assigned.

Because of the poor supply conditions principally only light, that is, single-engine formations, like fighters, dive-bombers and close range reconnaissance planes, could be shifted to Africa. In addition, there were a few night fighters and twin-engine fighters [Zerstoerer].

The Strength of the Italian Luftwaffe in the Mediterranean Theater at the Time of the Allied Invasion

The Italian Air Force at this time was rather strong, numerically speaking. However, because of the great technical inferiority of the Italian planes this strength was ineffective.

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Experiences in the battle against Malta had already shown that bombers absolutely could not be used in daytime, even when only a few enemy fighters were around. Consequently, daytime employment of bomber planes was discontinued after the Allied invasion.

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Inadequate training in night flying prevented extensive night operations. In fact, only a few Italian bombers (not more than 10) were able to take part in night operations. They had one advantage and that was their ability to fly at high altitudes on account of their woodwork construction, which made them less liable to being picked up by radar.

Italy had at its disposal some 400 fighter planes that were still serviceable to some extent. They were organized in 2 Geschwader [squadrons], (about 200 planes), one Geschwader of obsolete types and of only little operational value, being employed in Africa with the German-Italian Panzerarmee. The remainder served as protection to the Italian mainland.

The Italian torpedo planes were the best. Their disadvantage was their low speed, as they too were obsolete models. To cut down losses they could be used against vessels only in combined attack together with German bombers. While the latter dived down on the ships to draw the ships' Flak, the Italian torpedo planes attacked from the side, flying in low.

The Italian torpedo plane crews showed their mettle back in the time when they were fighting the naval convoys going to Malta by their spirited, though very costly, attacks. Approximately 15 or 20 Italian torpedo planes were ready for use at the time of the Allied invasion in French North Africa.

The Numerical Strength of the Allies in the Air after their Invasion in the Mediterranean Theater.

As opposed to the serious limitations imposed upon the German Luftwaffe, already very much inferior as to numbers, by having to fight on several fronts, America and England were able to bring to bear the mass of their air forces in ever increasing strength.

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At the opening of operations in the Mediterranean Theater the Allied had at their disposal:

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U.S.A.	Nov.	Dec.	Jan.	Feb.	Mar.	Ap.	May	Remarks
Fighter planes single-engine								[These columns
Fighter planes multi-engine								contained
Twin-engine bombers								no
Four-engine bombers								data]
Reconnaissance planes								
Torpedo planes								

England (including Malta)	[ditto]
Fighters, single-engine	
Twin-engine bombers	
Reconnaissance planes	
Torpedo planes	

Comparison of Forces

From the foregoing it develops that the Allies held a numerical superiority as follows:

In single-engine fighters	[no figures, etc.]
In twin-engine fighters	
In four-engine bombers	
In two-engine bombers	
In reconnaissance planes	
In torpedo planes	

Comparison of technical efficiency of the German and Allied planes operating in the Mediterranean Theater after the Allied invasion (insofar as their tactical performance is concerned). See Annex 2, Performance Table.

Examination of this table and practical experience shows:

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A comparison of the German bomber with the British twin-engine bomber is superfluous. The same defects of the rwin-engine bomber

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are inherent in them as in the case of their German counterpart. It [the British bomber] could appear therefore in the Mediterranean Theater in daytime only in areas free of German fighter defense or on fronts near the objectives with fighter cover. As compared to the German twin-engine bomber, the American 4-engine bomber exercised the decisive influence on the outcome of the war.

The 4-engine bomber, compared to the German twin-engine ship showed a superiority in speed .... [sic] .... kms. This superiority in speed had an effect on the radius of action.

The radius of action of the American bomber, exceeding the German by .... [sic] .... kms., enabled the former to execute attacks against important objectives lying far in rear of the front. In this manner just after the invasion there came the air attacks on the Ploesti oilfields whereas the German twin-engine bombers were unable to reach objectives of decisive importance, such as the landing points in Oran and Gibraltar, except with the aid of mechanical contrivances (catapult take-off) and then only with too small a bomb load. Their extraordinarily great radius of flight, moreover, permitted the Allied bombers to be kept on airdromes unexposed to German air attack, whereas German bombers suffered heavy losses from Allied air attacks on their airdromes.

On the basis of their .... [sic] .... % greater bomb-carrying capacity, the destructive effect of American bombing attacks was considerably more than that of German units. Because of this great bomb-carrying capacity it was possible to employ the "bomb carpet" method.

Their ability to reach high altitudes, their greater speed, and better defensive armament and armor made the American bomber less vulnerable to Flak and fighter attack. They could fly beyond the effective range of the German 8.8-cm. Flak

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On the other hand, the high vulnerability to gun-fire of the German bomber has already been shown.

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Comparison between Allied fighter and German bomber.

From the standpoint of speed the German bomber was considerably inferior to the Allied fighters, so that the latter could easily maneuver themselves into a good position for attack. The defensive armament of the German bomber to the rear, overhead and below in rear was comparatively weak. The tail assembly caused a dead angle.

The armor protection of the German bomber which only had back armor for the pilot was totally inadequate.

Equipped with only two engines the German bomber was highly vulnerable to gun-fire. If one engine were disabled the bomber was so limited in its ability to fly as to become an easy prey to fighters. Because of this high vulnerability to gun-fire, the opportunities for employing the German twin-engine bomber were considerably restricted. Beyond the radius of flight of its own fighter cover it could be used in areas protected by enemy fighters only under special weather conditions, or at dusk, at evening or dawn, or when continuous banks of clouds permitted flight to and from the objective under their cover.

In attacks on objectives in areas with strong enemy fighter cover our own fighters, even when in force, were unable to prevent rather heavy bomber losses. In such circumstances attacks could only be delivered at dawn or dusk.

Comparison of the German Fighter and the 4-engine Bomber

The German fighter, up to the appearance of the 4-engine bomber, had been able - except for its inadequate flight radius - to fulfill its defensive missions against bombers.

Following the appearance of the 4-engine bomber, the inadequacy of range of the fighter became far more evident. [Enemy] bomber formations with their great radius of action could [illegible]

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Following the appearance of the 4-engine bomber, the inadequacy of range of the fighter became far more evident. [Enemy] bomber formations with their great radius of action could simply fly around fighter protected regions. In view of the great expanses in the Mediterranean Theater that had to be protected, this was to turn out to be particularly disadvantageous to the defense. The limited

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flight radius of the German fighter, coupled with the extent of the region, made it impossible to concentrate the German fighter units in proper time and in such a condition that they could go into action, particularly on those occasions when the approaching hostile formation employed deceptive maneuvers.

Compared to the strong defensive powers of the 4-engine bomber, what with their rather great speed and heavy armor, the German fighter was shown to be ineffective. Its speed was not great enough to command the choice of his attack position. The strong defensive power of the defensive weapons, especially those of the bombers' tail gunners, interfered with the attacking fighters' flight toward the objective and caused them considerable losses. The armament of that time, as well as the effect of the shells themselves, did not hold out against the strong armor plate of the bomber's hull and was inadequate to bring about decisive results.

The 4-engine bomber was most vulnerable when attacked in front from above. Only few German pilots were able at the great meeting speed to bring their sheaf of fire accurately on the target.

(signed) D e i c h m a n n

Translated by: Lt. Col. H.F.K. Cahill.

March, 1948

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Total Strength *)

of Front Units of the German Air Forces

in November 1942

A. Bomber Units:

Combat Squadron 1	3 Groups	employed in the North of the East Front
Combat Squadron 2	3 Groups	employed at the West Front
Combat Squadron 3	3 Groups	employed at the East Front (Center)
Combat Squadron 4	3 Groups	employed in the North of the East Front
Combat Squadron 6	1 Group	in the process of organization
Combat Squadron 26	3 Groups	employed as torpedo planes in Norway
Combat Squadron 27	3 Groups	employed at the East Front (south sector)
Combat Squadron 30	3 Groups	employed at the East Front (south sector)
Combat Squadron 40	1-2 Groups	employed over the Atlantic
Combat Squadron 51	no detailed information possible	
Combat Squadron 53	3 Groups	employed at the East Front (northand center)
Combat Squadron 54	3 Groups	employed in the Mediterranean Theater
Combat Squadron 55	3 Groups	employed at the East Front Middle Sector
Combat Squadron 76	3 Groups	employed at the East Front
Combat Squadron 77	3 Groups	employed in Italy
Training Squadron	3 Groups	employed in Greece and Crete
Combat Squadron 100	2 Groups	employed in the West
Combat Squadron 200	2 Groups	distributed at different fronts

B. Fighter Units:

Fighter Squadron 1	3 Groups	employed in the Bay of Heligoland
Fighter Squadron 2	3 Groups	employed at the West Front
Fighter Squadron 3	3 Groups	employed at the West Front

Total Strength *)

of Front Units of the German Air Forces

in November 1942

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Combat Squadron 76	3 Groups	employed at the East Front
Combat Squadron 77	3 Groups	employed in Italy
Training Squadron	3 Groups	employed in Greece and Crete
Combat Squadron 100	2 Groups	employed in the West
Combat Squadron 200	2 Groups	distributed at different fronts

B. Fighter Units:

Fighter Squadron 1	3 Groups	employed in the Bay of Heligoland
Fighter Squadron 2	3 Groups	employed at the West Front
Fighter Squadron 3	3 Groups	employed at the East Front
Fighter Squadron 5	3 Groups	employed in Norway

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*) Drawn up without data, only from memory. Deviations in every respect, therefore, possible.

Fighter Squadron 26	3 Groups	Home Base Protection
Fighter Squadron 27	3 Groups	employed at the West Front
Fighter Squadron 51	3 Groups	East Front
Fighter Squadron 52	3 Groups	employed at the West Front
Fighter Squadron 53	3 Groups	employed in the Mediterranean, reinforced by at least one group of another squadron
Fighter Squadron 54	3 Groups	employed at the East Front
Fighter Squadron 77	3 Groups	employed at the East Front

C. Close-range Units:

Dive-bomber Squadron 1	3 Groups	employed at the East Front
Dive-bomber Squadron 2	3 Groups	employed at the East Front
Dive-bomber Squadron 3	2 Groups	employed in the Mediterranean Theater
Dive-bomber Squadron 77	3 Groups	employed at the East Front
Combat Squadron 1	2-3 Groups	employed at the East Front

(signed) D e i c h m a n n

COMPARATIVE TABLE OF PERFORMANCE*) OF THE GERMAN AND ALLIED FIGHTER AND BOMBER PLANES EMPLOYED IN THE MEDITERRANEAN THEATER

A. FIGHTER PLANES

	German	German	American
Type of Plane	Me 109 G	FW 190	
Engines	1 to 1000 HP	1 to 1000 HP	
Armament		4 MG	
Crew	1	1	
Maximum Speed			
0 m	500 km.	500 km.	
4000 m	550 km.	550 km.	
6000 m	550 km.	520 km.	
Speed in formation flying at 4000 m altitude	400 km.	400 km.	
Climbing capacity			
1000 m			
3000 m			
4000 m			
5000 m			
6000 m			
7000 m			
Ceiling with capacity load	9000 m	8500 m	
Maximum bomb load	250 kg.	250 kg.	
Radius of action/Duration of flight (maximum load)	1 hr. 10 min.	1 hr. 20 min.	
Weight tons	1,8	2,1	

*) Drawn up from memory; hence, of only approximate value.

COMPARATIVE TABLE OF PERFORMANCE *) OF THE GERMAN AND ALLIED FIGHTER AND BOMBER PLANES EMPLOYED IN THE MEDITERRANEAN THEATER

B. BOMBERS

Type of Plane	German He 111	German Ju 88	American
Engines	2 to 1000 HP	2 to 1000 HP	
Armament	3 MG	3 MG	
Crew	4	4	
Maximum Speed			
0 m	290 km.	320 km.	
4000 m	300 km.	400 km.	
6000 m	340 km.	350 km.	
Speed in formation flying at 4000 m altitude	260 km.	320 km.	
Climbing capacity			
1000 m			
2000 m			
3000 m			
4000 m			
5000 m			
6000 m			
7000 m			
Ceiling with capacity load	5500 m	7500 m	
Maximum bomb load	1000 kg.	2000 kg.	
special	2000 kg.		
Radius of action **) (maximum load)	1000 km.	1400 km.	
Weight tons	8,5	9,5	

*) Drawn up from memory; hence, of only approximate value.

**) Maximum radius of action with only reduced bomb load.

COMPARATIVE TABLE OF PERFORMANCE*) OF THE GERMAN AND ALLIED FIGHTER AND BOMBER PLANES EMPLOYED IN THE MEDITERRANEAN THEATER

C. CLOSE-RANGE PLANES

Type of Plane	German Ju 87	German BF 109 E	German Me 210	German Me 110	American
Engines	1 to 1000 HP	1 to 1000 HP	2 to 1000 HP	2 to 1000 HP	
Armament	2 MG in front 1 twin-gun in rear	2 MG 2 cannons		4 MG in front 1 MG in rear	
Crew	2	1	2	2	
Maximum Speed					
0	300 km.	380 km.	380 km.	350 km.	
4000 m	330 km.	420 km.	450 km.	400 km.	
6000 m	280 km.	400 km.	390 km.	380 km.	
Speed in formation flying at 4000 m. altitude	250 km.	350 km.	320 km.	300 km.	
Climbing capacity					
1000 m					
2000 m					
3000 m					
4000 m					
5000 m					
6000 m					
7000 m					
Ceiling with capacity load	6500 m	7500 m	7000 m	7000 m	
Maximum bomb load	1000 kg.	500 kg.	500 kg.	500 kg.	
Radius of action, max. load	150 km.	Duration of flight 1 hr. 10 min.	800 km.	500 km.	
Weight tons	3,5	1,8	6	4,5	

*) Drawn up from memory; hence, of only approximate value.

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Type:	Crew	Armament	Weight in kg.		Maxim. Speed at altitude: o m	4000 m	6000 m	Speed in form. flying at 4000 m altit.	Ceiling with max. load	Maximum bomb load in kg.	Radius of action with bombs to..... km
He 111 HG	4	3 M.G.	8,5	2 to (1000 HP	290	360	340	260	5500	1000 sp. 2000	1000
Ju 88	4	4 - 6 M.G.	9,5	2 to (1000 HP	320	400	350	320	7500	2000	1400
Me 410	2	4 MG in front 2 MG in rear	6,0	2 to (1000 HP	380	450	390	320	7000	500	800
BF 109 E Combat plane	1	2 cannons	1,8	1 to (1000 HP	380	420	400	350	7500	500	
BF 109 G	1	2 M.G. 1 2 cm Cannon	1,8	1 to (1400 HP	500	550	550	400	9000	500	1 hr. 10'
FW 190 Fighter	1	3 Cannons (2 M.G.	2,1	1 to (1400 HP	500	550	520	400	8500	500	
Me 110	2	(2 Cannons in front 1 M.G. in rear	4,5	(2 to 1000 HP	350	400	380	300	7000	500	500
Ju 87	2	2 M.G. in front 1 twin MG in rear	3,5	1 to 1000 HP	300	330	280	250	6500	1000	150

Remark: Above figures are cited from memory. Errors possible.