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THE ANTIAIRCRAFT ARTILLERY BUILDUP IN 1939-40

The program established on 13 December 1938 for the antiaircraft artillery arm provided for the following production in the 1939-42 period:

Caliber	Monthly Output in Guns	Planned Total in Guns
20-mm	682	30 000
37-mm	109	5 000
88-mm	155	8 200
105-mm	152	2 000

The totals available at the outbreak of war were as follows:

20-mm and 37-mm guns	6 700
88-mm and 105-mm guns	2 600

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This reveals that plans provided for a strength in all calibers of antiaircraft guns by 1942 five times as great as that available at the outbreak of the war,[234] which in turn is indicative of the high degree of importance attached to antiaircraft artillery for air defense.

An examination of the production figures for the offensive with those for the defensive weapons of the Luftwaffe clearly shows that the strategic concept was directed in every sense at retaining the initiative to ned the conflict with the Western Powers by attack.

THE 1940 WESTERN CAMPAIGN

Following the pattern applied successfully in Spain, Poland, and Denmark-Norway, operations for the first and second day of the campaign were planned in all detail and prescribed in orders.

The strategic objective in the planned air operations was consonant with the principles established in Paragraph 16 of THE CONDUCT OF AIR OPERATIONS, according to which the primary mission of the air forces was, "from the first day of warfare on" to annihilate the enemy air forces in their bases, and thereby at the same time serve the purposes of home air defense.

That, in the allocation of units, the offensive

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234. Source 140.

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forces of the Luftwaffe were allocated everything required to insure the successful execution of their mission was strictly consistent with uncompromising logic.

As has been shown the necessity to provide fighter and twin-engine fighter protection for the bomber forces had become a fixed maxim after the experience gained in Spain and Poland.

The ten twin-engine fighter groups available on 10 May 1940 could not have fulfilled this protective mission alone.

In May 1940 the Luftwaffe had the following operable air units on line:

Bomber aircraft	1 120
Dive-bomber aircraft	324
Ground-support aircraft	42
Total available for bombing missions	1 504
Twin-engine fighter aircraft	248
Single-engine " "	1 016
Total available for escort missions	1 264

To oppose these forces the Western Allies had (including the air forces of Belgium and Holland) approximately 6 000 aircraft, of which number 3 000 were stationed

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at airfields on the continent of Europe, the majority of them fighters.[235]

Faced by this situation the German Air Command could not afford to leave fighter forces to defend targets in the homeland.

With the exception of the 2d Group, 77th Fighter Wing stationed in Norway, all fighter and twin-engine fighter units in existence were therefore allocated exclusively for operational missions to protect the attacking German bombers against their western opponents. The allocations and the assigned areas of operations were as follows:

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235. Source 130.

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A. SECOND AIR FLEET ZONE OF OPERATIONS

Unit	Aircraft Type	Area
HQ, First Fighter Wing	Me-109-E	Northern Holland
1st Group, 76th Twin-Engine Fighter Wing	Me-110-C	" "
1st Group, 186th Fighter Wing	Me-109-E	" "
HQ, 2d Fighter Command	"	Holland, Belgium, Northern France
HQ, 3d Fighter Wing	"	Holland, Belgium
2d Group, 3d Fighter Wing	"	" "
3d " "	"	" "
HQ, 26th Fighter Wing	"	Belgium, Northern France
2d Group	"	" "
3d "	"	" "
HQ, 27th Fighter Wing	"	" "
1st Gp., 1st Fight. Wing	"	" "
1st " 21st " "	"	" "
1st " 27th " "	"	" "
1st (Fighter) Group, 2d Training Wing	"	" "
HQ, 51st Fighter Wing	"	Holland
1st Gp., 26th Fight. Wing	"	"
1st " 20th " "	Me-109-D	"
2d " 27th " "	Me-109-E	"

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THIRD AIR FLEET ZONE OF OPERATIONS

Unit	Aircraft Type	Area
HQ, 3d Fighter Command	Me-109-E	Belgium, France
HQ, 2d Fighter Wing	"	" "
1st Group	"	" "
2d "	"	" "
3d "	"	" "
4th "	"	" "
1st " 76th Fighter Wing	"	" "
HQ, 52d Fighter Wing	"	France
1st Group	"	"
2d "	"	"
1st " 51st Fighter Wing	"	"
HQ, 53d Fighter Wing	"	"
1st Group	"	"
2d "	"	"
3d "	"	"
HQ, 77th Fighter Wing	"	"
1st Group	"	"
1st G " 3d Fighter Wing	"	"
HQ, I Flak Corps		
26th Twin Engine Fight.Wing	Me-110-C	Belgium,North. France
1st Group, 1st Wing	"	" "
2d " 26th "	"	" "
3d " 26th "	"	" "

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Unit	Aircraft Type	Area
HQ, I Flak Corps,-cont.		
76th Twin-Eng.Fight Wing	Me-110-C	Belgium, North.Franc
2d Group	Me-110-C/D	" "
1st " 26th Wing	Me-110-C	" "
HQ, II Flak Corps		
HQ,2d Twin-Eng.Fight.Wing	"	Belgium, France
1st Group	"	" "
5th(Twin-Eng),1st Tng Wing	"	" "
HQ, V Flak Corps	Me-109-E	France
HQ,54th Fighter Wing	"	"
1st Group	"	"
2d " 51st Fight.Wing	"	"
1st " 52dt Twin-Engine Fighter Wing	Me-110-C	"
2d " 1st Twin-Engine Fighter Wing	"	"

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At daybreak on 10 May 1940 the well-prepared all-out attack against the air bases of the Western Powers began.

On the same day a number of bombs were dropped on the city of Freiburg im Breisgau, also in the morning. The oofi-cial bulletin reported that 3 enemy aircraft had attacked the city and the airfield at Freiburg, killing 28 civilians, including children, injuring large numbers, and damaging a number of buildings.

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On 12 May 1940 two fighter groups were withdrawn from their offensive missions in the West and transferred on missions of air defense to Freiburg and Boeblingen..These were the 1st Group, 54th, and 2d Group, 51st Fighter Wings.[238] They were placed under Air District Command VII.[239]

This event and the measures taken reveals what might be called an "after the event" tendency on the part of the Luftwaffe Command, a tendency which was to develop into a lasting attitude later in the war. It had been thought,

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236. Sources 123, 125.
237. Source 129
238. Source 123.
239. Source 98.

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as related previously in this study, that the forward movement of the fighter defenses to the front areas would make it possible to dispense with fighter protection for specific target areas in the homeland. Then, a small sttack by three airplanes in a relatively insignificant area of Germany resulting admittedly in appreciable damage was sufficient to to sway the command back to the idea of direct fighter defense for specific targets. There can be no doubt that this change in sentiment was due also partly to public opinion, which could find vigorous expression through the local Party organs outside of military channels.

To crown the whole absurdity, investigations by a military court established that the bombing of Freiburg had been done erroneously by a German flight of bombers. Catching sight of the city and airfield through an opening in the clouds the bomber crews had mistaken it for a target in France.

In contrast, the increasing activities of the Western Powers in air attacks against the Rhine-Ruhr region were accepted with stoical calm.

Allied bombing attacks on 10 May 1940 against the Krupp Works in Essen, and against a coal mine in the Rhur region and another at Emmerich, on 11 May against Oberwesel, on 11-12 May against fifteen separate points in

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the areas of Aachen, Muenchen-Gladbach, Duesseldorf, and Viersen, on 12-13 May against Duisburg, Kaldenkirchen, Cologne, Troisdorf, Siegen, Saarburg and other points passed without any reaction in the form of moving in fighter forces as a precaution against repetitions. Here, the cause for this inaction may have been that the damage done was small coupled with the knowledge that the industrial areas had strong antiaircraft artillery defenses, the repelling power of which could be considered sufficient, until the campaign in the west could be brought to an end, without support from fighters.

Events in the air operations in the West had increased the conviction that the execution of bombing missions under no circumstances could be risked without fighter protection. One event in particular strongly influenced thought in this direction:

According to prearranged operational plans, a bomber group equipped with He-111 planes was to attack the French air base Albert at Amiens on 11 May 1940. In discussions preceding the action it was realized that the 76th Twin-engine Fighter Wing, assigned to escort the bombers, could not, from its tactical airfields at Wahn and Niedermending provide escort protection through to the target, because the distance exceeded the extreme range of the

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Me-110-C fighters by roughly 30 miles.

The bomber command stated its opinion that the He-111 bomber force by reason of its excellent defensive fire power could well afford to fly the last part of its route to the target without fighter protection, if escorts could be provided for the first part of the route and to receive the bombers on their return.

Thereupon it was agreed that fighters would escort the bombers to a designated point approximately 30 miles before the target, and that another fighter unit would be at the same point ten minutes later to escort the bombers on their return from their mission.

The 76th Twin-Engine Fighter Wing assigned its 2d Group, which escorted the bombers on their approach route, and the mission of escorting them on their return route was assigned to the 1st Group, 26th Twin-Engine Fighter Wing.

The approach under twin-engine fighter escort proceeded without interference, but during the bombing run and during the return to the point of juncture with the relieving unit of twin-engine fighters, French fighters downed 27 of the 30 bombers participating in the bombing mission.

This incident resulted in a general order from the

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Commander in Chief of the Luftwaffe prohibiting bombing missions altogether except under fighter escort.[240]

From the above incident it is clear that all available fighter forces were required primarily to achieve the set operational objectives in the western campaign and that no fighter forces could be released for air defense missions in the zone of interior.

How desperately urgent the need was for fighters is evident from the fact that the two fighter groups (1st, 54th and 26,51st Fighter Wings) moved to Freiburg and Boeblingen in the first moment of shock after the attack against Freiburg were required, in addition to their defensive mission, to carry out escort missions and low-altitude attacks under directions from the V Air Corps in the southern sector of the front. Firthermore, the 6th Squadron of the 51st Fighter Wing in mid-May was transferred to Dinant, Belgium and placed under the 76th Twin-Engine Fighter Wing for the rest of the campaign. At the beginning of June both groups were transferred to Vitry and Abbeville and returned to their parent unit, the 54th Fighter Wing. In the second phase of the campaign

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240. Source 3.

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Photo

Me-110 Twin-Engine Fighter of the 76th Twin-Engine Fighter Wing, Known generally as the Shark (Haifisch) Wing.

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which commenced on 3 June 1940 with the launching of Operation Paula, an all-out air attack against air bases in the Paris area, both units were again committed exclusively in operational missions.[241]

WESTERN AIR SITUATION 10-31 May 1940

The dominant feature in the air situation from 10-31 May 1940 was the day and night harassing air attacks against the Helligoland Bight area and western Germany in general. The attacks were carried out by forces of between 7 and 25 aircraft, which dropped their bombs indiscriminatingly, usually on non-military targets. In the 10-22 May period penetrations occurred on five nights, in the 22-31 May period all penetrations were at night.

The heaviest attack was carried out on the night of 17-18 May by 40-50 bombers against the Hamburg and Bremen areas, resulting in 43 civilians killed and 10 wounded.[242]

The problem now evolving was thus not one of daylight but of night air defense.

This problem presented two aspects:

1. Means to provide night air defense by fighters were not available.

2. Night air defense by antiaircraft was to some extent problematical, since the enemy planes also

241. Sources 98, 123. 242. Source 129.

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penetrated over German territory during conditions of poor visibility and indiscriminately bombed any targets found , targets which were without military significance and therefore had no antiaircraft defenses. The deaths and injuries inflicted in such attacks imposed the categorical necessity to provide defense against them. This defense could not be furnished by antiaircraft guns but only by fighters, which could operate more flexibly in larger areas.

The German air Command was quick to draw the logical conclusions from this compelling situation.

BUILD-UP OF THE NIGHT-FIGHTER ARM 1940

On 22 June 1940, the day on which the Armistice with France was signed, the 4th Group, 26th Twin-Engine Fighter Wing (1st Group, 1st Twin-Engine Fighter Wing) was withdrawn from the wing and transferred to the Muenchen-Gladbach air base. Captain Falk, who was in command of the group and with his group had distinguished himself particularly in defensive action against the British air attack on Wilhelmshaven on 18 December 1939, was ordered to report personally to the Commander in Chief of the Luftwaffe, promoted to major rank, and instructed to organize the 1st Night Fighter Wing.

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The reason why Captain Falk's group was selected for this mission was an after-action report the unit had turned in on action against British bombers attacking at night in Denmark. While the group was stationed there on the Aalborg airfield, in the period from 20 April-3 May 1940, British Wellington bombers in the night of 20-21 April staged a night attack against the Aalborg airfield. On its own initiative the group had gone into defensive action at twilight and continued its operations into the night.

Simultaneously with the instructions to Captain Falk to organize a night fighter wing, the 1st Searchlight Regiment, under Lieutenant Colonel Fichter, received orders to cooperate with the new night-fighter group in night fighter operations and was transferred to left of the Rhine River north of Duesseldorf for the purpose. The twin-engine fighter group was transferred to Duesseldorf.

Command authority in the region was vested in the local air district commander. Under this command the joint operations did not develop favorably. The searchlights were emplaced within the antiaircraft artillery zone and the air district commander naturally only committed the fighters when weather conditions were too unfavorable for antiaircraft guns even against targets

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lit up by searchlights. The result was, that the fighters only went into action when weather and visibility conditions were also too poor for them to be effective. For some time activities were restricted to practice flights. Some of the crews were detailed to participate in training courses on blind navigation and the aircraft had to be reequipped for night operations.[243]

GERMAN AIR DEFENSES AFTER THE WESTERN CAMPAIGN

Immediately after conclusion of the Franco-German Armistice Agreement on 22 June 1940 a number of fighter units were withdrawn from operational missions and assigned air defense missions under the various air district commands, as follows:

Area	Unit	Station	Under Air District Command
Norway	1st Gp,76th Twin-Eng Fighter Wing	Stavanger	Norway
	2d Gp.77th Fight.Wing	Kristiansand	"
Holland	HQ, 54th Fighter Wing	Schiphol	Holland
	1st Group	"	"
	2d " (1st Gp,76th Wing)	Soesterberg	"
	3d Group (1st Gp,21st Wing)	"	"
Helligoland Bight	HQ, 1st Fighter Wing		XI
	1-2 fighter groups in rotation		
Ruhr Region	3d Gp., 3d Fighter Wing	Boenninghardt	VI

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Area	Unit	Station	Under Air District Command
Hanover	2d Gp., 27th Fighter Wing	Wunstorf	VI
Berlin	HQ, 77th Fighter Wing	Doeberitz	III
	1st Group	"	
	3d " (2d Gp., 186th Wing).	"	244

243. Source 67.

244. Sources 18, 92, 111, 123, 127, 141.

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Owing to the lack of records, the above tabulation is not complete. It is probable that elements of the 26th, 52d, and 53d Fighter Wings also displaced to their peacetime stations of Cologne/Duesseldorf, Wiesbaden, and Mannheim to protect the industrial areas.

While this general redisposition of forces was going on measures were taken to remove the confusion existing in the unit designation numbers, and in many cases, whenever necessary, the numbers of groups were changed to coincide with the numbering of their wings, as follows:

Old Designation	New Designation
1st Group, 1st Fighter Wing	3d Group, 27th Fighter Wing
1st " 20th " "	3d " 51st " "
1st " 21st " "	3d " 54th " "
1st " 76th " "	3d " 54th " "
2d " 186th " "	3d " 77th " "

Twin-Engine Units

1st Group, 1st Wing	4th Group, 26th Wing
3d " 1st "	3d " 76th Wing
1st " 52d "	2d " 2d "

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On 30 June 1940 the Commander in Chief of the Luftwaffe issued a general directive regulating air defense operations in the zone of interior. The directive contained the following instructions:

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1. Reinforcement of the home air defenses has become necessary because of increasing enemy air activities against the German economy. Main emphasis in air defense must be placed on the following: the command areas of District Air Commands XI, VI, and XII, and the western parts of Air District Commands XIII and VII

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245. Sources 18, 142.

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2. Tactical command over the fighter forces for the purpose of developing local power concentrations will in each case be exercised by a wing or fighter command headquarters.

3. Steps must be taken to insure reliable aircraft reporting services organized in depth and to insure smooth integration at the air district command boundaries. During weather favorable for surprise attacks by enemy air forces, air reconnaissance will be maintained by pairs of observation aircraft.

4. A high degree of readiness for action must be secured by light antiaircraft guns to repel British air units attempting to achieve surprise in attack by sudden dives through cloud ceilings.

5. All twin-engine fighter units will promote training in night fighting. Suitably qualified crews in the fighter groups will be committed in night fighter action on moonlit nights.

Exercises will be carried out to test the method of maintaining fighters on roving patrols within the antiaircraft fire zone but at altitudes closed for antiaircraft fire.

6. Units of the I and II Flak Corps will be deployed to protect the ground service organization in

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the occupied western territories. All weapons suitable for air defense action, including those of the Army, will be used to reinforce them. This applies also to organic air defense units of the Army, which will be committed as the local situation requires.

7. A close aircraft reporting network will be established along the coastline along the English Channel and the Atlantik to as far as Biarritz.

A seaborne coastal aircraft reporting service will be developed in cooperation with the locally responsible naval commands.

A coastal air reconnaissance patrol service will be organized with tactical reconnaissance Hs-126 type planes to detect enemy units at low altitudes and report their approach directly to the appropriate fighter and antiaircraft artillery units.[246]

The tenor of these instructions reveals that the German Air Command had shifted emphasis to defensive air warfare immediately after achieving its objectives in operational offensive warfare.

However, this period lasted only until new plans for continuation of startegic air warfare had taken on a more concrete form.

The main problem of air defense, that of night defense,

245. Source 143.

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was given a decisively vigorous organizational impulse with the assignment of General Kammhuber to command the existing night fighter division.

BUILD-UP OF THE NIGHT FIGHTER ARM IN 1940

With the assignment of General Kammhuber a personality was introduced into the night fighter arm who had important qualifications necessary for success in this field:

1. 1. General Kammhuber had received training as a fighter pilot in Russia. As former chief of the Operations Division of the Luftwaffe General Staff he furthermore had very especial experience, from his tenure of office during the initial build up of the Luftwaffe, in the field of large-scale organization.

2. As former Chief of Staff, Second Air Fleet, he had wide experience in all fields of air operations, including those of the offensive and defensive forces and of the ground service organization.

3. As Wing Commander of the 51st Bomber Wing in the western campaign he had gained personal experience in the field of the modern operational methods of bomber forces.

246. Source 143.

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Based on estimates of the performance capabilities of the Royal Air Force and on past experience concerning the objectives aimed at in air warfare by the British, it was safe to assume that the Ruhr region would continue to be the main target for attack by the British air forces.

For this reason General Kammhuber's first purpose was to establish a night-fighter belt in front of the Ruhr region. The basic idea in his system was to establish a searchlight belt 18 miles deep forward of the antiaircraft artillery fire zone. In this belt night fighters were to attack enemy planes lit up by searchlights before they could reach the antiaircraft artillery fire zone.

In order to be able to detect the approach of enemy aircraft in time to insure the timely take off of night fighters held under alert, one Wuerzburg A radar set was to be assigned to each searchlight battalion deployed within the searchlight belt.

The night fighter units were to remain in waiting positions behind the searchlight belt until called into action immediately after enemy units were detected by the Wuerzburg radar instrument. Relying on his own navigation the fighter pilot was to fly towards the probable point of contact so as to be ready in the vicinity as soon as forward line of searchlights of the belt picked up

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the target. With each successive line of searchlights picking up the target as it left the effective lighting range of the line before, the enemy within the searchlight belt of 18 miles would be lit up for about ten minutes, and this, it was presumed, would be enough time for action by the night fighters committed. After organization of a headquarters staff, the night fighter division established headquarters at Bruessels-Zeist, in Holland, and was placed under the Second Air Fleet, in whose zone of command the forward area of night fighter operations was located.[247]

On 21 July 1940 an important decision by the Commander in Chief of the Luftwaffe increased considerably the scope of the night fighter mission.

Orders were issued to include operations against hostile night fighter air bases in the night fighter missions as soon as appropriate standards of training were achieved.

This implied the organization of a strategic night fighter arm.

In the initial stages the organization of a close-in night fighter defense system to protect the Ruhr region was complicated by the lack of units suitable for night fighter operations and by the lack of searchlight units.

So far as the air units part of the problem was concerned, the only remedy was to release twin-engine units

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for the purpose. The requirements in searchlight units from the antiaircraft artillery arm could not be met before new units became available from the activation program which would begin on 10 August.[248]

For this reason the Night fighter division for the time being had to rely on only one night fighter group, the 1st Group, 1st Night Fighter Wing, and one searchlight regiment, the 1st Searchlight Regiment.

First experience showed that the area northwest of Duesseldorf was exceedingly unfavorable for night fighter operations because of the haze caused by industrial plants. Since the enemy units as a rule penetrated into the Ruhr region from northwest, the fighter group was transferred to Guetersloh and the searchlight regiment deployed northwest of Muenster in July 1940.

This measure soon proved sound by producing the first successes in night fighter operations.

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247. Sources 67, 144, 145.
248. Source 146.

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First Lieutenant Streib, a squadron leader in the night fighter group, was the first to bring down an enemy plane, but was soon followed by First Lieutenant Ehle and Sergeant Gildner, with Lieutenant Streib then following again, this time with two planes downed.

These successes gave increased impetus to the expansion of the night- fighter arm.

AIR BATTLE FOR BRITAIN, 1940

In the meanwhile the decision had been made concerning the continuation of the war. On 23 July 1940 British Foreign Minister Lord Halifax had rejected German Reich Chancellor Hitler's overtures of peace. Thereupon Britain was decided upon as the next strategic objective.

Once again the course in air armaments was changed, with main emphasis now once more on the offensive. The importance of fighter and twin-engine fighter forces to escort bombers and dive-bombers was increased by the fact that Britain had a well organized defense system and more particularly by the fact that the Royal Air Force had to be considered a serious opponent both in respect to the number and quality of its fighter forces. In air battles fought over Dunkirk Spitfires had given impressive proof of their capabilities in combat with the German Me-109 and Me-110 units.[250]

249. Source 113. 250. Source 3.

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Between 5 and 8 August 1940 the Luftwaffe marshalled its forces for the air offensive against Britain. Of the forces transferred after the western campaign to the zone of interior for employment in defensive missions, only the following remained in the home defense system:

Unit	Station	Defense Area
HQ, 77th Fighter Wing	Doeberitz	Berlin area
3d Group	"	"
HQ, First Fighter Wing	Jever	Helligoland Bight
2d Group, 77th Fight. Wing	Kristiansand	Southern Norway
1st " 76th " "	Stavanger	Southwest Norway

At the same time a new fighter group was activated at Doeberitz, the 3d Group, 52d Fighter Wing.[251]

The Battle for Britain opened on 15th August 1940. The objective was to gain air supremacy over Britain as the primary condition for a invasion of the island. This objective was not achieved.

The chief reasons for this failure were as follows:

1. The conduct of strategic air warfare with bomber forces was seriously limited by the striking range of the fighter and twin-engine fighter forces required to escort the bombers on their missions.

2. In point of quality the British Spitfire fighter aircraft and the British fighter pilots

251. Sources 18, 147.

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Photo

British Spitfire Fighter Plane

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were equal to anything the German fighter and twin-engine fighter forces could send against them. Lacking the advantage of superior quality, which had been the deciding factor in Poland and France, the numerical ratio of the opposing forces decided the issue.

3. The narrow base area from which the German forces had to operate and the small area against which theywere operating limited their opportunities for deceptive and misleading tactics and made it very easy for the British to throw their fighters into action in concentration at the currently critical points from case to case. This became acutely noticeable later, in the second phase of the air offensive, when the British had recognized the limits of possible operations and the German intention to adhere to London as their target. Without fear they were then able to strip areas farther off of fighters and concentrate everything on defense of the London areas.

4. Concurrently with the increasing intensity of British fighter defense action due to the above causes, the effective strength of the attacking German fighter and twin-engine fighter units declined steadily because of inadequate replacements in

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in trained personnel and aircraft.

The result was that, from early September on the escort units, particularly the twin-engine fighters, over enemy territory had to contend against a steadily increasing numerical superiority of British fighters. The great handicap for the German fighters here was that the time needed to bring an air action to a close frequently taxed their time-in-air capacities to the utmost limit, which gave all the advantages in battle to the defenders.[252]

SUB-DIVISION OF THE TWIN-ENGINE FIGHTER UNITS
AUTUMN 1940

As a result of these circumstances the Commanding Officer, 1st Fighter Command, who controlled all twin-engine fighter forces, came to the conclusion that continuation of strategic warfare in reliance on protection of the bombers by twin-engine fighter forces would be too costly. In a memorandum dated 15 September 1940 he submitted the following recommendations:

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252. Source 3.

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1. The establishment of mixed escort forces by assigning, tactically and administratively, 1 twin-engine and 2 single-engine fighter groups to each fighter wing as an organic unit.

2. The instalment of DB-601-N (High-altitude) engines in single-engine fighter planes in order to give them capabilities superior to those of the British Spitfires and increase their effective range.

The memorandum was submitted to the Commanding Officer, 2d Fighter Command for comments and on 24 September he recommended as follows:

1. That twin-engine fighters should only be employed as escorts on long-range missions and only in areas where weak fighter defenses could be expected.

2. Commitment of the twin-engine fighter units in air defense missions in order to release the single-engine units for operations against Britain. Owing to their longer time-in-air capacity each twin-engine unit of group size would be able to replace three single-engine units in this manner, also of group size.

3. Use of twin-engine fighters as fast bombers escorted by single-engine units.

4. The use of twin-engine units in night air defense.

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Second Air Fleet Headquarters submitted the above recommendations by the two fighter commands to the Commander in Chief of the Luftwaffe on 4 October 1940 with the following indorsements:

1. If opposed by numerically weaker enemy fighter forces, the twin-engine fighter units were able in every respect to perform their missions as escort units. Difficulties only arise when the limitations of their time-in-air capacities compel them to break contact with opposing enemy forces of equal or superior numerical strength.

The recommendation of the 2d Fighter Command under Item (1) of its memorandum is approved by this headquarters.

2. It would be wiser to leave the twin-engine and single-engine fighters in their separate wings, but to consolidate the wings under fighter brigade or division headquarters in a ratio of 1 twin-engine to 2 or 3 single-engine wings under each such headquarters.[253]

The Commander in Chief of the Luftwaffe decided on the following compromise:

The 26th Twin-Engine Fighter Wing remained committed in operations at the English Channel, but was reequipped as a fast bomber force.

The 76th Twin-Engine Fighter Wing transferred

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its headquarters, together with its 3d Group to Norway, where it was assigned a defensive mission to relieve the 2d Group, 77th Fighter Wing currently stationed there. The fighter group was assigned to the 77th Fighter Wing, its parent unit, for operations on the EnglishChannel front. The 2d Group, 76th Twin-Engine Fighter Group received planes with DB-601-N engines and was placed under Air District Command XI for daylight air defense missions.

The 2d Twin-Engine Fighter Wing was disbanded and transferred to the night fighter arm. Only its first squadron remained intact as a traditional wing unit under the new designation of 4th Squadron, 2d Night Fighter Wing.

The 2d Group, 1st Twin-Engine Fighter Wing was placed in the night fighter arm as a long-range night fighter unit and was reequipped with Ju-88 and Do-17 planes.

The 5th (Twin-Engine) Group, 1st Training Wing was redesignated as the 1st Group, 3d Night Fighter Wing and transferred to the night fighter arm.[254]

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253. Source 148.

254. Source 149.

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EXPANSION OF THE NIGHT FIGHTER ARM

1940-41

In making the decisions just described above the Commander in Chief of the Luftwaffe undoubtedly was seriously influenced by concern over the increasing British night attacks. The release of twin-engine fighter units for the purpose was the only possibility to reinforce the night fighter arm.without delay. Normal training for twin-engine fighter personnel included the subjects of fighter action and blind and instrument navigation. Daylight fighter personnel lacked training in the latter, bomber personnel in the former of these two subjects.

Since the Me-110 plane was quite suitable for blind navigateion, had very heavy fire power, and an adequate time-in-air capacity (2 hours and fortyfive minutes)for night operations of limited duration, no quicker and sounder solution of the problem could have been found.

Even before the measures just described were taken, realization of the necessity for a speedy expansion of the night fighter arm, which in July 1940 had only one group, the 1st Group, 1st Night Fighter Wing, had led to the transfer of available units to the arm prior to October 1940.

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These transfers began with the withdrawal of one squadron of the 1st Group, 76th Twin-Engine Fighter Wing in August 1940 from its defensive mission in Norway, where it had not been employed to full capacity, and its transfer to Deelen, Holland, where its personnel were trained in night fighter tactics by a squadron of the 1st Group, 1st Night Fighter Wing, also transferred to Deelen. Another squadron of the twin-engine fighter group was transferred from Norway to the 1st Group, 1st Night Fighter Wing, and, finally the last remaining squadron together with the group headquarters was used to establish the 2d Group, 1st Nighter Fighter Wing at Deelen.

The 4th Group, 2d Fighter Wing included as its 10th squadron the unit which had conducted night fighter experiments prior to the war and therefore had experience in this field. Prior to the opening of the offensive against Britain this group was assigned to the night fighter division to form the 3d Group, 1st Night Fighter Wing. Initially this group had Me-109-E aircraft. Since they were found unsuitable for the purpose because of their small time-in-air capacities and their inadequate equipment for blind navigation, reequipment of

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the group's squadrons with Me-110 aircraft commenced in December 1940 .

At the end of 1940 the following night fighter forces were in existence:

Unit	Aircraft Type
HQ, 1st Night Fighter Wing	Me-110-D
1st Group	"
2d "	"
3d "	Me-110-C/D & Me-109-E
1st " 2d Night Fighter Wing	Ju-88 & Do-17 for long-range missions
4th " 2d " " "	Ju-88 for long-range missions
1st " 3d " " "	Me-110-D

Up to the end of December 1940 the 10th Squadron, 1st Fighter Wing, designated as a night fighter unit, remained committed under Air District Command Holland at Vlissingen. Its mission there was to intercept British reconnaissance aircraft, which frequently penetrated over the Schelde estuary areas during twilight, either during their approach or return flight.

The newly established 1st Group, 3d Night Fighter Wing was organized from the former 5th (Twin-Engine) Group, 1st Training Wing.[255]

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255. Sources 18, 67, 150, 180.

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The authorized strength of the night fighter units was as follows:

Wing Headquarters	3 aircraft with crews
Group Headquarters	3 aircraft with crews
Squadron	12 aircraft with crews
Group	29 aircraft with crews

Reports by the Chief of Luftwaffe Supply and Administration for 2 November 1940 show the following strengths in twin-engine and single-engine night fighter forces

Authorized		Actual		Effective	
Aircraft	Crews	Aircraft	Crews	Aircraft	Crews
207	207	172	161	93	95

The authorized strength of 207 is calculated on the basis of 5 groups of each 39 aircraft plus 1 squadron of 12 aircraft.[256]

At the end of December 1940 the 10th Squadron, 1st Fighter Wing was transferred to the daylight fighter forces as the 1st Squadron of the same wing.[257]

Reports by the Chief of Luftwaffe Supply and Administration for 28 December 1940 show the following strengths in twin-engine night fighter forces:

Authorized		Actual		Effective	
Aircraft	Crews	Aircraft	Crews	Aircraft	Crews
195	195	165	173	104	61

[258]

256. Sources 54, 102, 153. 257. Source 150.
258. Source 102.

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These figures remained unchanged by new activations up to 29 March 1931.

The report by the Chief of Luftwaffe Supply and Administration for 29 March 1941 is the first to show an increase in authorized strengths by 1 wing headquarters (the 3d Night Fighter Wing) and 1 squadron (the 4th Squadron, 2d Night Fighter Wing. It also shows 115 effective crews against 124 effective aircraft available , a sign of the good results produced by the preceding training period.[259]

SEARCHLIGHT SUPPORT IN NIGHT FIGHTER OPERATIONS 1940-41

Hand in hand with the build up of night fighter forces went a considerable expansion of the searchlight forces organization. From July 1940 on the following new units were established:

Unit	Mission
1st Searchlight Brigade	Development of the searchlight belt in northwestern Germany
2d " "	Development of the searchlight belt west of the Rhine-Ruhr region.[260]

RULING PRINCIPLES IN THE ORGANIZATION AND EQUIPMENT OF NIGHT FIGHTER FORCES

From 1 September 1940 on the night fighter arm

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was organized and expanded in accordance with the following principles:

1. Strategic or Long-Range Fighter Forces.

Purpose. Action against the enemy air forces in the form of attacks with bombs and weapons fire against their bases, to include dispersal fields, and units taking off or landing at the bases; Action against enemy air forces during their approach and return flights.

2. Tactical or Close-In Night Fighter Forces.

a. Illuminated Night Fighter Defense, with support from searchlight units. Plans provided for the development of a searchlight belt 18 miles in depth forward of a line extending from Schleswig through Kiel, Hamburg, Bremen, the Ruhr region, Arnheim, Venlo, and Liege and of a second belt to protect Berlin and extending from Guestrow through Stendal to Gardelegen.

The searchlight beams were to be directed by means of sound locators in the direction of approaching aircraft.

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259. Source 153.

260. Source 154.

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Photos

Left: Mobile Wuerzburg Type Radar

Right Freya Type Radar

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On 16 October 1940 the night fighter division received its first Wuerzburg A radar set, which was installed in a Freya type radar position at Zuphten in Holland. Initially this instrument was used to control the movements of night fighters and guide them, by means of radio messages, to targets picked up by searchlights.

As more of these instruments became available they were placed in positions at the forward boundary of each searchlight battalion zone to insure earlier detection of approaching enemy aircraft and to guide night fighters and searchlights towards them.

Continued deliveries made it possible to place one istrument at the rear boundary of each third searchlight battalion in order to establish the same advantages against enemy units during their return flight.

Of each 3 Wuerzburg instruments in operation 1 was assigned to control the operations of night fighter aircraft, in addition to which some of the coastal positions also had a Freya instrument with a supplementary control set (Freya-Geraet mit AN-Fuehrungszusatz). This made it possible in time to develop a system in which the position of an enemy plane and the German night fighter could be computed centrally on a plotting table and transmitted by radio to the night fighter in the form of an "intercepting

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point order", thereby guiding the fighter pilot so close to his target that he could sight and attack it.

This method was also tried with targets not spotted by the searchlights and proved successful on moonlight nights. Finally, it was adopted as the standard system in night operations without searchlight support.

b. Night Fighter Defense without Searchlight Support. The limitations imposed on searchlight operations by weather conditions soon made it clear that the protection afforded by illuminated night fighter defense was inadequate to prevent night attacks, and that this inadequacy increased as the enemy increased attacking in unfavorable weather conditions with growing frequency.

A starting point for a solution of this problem existed in the results obtained in the previously mentioned experiments at using a radar instrument to detect the enemy plane and guide the night interceptor to it. The inaccuracy of the data obtained with the radar sets then in existence necessitated a high degree of ability on the part of the fighter control officer at the radar instrument to guide the night fighter to within sight of his target, and only very few experts achieved such high standards.

Until the Wuerzburg Riese fighter control radar set

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was introduced in 1941 radar positions were therefore so arranged that they could serve to control both daylight and night fighter operations.

By 31 December 1940 units of the night fighter division shot down 42 enemy planes, most of them with searchlight support, some in strategic night missions, and some in night operations without searchlights.

In tests carried out without searchlights it had been found that even on light nights the detection of a target with the naked eye was more or less a matter of chance. This naturally led to the requirement to extend the range of human vision through the installation of radar locators on the fighter aircraft. A laboratory test model of a radar instrument, known as the Lichtenstein B/C, was developed for this purpose, but was not ready for delivery to active units before the autumn of 1941.[261]

COMBINED NIGHT FIGHTER-ANTIAIRCRAFT ARTILLERY OPERATIONS IN 1941

Early in January 1941 the 1st Squadron, 1st Night Fighter Wing, was transferred to the Berlin area to carry out tests in night operations with searchlight support and in combination with antiaircraft artillery within the defense target area.

Test I was to try out the feasibility of night

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fighter action action in the rear of the defense area, while most of the guns in the antiaircraft artillery zone withheld fire.

Test 2 was to try out the practicability of simultaneous night fighter and antiaircraft artillery action against enemy aircraft over the target area.

Test 3 was to try out the effectiveness of night fighter action against enemy aircraft in a zone forward from the target area.

The Air Defense Commander in Air District Commands III and IV reported on the results obtained in these tests on 8 March 1941 as follows:

1. Test I. Operations of this type can be carried out without complications. Preparations can be made for the aircraft and the necessary signal communications at short notice.

2. Test 2. Operations of this type can be executed by three methods:

a. Night fighter action within the antiaircraft zone. The antiaircraft artillery will attack the enemy until the night fighters are close by. During the night fighter action, antiaircraft guns in the sector will withhold fire. The scope on which antiaircraft fire would have to cease appears excessive.

261. Sources 22, 144.

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b. The zones of action for the antiaircraft artillery and for the night fighters will be separated in altitude, the antiaircraft artillery zone extending up to approximately 11 500 feet (3 500 meters), where the night fighter zone would begin. It would be impossible to avert endangering friendly fighters, especially if they fly in to attack enemy aircraft within the antiaircraft fire zone. The chances of success in this type of operations seem small, since the opportunities for successful action by night fighters would be limited, while the enemy would have improved opportunities to bomb from altitudes above 11 500 feet.

c. Night fighters to operate within zone of antiaircraft fire and to be identifiable by a marking which would appear on the radar screen. On appearance of this marking antiaircraft fire would cease until the marking and the enemy plane appear separately on the radar screen.

This method appears to be the solution best worthy of efforts to adopt.

The 1st Squadron, 1st Night Fighter Wing took the opportunity during these tests to carry out experiments in night fighter action without searchlights, but had only one Wuerzburg A instrument available to track enemy

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planes. The whole principle proved impracticable because the data obtained was far too unreliable for the plotting of courses, and because there was no certainty that the fighter pilot would adhere rigidly to the course he was ordered to fly. For these reasons the system of night

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262. Source 155.

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fighter operations with searchlights had to be retained until an ad quate number of Wuerzburg Riesen fighter control radar could be made available to instal two in each radar station, one to track the target, and one to control the friendly fighter. The radar station system therefore had to be established along the searchlight belt for the time being, with an outpost area extending as far as the coastline of the English Channel.[263]

REVIEW OF EXPANSION OF THE NIGHT FIGHTER ARM

So far as developments in night fighting are concerned it can be said of the 26 June 1940-21 March 1941 period that

1. The whole system was placed under the command of a particularly capable officer of the Luftwaffe, who went about his mission with foresight, intuitive understanding, and energy.

2. The release of twin-engine fighter units for the purpose after failure of the air offensive against Britain made a quick expansion of the night fighter, defense system possible.

3. The combination of long-range and close-in defense night fighter operations provided a concept offering optimum chances of success.

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4. In view of the fact that the enemy still showed a preference for light nights in which to carry out night attacks and still had to rely on good visibility for the aimed bombing of targets of military importance, the system of night fighter operations with searchlight support provided the best protection and was most appropriate to the tactics employed by the enemy.

5. With appropriate foresight and well ahead of time measures were introduced to create favorable conditions for night fighter operations through an increased delivery of radar instruments to the ground service organization and through the development of a radar target detector for installation on night fighter aircraft.

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263. Source 145.

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REINFORCEMENT OF THE DAYLIGHT FIGHTER FORCES IN THE ZONE OF INTERIOR, 1940-41

As a result of the failure of the air offensive against Britain and because of the limited opportunities for air operations owing to weather conditions, a number of daylight fighter units were also withdrawn from action at the Channel coast by the end of 1940 and were transferred to the air defense forces under the various air district commands.

This measure was not in response to any acute necessity resulting from the current air situation, but was more in the nature of a precaution. The Royal Air Force had shown that it had exceptional capabilities for long-range penetrations. On the night of 26-27 August 1940 its units had attacked Berlin, and on the night of 27-28 August a number of Whitley bombers had attacked the Skoda armament works at Pilsen, in Czechoslovakia.[264]

All areas of penetration were within the command zones of the Second Air Fleet, and no attacks against German territory had so far been carried out in the zones of the Third Air Fleet.

On 1 January 1941 the following forces were stationed within Germany and Holland in daylight air defense missions

264. Source 112.

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Air District Command	Unit	Defense Area
III-IV	1st Group, 27th Fighter Wing	Berlin-Central Germany
XI	HQ, 1st Fighter Wing	Helligoland Bight
	1st Gp, 54th Wing	" "
	2d " 76th Twin-Eng. Fighter Wing	" "
VI	1 swarm* from the 3d Gp.,3d Fighter Wing	Ruhr Region
Holland	2d Gp.,52d Fight.Wing	Holland
	1st " 1st " "	"

The strongest defensive forces were allocated to the Helligoland Bight areas. It was presumed that the fighter forces stationed in Belgium and Northern France provided adequate protection for the Ruhr region against any penetration by enemy bomber forces. The rearward transfer of one swarm* from the 3d Group, 3d Fighter Wing, to the vicinity served the purpose of intercepting at their mission target the enemy reconnaissance planes which frequently penetrated undetected by wide detour routes.

In addition a start was made in November 1940 at employing fighter training units in air defense missions in areas for which no other fighter forces were available.

The first training units so employed, in southern Germany, were groups of the 26th Twin-Engine Fighter Wing,

*Between 4 and 6 aircraft. Not a standard unit.

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Germany, were groups of the 26th TwingEngine Fighter Wing, which had been transferred to Memmingen for rehabilitation and to establish the 2d Twin-Engine Fighter Pilot School, and the twin-engine fighter replacement group stationed at Vaerlöse, Denmark. All of these groups were under administrative and disciplinary control by the Chief Training Officer, under tactical control by the local air district commands.

This measure must be considered an improvization made necessary by the lack of adequate fighter units.

On 9 February 1941 the same measures were applied to the replacement squadrons of the 52d and 77th Fighter Wings, in the command zone of the First Air Fleet. On 29 March the squadrons were expanded to form replacement groups and placed under tactical control by Air District Command III. The 51st Replacement Fighter Group and the 26th Twin-Engine Replacement Fighter Group, both in the area of Air District Command II, and the 76th Replacement Twin-Engine Fighter Group, in the area of Air District Command XI, were also assigned air defense missions.

The purpose of these measures was to have a large number of tactical units, in strengths varying between

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2 and 12 aircraft, stationed throughout Germany in order to insure better opportunities for action against enemy reconnaissance planes, against which the available anti-aircraft artillery forces were not adequately effective. In addition, these units represented a reserve force for action against penetrating enemy bomber forces.

The 1 January-21 March 1941 period brought no appreciable changes in the strength or organization of the front line units allocated for daylight and night air defense.

FIGHTER DEFENSES WITHIN GERMANY
Status 18 March 1941

I. FIRST AIR FLEET COMMAND ZONE

Air Defense Commander in Air Districts III and IV.

52d Replacement Fighter Group

77th " " "

Air District Command II

51st Replacement Fighter Group

26th " Twin-Engine Fighter Group

II. SECOND AIR FLEET COMMAND ZONE

Night Fighter Division.

HQ, 1st Night Fighter Wing

1st Group

2d Group

3d Group

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SECOND AIR FLEET COMMAND ZONE--Cont.

HQ, 1st Night Fighter Wing--Cont.

1st Group, 2d Night Fighter Wing (Strategic)

4th " 2d " " " "

HQ, 26th Twin-Engine Fighter Wing

1st Group (minus 1st Squadron with X Air Corps), 3d Night Fighter Wing

Air District Command XI

HQ, 1st Fighter Wing

1st Group, 54th Fighter Wing

2d " 76th Twin-Engine Fighter Wing

76th Replacement Twin-Engine Fighter Group

Replacement Twin-Engine Fighter Group Vaerldse

Air District Command VI

1 Swarm from 3d Group, 3d Fighter Wing

Air District Command Holland

1st Squadron, 1st Fighter Wing

HQ, 52d Fighter Wing

1st Group (Only under tactical control by Air District Command Holland).

III. Third Air Fleet Command Zone

Air District Command VII

1st Group, 26th Twin-Engine Fighter Wing.

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FIGHTER DEFENSES IN THE WEST,1941

The air defenses in the outpost areas of Belgium and France had been weakened by preparations for the organization of the Africa Corps and for occupation of the Balkan areas, which from 1 January 1941 on had necessitated the withdrawal of fighter and twin-engine fighter forces.

The following units were transferred to Germany for these purposes:

HQ, 27th Fighter Wing with its 2d and 3d Group,
1 Squadron from the 26th Fighter Wing, and the
2d and 3d Groups, 26th Twin-Engine Fighter Wing.

The fighter forces remaining available for air defense in Belgium and France on 18 March 1941 were as follows:

2d Fighter Command: Channel coast to mouth of Seine River

HQ, 3d Fighter Wing with 3 groups
HQ,26th " " " 4 "
HQ,51st " " " 7 "
HQ,53d " " " 2 "

Approximately one-third of these units were constantly out of service, since measures had commenced early in 1941 to equip them with Me-109-E planes powered by DB-601-N (high-altitude) engines and GM-1 engines burning a fuel with a hydro-methanol admixture,

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and some of them with the new Me-109-F plane.

3d Fighter Command: Channel coast from Seine River to Brest.

HQ, 2d Fighter Wing		with 3 groups
HQ, 54th	" "	with 2 groups (fighter-bombers)
HQ, 77th	" "	with 2 groups (one of them fighter bombers)
2d Replacement Fighter Group		
26th	" " "	
53d	" " "	266

FIGHTER-BOMBER UNITS IN THE WEST, 1940-41

It is noticeable from the above tabulationthat three fighter groups under the 3d Fighter Command were intended as fighter-bomber forces. The events leading up to this development clearly reveal how strongly the German Air Command was influenced by the ideas of offensive air warfare.

While the air offensive against Britain was still in progress the only ground-support group equipped with Me-109-F planes, the 2d Group, 2d Training Wing, had been committed with considerable success in bombing attacks, under fighter escort, against London.

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266. Source 156.

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Photo

Me-109 Fighter-Bomber

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This form of attack had caused considerable confusion in the British defense system and had compelled British fighters to take off even if only German fighters were reported approaching, since there was no way to determine whether the approaching force included Me-109 aircraft carrying bombs. This caused the British unnecessary attrition, exactly what the German command intended with this form of attack.

Although the personnel had no training in fighter tactics, the ground-attack group incurred practically no losses in these operations, which was due to the speed of the Me-109.

Another unit of this type was the 210th Bomber Group, equipped with Me-210 bombers, and Me-109 fighter escort planes.

When the daytime bombing offensive came to an end in October 1940 and the German Command found itself compelled to restrict its operations to a type of harassing raids of questionable effectiveness during bad weather and under cover of night, the success achieved in the fighter-bomber attacks by the 2d Group, 2d Training Wing and the 210th Bomber Group was called to mind. The first step now taken was to relieve the 26th Twin-Engine Fighter Wing of its escort mission and employ its units as

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bombers under fighter escort. Instead of also transferring this wing to the night fighter arm, the determination was to maintain in force the slogan of "bombs on Britain."

This type of bombing very soon proved a complete failure, and both the twin-engine fighter-bombers and the single-engine fighterunits escorting them incurred heavy losses.

Lacking special bomb aiming sights, the units had to do their bombing in a glide flight at low or almost ground levels. With its speed already reduced by 18-24 miles because of its bomb-carrying equipment, the Me-110 when

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operating at low levels, because of its large size and inadequate maneuverability and its inability to exploit its superior sloping and diving speeds was no match for the British fighters and was an easy kill for them. Compelled to follow the twin-engine unit they were escorting, the fighters had to sacrifice the advantage of altitude and also found themselves in an extremely unfavorable position for combat against the Britisg fighters attacking them at great speed from higher altitudes.

Since the results achieved were entirely out of proportion to the losses incurred, the 26th Twin-Engine Fighter Wing was withdrawn from action, its 2d and 3d Group in mid-November, wing headquarters on 2 December, and its 3d (sic) Group on 11 December 1940.[267]

Simultaneously with the reequipment of the 26th Twin-Engine Fighter Wing for bombing operations, orders were issued to reequip other fighter units as fighter bombers. The units in question were the 3d, 51st, and 53d Fighter Wings and the 1st Group, 2d Training Wing.[268]

The following directives were issued by the Commander in Chief of the Luftwaffe governing the operations of dive-bomber units:

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267. Sources 93, 157, 158, 159, 160.
268. Source 149.

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1. The purpose of the operations is to maintain continuous attrition attacks against London. In order to insure continuous uneasiness on the part of the enemy the size and timing of the attacks must vary constantly.

2. The important point is not only to commit strong forces against London during favorable weather, but to have bombs falling on London over as long a time as possible.

The strength of the units committed will be decided in accordance with current weather conditions.

3. A closed cloud ceiling along the approach routs will not be considered a deterrent if weather reconnaissance has reported that the ground is visible from the air over London.

4. All crew members will be informed of the importance of this war of attrition. Any abatement in this form of operations at a wrong time could prevent early success in the war, so that the sacrifices already made would be in vain.

This ceaseless war with bombs is also a proof of the aggressiveness of German fighter pilots.[269]

It would be impossible to show more clearly than by these instructions how the principle of offensive action

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269. Source 161.

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as the decisive factor in air warfare dominated all thought in the German Air Command.

AIR DEFENSE IN RUMANIA, 1940-41

In the end it was Southeastern Europe once again which led to a further weakening of the German air defenses in the West, so far as fighter defense was concerned.

The very friendly relations existing with Rumania under General Antonescu resulted in permission for Germany to protect her own vital interests in the Rumanian oil regions with German air defense forces.

The German Air Mission, under Generalleutnent (Major General) Speidel, received instructions to assume responsibility for the oilfields and oil refining installations in the Ploesti region and for the training of the Rumanian Air Force.

The first fighter forces assigned for these purposes were the 9th Squadron of the 3d Group, 52d Fighter Wing--the group newly activated at Doeberitz in August 1940--, the recently organized headquarters of the 1st Group, 28th Fighter Wing, and two tactical reconnaissance squadrons--the 3d of the 13th and the 4th of the 13th Tactical Air Reconnaissance Group, both equipped with He-126 and Me-109 planes. The latter squadron was to serve as what might be called an airborne aircraft reporting service.

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These were followed on 11 November 1940 by the other two squadrons of the 52d Fighter Wing (the 7th and 8th) hitherto committed to defend Berlin.

On 26 November 77th Fighter Wing Headquarters and the wing's 3d Group were withdrawn from the Berlin defenses and transferred to the English Channel to close the gap caused by the withdrawal from there of the single- and twin-engine fighter units intended for operations in the Balkans and for the Africa Corps. The 1st Group, 27th Fighter Wing took the place of the 77th Wing in the Berlin defense system, where it remained until also withdrawn on 8 February 1941 for participation in the Balkan campaign. Responsibility for the air defense of Berlin was then assigned to the newly established 52d and 77th Replacement Fighter Squadrons, activated under Air District Command III.[270]

These measures alone serve to show how the expanding theaters of war were straining the available fighter forces to the utmost, to such an extent that it became increasingly necessary to make use of what might be called

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270. Sources 149, 162, 157, 163, 164.

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improvized units formed with competent training crews from the training schools for air defense in the zone of interior.

Sight must not be lost here of the fact that the Royal Air Force at that time would have been in the position to outmaneuver the entire German fighter defense system along the Channel coast by dispatching its Wellington and Whitley bombers across the North and Baltic Sea to strike into the far German rear, where they would not have encountered any very effective air defenses. However, at that time, in early 1941, the British apparently had not yet recovered from the serious shock they had received on 18 December 1939. They continued to adhere to their tactics of night bombing, placing upon the German Air Command the primary concern for the development of night air defenses.

These circumstances may have contributed towards encouraging Hitler as early as at the end of 1940 in his thoughts, which he had broached already in August of that year, of a campaign against Russia, the successful conclusion of which was to compel Britain to accept peace, and it may have been the factor which gave these thoughts a concrete form.

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PREPARATIONS FOR THE RUSSIAN CAMPAIGN

The directive issued by Hitler on 18 December 1940 contains the following passages concerning Operation Barbarossa, the plan of operations prepared against the eventuality of war with the Soviet Union:

> For the Luftwaffe the important point in the Eastern campaign is to make such strong forces available to support the Army that it will be possible to count on swift progress in operations on the ground and that the damage done to the eastern territories of Germany by enemy air attacks will be as small as possible. This power concentration in the East is limited by the requirement that all areas of operations and armament production under our control must remain adequately protected against enemy air attack and that the offensive war against Britain, particularly against British import traffic, must not cease.[271]

Under any circumstances, this implied the withdrawal of strong fighter forces from the western theater and thereby a considerable weakening of the air defenses against the West. On the other hand, the whole idea of another Blitz campaign would have been utopian without air support by the fighter forces thus withdrawn.

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AIR DEFENSE MISSIONS IN ITALY

In addition to the above requirements, a Joint Military Command (OKW) directive of February 1941 instructed the Luftwaffe, in cooperation with the Italian Air Force and the Italian Naval Command Catania, to protect German seaborne transportation from Sicily to Northern Africa, including the loading and unloading operations, against the enemy air and naval forces.[272]

In spite of the heavy demands which thus would be made in the near future on the existing German fighter forces for operations in the eastern, southeastern, and southern theaters of operations, no concrete planning was done to increase the existing number of fighter units. As previously mentioned above, the Luftwaffe General Staff in September 1941 still considered that a monthly output of 360 fighter aircraft would be adequate to meet resupply and replacement requirements. This is proof that no serious threat of daytime air operations against the German armament industry was expected to develop in the foreseeable future.

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271. Source 165.

272. Source 166.

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COMMAND AND TACTICAL PRINCIPLES FOR

THE FIGHTER ARM, 1941

In view of the large number of fighter units distributed all over Germany in air defense missions, it was necessary to establish new principles governing the tactics to be employed and the responsibilities in this field.

This was done in a bulletin issued by order of the Commander in Chief of the Luftwaffe through the Air Operations Section of the Luftwaffe Operations Division (Fuehrungsstab Ia) on 3 March 1941 and containing the following instructions:

1. The air fleets and the Air Command Center are responsible for fighter defense in their command zones with the fighter forces assigned to them. As a rule they will delegate this responsibility to fighter commands, which will subdivide the signal communications and aircraft reporting networks into defense sectors according to the requirements of their respective zones.

2. For the exercise of local command authority in these defense sectors, the fighter commands will be assigned fighter wing or group commanders or, in rearward areas, officers in command of one or a

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number of independently operating squadrons (tactical units from schools).

These officers will be fully responsible within their sectors and will conduct operations independently under directives from the air fleets or fighter commands. They are authorized to order the various stages of alert to assign combat missions, and to commit their reserves. They will control their units either from the ground or from their lead plane. In the latter case a permanent deputy will be appointed.

3. The officer at the head of the fighter command will only assume personal command if forces stronger than one wing are committed in any one of his sectors or if it appears wise to employ units outside of their sectors.

4. If large enemy units under fighter escort are encountered units will be detailed to engage the enemy fighters, if the enemy unit is flying in close formation, while complete fighter groups attack the bulk of the enemy force.

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5. Enemy surprise raids in the coastal and other forward areas will be countered by the stationing of fighter units on airfields in the coastal or near front areas and by a high stage of alert.

6. To supplement the aircraft reporting service officer observers will be stationed in advanced posts with a clear field of vision as a precaution against a surprise approach of enemy aircraft at low altitudes.

7. If possible a DF post will be established in each defense sector to safeguard fighters in flight.

8. If at all possible the command post of the sector commander, the radio station, and the processing center for Freya and Wuerzburg radar messages will all be established in one and the same building; the processing center of the intercept service will be connected (by means of a loudspeaker).

9. Steps will be taken to insure close contact between the sector commander and the antiaircraft artillery commanders committed within the sector in order to secure smooth cooperation in defense action.

The bulletin was signed by General Jeschonnek, Chief of the Luftwaffe General Staff.[273]

The arrangement thus established was very similar to

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273. Source 175.

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the British system of defense sectors with an independent command within each individual sector. However, it certainly was the system best adapted to the current air situation, the characteristic features of which were at the time, so far as Germany was concerned, irregular penetrations by individual enemy reconnaissance planes and, in the western outpost areas, occasional surprise raids by small units of medium bombers under fighter protection directed against targets near the coast.

However, the establishment of specific fighter commands as a generally accepted integral part of the air defense organization already indicated a development which was to lead later to the centralized control of all fighter forces for the purpose of developing power concentrations, a development which the measure greatly facilitated.

FIGHTER STRENGTHS IN 1940-41

The following figures on the numerical strength of the German fighter arm are taken from reports by the Chief of Luftwaffe Supply and Administration:

Date	Authorized Aircraft	Authorized Crews	Actual Aircraft	Actual Crews	Effective Aircraft	Effective Crews
1940						
Jun 29.	1171	1171	1107	1126	856	906
Aug 3.	1171	1171	1065	1118	878	869
Sep 28	1132	1132	932	929	721	688
Nov 2.	1141	1141	921	981	673	673
Dec 28.	1162	1162	832	920	587	720
1941						
Mar 29	1375	1375	1158	1259	846	1136

274

274. Source 101

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The authorized strengths listed merit special attention. On 3 August 1940 the entire fighter arm consisted of

10 wing headquarters, 28 fighter groups, and 1 night fighter squadron (10th of 1st Fighter Wing).

The difference between the figure for 3 August and 28 September, showing a reduction of 39 aircraft, is due to the transfer of the 4th Group, 2d Fighter Wing to the night fighter arm.[275]

The increase in authorized strengths between 2 November 1940 and 29 March 1941 is due exclusively to the organization of 6 replacement fighter groups, the 2d, 26th, 51st, 53d, and 77th.[276]

Another noteworthy feature is the decline in actual strengths in the 3 August to 28 December 1940 period, and particularly the decline in aircraft strengths, which shows that deliveries from new output and repair workshops were definitely inadequate. In this period a total of 931 aircraft were damaged to an extent exceeding 10 percent, which meant that they had to sent to factories for repair.

Aircraft replacements received from output and repair workshops in the 1 August to 31 December 1940 period totalled 831 Me-100 planes.[277]

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This shows that as far as fighters were concerned the loss in Me-109 aircraft was 100 more than could be replaced from production.

The most unfavorable ratio becomes apparent, however, in the figures reflecting operability. On 28 December 1940 the actual strength in aircraft was only 70 percent of the authorized figure, compared with 82 percent on 29 June 1940. This shows that the units were receiving inadequate supplies in spare parts required in first echelon maintenance.

It remains finally to examine the figures on crews actually available.

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275. Source 149. 276. Source 167.

277. Sources 101, 138.

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In the 29 June-2 November 1940 period 565 crews were lost through enemy action, killed or wounded. By 2 November only 332 could be replaced, showing a shortage of 233 coming from the training schools, a sign that the capacities of the fighter pilot training schools were far from adequate.

In the 2 November to 28 December 1940 66 crews were lost and for the first time the schools were able to furnish replacements totalling 47 more than the losses had been. Here, however, it must be pointed out that in the inclement weather during this season there had been less fighter action than in the preceding period and consequently smaller losses were incurred.[278]

DEVELOPMENT OF THE DAYTIME FIGHTER ARM
UP TO 21 MARCH 1941

Developments in the daytime forces of the fighter arm in air defense can be summarized as follows: for the 10 May 1940 to 21 March 1941 period:

1. During the phase of intensified strategic air warfare, the fighter arm had the primary mission of providing protection for the offensive operations.

2. When the effectiveness of the bomber forces was no longer adequate, single- and twin-engine fighter units were given the added mission of carrying out bombing attacks.

278. Source 101.

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3. Commitment of the bulk of the existing fighter units in strategic missions made it necessary to assign the mission of home air defense to improvized units, the proper and primary mission of which should have been to train replacements.

4. The threat of daytime bombing attacks was not considered serious enough to require an increase in fighter strengths, for which reason no measures in this direction were initiated or even considered.

5. No logical conclusions were drawn from the visible steady decline in the actual and effective strength of fighter units concerning a more active program of production, repair, and training.

6. The Luftwaffe High Command evi ently considered that it could handle the newly developing missions for its fighter arm in the east, southeast, and south without taking any measures to increase that arm's numerical strength. Main emphasis in air defense was placed clearly on the development of night-fighter forces.

While politico-military circles viewed future missions with optimistic equanimity, industrial circles regarded matters from the viewpoint of armament producing capacities and took the initiative by introducing measures to bring about a fundamental change in manufacturing

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concepts.

One of the most prominent members, F. W. Siebel, an official economics controller (Wirtschaftsfuehrer) and director of an aircraft factory, was a close personal friend of General Udet, at the time Chief of Luftwaffe Special Supply and Procurement Services. In July 1940 he discussed with General Udet the serious concern felt in industrial circles concerning the tendency to underestimate the significance of America's air armament capacities.

INDUSTRIALISTS DEMAND INCREASED AIR ARMAMENTS, 1940-41

On 7 October 1940 Siebel formulated in a memorandum the thoughts he had discussed orally with General Udet. In this memorandum he propounded the theory that, in view of the vast potential air armament capacities of America on the side of the Western Powers, it was essential to reckon in the foreseeable future not with thousands but with tens of thousands of the most up-to-date aircraft opposing the German forces. If German air supremacy could not be maintained it would become impossible, under attack by such enormous air fleets, to continue the activities necessary to sustain the armed forces and the population of Germany. If it was thought that America would come into the war, either as a combatant directly or indirectly by supporting Britain, then it was

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an imperative necessity to immediately increase German air armaments. The following requirements were stated:

1. Expansion of the raw materials supply basis.

2. Expansion of the basic manufacturing capacities, in particular measures to expand the manufacture of machine tools and drop forges.

3. Release of skilled workers from military service to satisfy the needs of the industry for specialist personnel.

4. Establishment of new factories.

5. Measures to insure fuel supplies.

6. Conversion of existing manufacturing techniques to those of mass production. Attention in the designing of aircraft to the requirements of mass production.

7. The issue of special powers of authority to those responsible for the air armament program.

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General Udet was deeply impressed by the memorandum andsubmitted it to Reich Chancellor Hitler. Hitler scanned it briefly. He rejected the statements it contained on America's air armament potential with the remark that the USA did not have adequate supplies of light metals, as evidenced by the collections of light metals already in progress there.

Following another discussion with General Udet, a more comprehensive memorandum was prepared. In the autumn of 1941 this memorandum was revised in the light of new information available on the air armament potential of the USA and forwarded to Hitler, Goering, and the Luftwaffe General Staff, and Siebel himself reported orally to Hitler on the subject. Hitler declared:

> What is written here sounds quite good; it is possible that the gentlementare right. But I already have victory in my pocket.

Hitler gave strict instructions that the contents of of the memorandum under no circumstances were to be discussed in wider circles.[279]

ANTIAIRCRAFT ARTILLERY IN GERMANY AND THE WESTERN TERRITORIES, 1940-41

As previously stated above the air situation had become more precarious since 10 May 1940. The characteristic

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features of the enemy air attacks were that almost all of them were night attacks, and that they were directed without any systematic pattern, usually against targets of no military significance and situated outside of the effective range of the guns deployed in regions with strong anti-aircraft artillery defenses.

On the basis of its own concepts of air warfare, the German Air Command has assumed that the enemy would react to the military operations against France at least with sizable bombing attacks against the Ruhr region. However,

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279. Sources 168, 169.

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no such concentrated action by the enemy had taken place, and the antiaircraft artillery forces massed to defend vitally important target areas had practically no opportunity to prove their defensive power. Most of the bombs were dropped at points which had no antiaircraft artillery defenses at all.[280]

Disquieting facts, however, were the considerable penetration range Royal Air Force units had shown in their previously mentioned attacks against Berlin and the Skoda armament works at Pilsen, Czechoslovakia, and the knowledge that on the night of 16-17 December 1940 British bombers had ventured into the city areas of Mannheim, which was heavily defended by antiaircraft artillery, and had dropped a total of 100 tons of bombs on the area.[281]

This situation called for new decisions concerning the antiaircraft artillery. The problems were:

1. How to expand antiaircraft artillery defenses to include all sizable settlements and industrial areas within the zone of interior, in order to protect the civilian populationagainst attack in all territories within range of the enemy air forces. The territories of eastern Germany now also had to be included.

2. Reorientation in the equipment of antiaircraft

280. Source 129. 281. Source 112.

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artillery units, with main emphasis on night defense operations.

3. The build up of antiaircraft artillery defenses in the occupied western territories.

Problem # 1 was a matter of the number of guns and personnel to service them available. Problem # 2 was one of firing techniques and of the availability of searchlights and radar instruments. Problem # 3 implied the release of antiaircraft artillery units from home defense.

From the records on a conference at headquarters of the Commander in Chief of the Luftwaffe on 21 July 1940 it is evident that a new program for the activation of units, to be completed in the 10 August to 1 October 1940 period, was established with a view to increasing the number of units in existence. The program called for the activation of searchlight units for the antiaircraft artillery arm in order to remedy the shortage of such units due to the increased requirements to meet the demands of the night fighter division.

It was emphasized particularly at the conference that the activation of the new units must not be allowed to interfere with the current effectiveness of the battalions already in existence.

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The best way to arrive at figures for the size of the activation program is by comparing the total number of batteries in the antiaircraft artillery arm on 31 July 1940 with the total available on 1 October 1940 as shown by the antiaircraft artillery disposition chart in the Office of the Commander in Chief of the Luftwaffe on these two dates. The figures are as follows:

	German Territories			Occupied Western Territories		
	Gun Batteries			Gun Batteries		
	Heavy	Medium & Light	Searchlight Batteries	Heavy	Medium & Light	Searchlight Batteries
1940 Jul 31	423	333	143	234	227	45
Oct 1	490	442	152	245	332	64
Increase	67	109	9	11	105	19

Hence, the units activated in the 10 August to 1 October 1940 period totalled

78 heavy and 214 medium and light gun batteries and 28 searchlight batteries.[282]

In order to meet the requirements for antiaircraft artillery defenses in the occupied western territories and to achieve the appreciable strength already existing on 31 July 1940 of 234 heavy and 227 medium and light gun

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282. Source 105.

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batteries plus 45 searchlight batteries, the following measures had been taken:

1. All mobile antiaircraft artillery units deployed in Air Defense Zone West were transferred to the West. After the campaign in France Air Defense Zone West ceased to exist and the equipment left there was moved to other areas for use in home defense.[283]

2. Elements of the antiaircraft units committed in the home defense system were transferred to the occupied western territories to protect the ground service installations there.

3. After the end of the campaign in France the two Flak corps also were assigned local air defense missions in their assembly areas. However, their units could not be counted at full strength since they required rehabilitation after their strenuous operations in the campaign. Furthermore they were heavily occupied with preparations for support operations in the planned invasion of Britain. (Operation Sea Lion).[284]

Plans for the future employment of the two Flak corps in purely operational type missions were due to the outstanding success they had achieved in the western campaign in integrated action with armored units.

283. Source 65. 284. Source 152.

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ACHIEVEMENTS OF THE TWO FLAK CORPS IN 1940

An examination of the success achieved by the two Flak Corps clearly shows the reasons for the decision taken concerning their future employment.

The I Flak Corps reported on 10 July 1940

372 aircraft shot down while airborne

252 aircraft destroyed or captured on the ground

47 tanks destroyed by weapons fire

30 bunkers destroyed

1 warship destroyed

12 warships, 1 cargo vessels and 8 troop transport ships damaged.

The II Flak Corps after the close of the western campaign reported

214 aircraft shot down while airborne

207 tanks destroyed by weapons fire

17 armored and other forts destroyed

7 troop transport ships sunk and numerous other ships damaged.

The losses incurred by the II Flak Corps totalled

106 personnel dead or missing

312 personnel wounded

8 88-mm guns completely destroyed

4 37-mm guns completely destroyed

12 20-mm guns completely destroyed.

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It must be borne in mind here that the II Flak Corps was reinforced in the period from 19 May to 31 May 1940 by the 202d AAA Regiment, under Colonel Schilffahrt. This regiment comprised the following units:

1st (Composite) Battalion, 37th AAA Regiment

1st " " 61st " "

74th Light AAA Battalion.

Furthermore, from 12 to 18 May the 6th AAA Regiment of 2 composite and 2 light battalions was committed under command by the II Flak Corps.

REINFORCEMENT OF THE ANTIAIRCRAFT ARTILLERY DEFENSES IN GERMAN TERRITORIES

On 19 August 1940 the Joint Military Command (Oberkommando der Wehrmacht) issued the following instructions on reinforcement of the antiaircraft artillery defenses in German territories:

1. In view of the increasing penetration range of British bomber aircraft, antiaircraft artillery defenses must also be organized as speedily as possible in regions hitherto not so protected.

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285. Sources 170, 181.

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2. Advantage will be taken of the existence of the new units organized by the Luftwaffe in August 1940 in particular to provide protection for the industrial centers of Upper Silesia, Saxony, Austria, and the Protectorate of Bohemia and Moravia (Czechoslovakia).

3. Throughout the eastern territories of Germany as many captured guns as possible will be emplaced permanently, organized in batteries, at important towns in the regions hitherto without protection.

4. All military materiel found in France which can be used in antiaircraft defense will be given top priority over all other movements for transportation to points designated by the Commander in Chief of the Luftwaffe, and all available means of transportation will be used for this purpose.

5. To fill the requirements of the Luftwaffe for personnel to man the antiaircraft barrage batteries, the Army will transfer officers, nomcommissioned officers, and men, wherever possible artillery personnel, temporarily to the Luftwaffe.

Civilian personnel employed in the defense areas may also be required to serve in manning these guns.

6. Army units stationed in the zone of interior will immediately commence participating in air defense

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activities in such a manner that they can use those of their weapons which are suitable for antiaircraft action as required to do so by the appropriate Luftwaffe commands.[286]

These instructions reveal strikingly how unfavorably the scope of the missions to be performed had expanded in comparison with the available potentials. Here again, as had been the case with the employment of training units in tactical missions, a tendency towards improvizations is evident with an inherent large measure of delusion. The views held on the effectiveness of antiaircraft barrage fire with captured guns serviced by emergency personnel already exceeded all bounds of common sense.

Hitler personally held a very high opinion of the antiaircraft artillery. During a conference on 22 January 1941, in which the subject of air warfare was touched upon, he spoke of "....the necessity for a gigantic antiaircraft artillery force with very large supplies of ammunition."[287]

ANTIAIRCRAFT ARTILLERY FIRE CONTROL EQUIPMENT BASED ON RADAR OBSERVATION

The problem of fire control at night progressed towards solution as fast as the optical aiming devices could be replaced by radar instruments. The delivery of Wuerzburg A

286. Source 106.
287. Source 171.

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instruments, which commenced in May 1940 from serial production, proceeded very slowly, since this entirely new branch of industry also had to satisfy the urgent needs of other users, such as the night fighter arm, the aircraft reporting services, and the Navy.

Furthermore, the first series of instruments delivered did not meet the antiaircraft artillery specifications to full satisfaction and necessitated intensive training and practice on the part of the servicing personnel in collaboration with personnel servicing fire directing instruments.

In a report to the Commandér in Chief of the Luftwaffe dated 31 December 1940 concerning his observations while on a tour of inspection, the Chief Antiaircraft Artillery Officer stated as follows:

1. In Air District Commands VI and XI the introduction of antiaircraft artillery radar instruments is proceeding without friction.

2. To compensate for the lack of sufficient radar instruments tests were carried out in the control of 3 batteries totalling 12 88-mm guns by a central station using only one Wuerzburg A instrument.

These tests were suggested by the night fighter division, which offered the use of its instruments

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for the purpose, the intention being to insure use of its instruments for antiaircraft fire control within the searchlight zone during periods of bad weather in which night fighters were unable to operate, so that the instruments were not in use.

The Chief Antiaircraft Artillery Officer, Office of the Commander in Chief of the Luftwaffe, sees no prospects of success in these tests, since hitherto all antiaircraft fire barrage zones, such as Air Defense Zone West, have proved ineffective, because, if they do not simultaneously serve the purpose of direct target defense, they can easily be bypassed or passed over at extreme altitudes by penetrating enemy aircraft.

3. It is to be expected that delivery of the new Wuerzburg C instrument, which relays the fire data automatically to the fire directing instruments and delivery of which is being expedited, will result in a considerable improvement in the effectiveness of antiaircraft fire at night.[288]

The specifications of the antiaircraft artillery for further development of antiaircraft artillery radar instruments required a special antiaircraft fire control instrument with specific niceties of a technical nature, such as

288. Source 172.

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target tracking and speed computing mechanisms, locating by instruments, transmission of data by electrical means. These specifications resulted later in development of the Mannheim radar which replaced the Wuerzburg C instruments.[289]

It was to be expected, therefore, that 1941 would bring an improved effectiveness of antiaircraft fire at night based on radar controlled fire directing instruments and independent of the vagaries of weather.

However, the solution of the technological problem immediately created a new problem, that of securing the highly qualified technical personnel required to service equipment of so complicated a nature. In his report of 31 December 1940 the Chief Antiaircraft Artillery Officer therefore drew attention to the necessity for a program of intensified training in this field.

ANTIAIRCRAFT ARTILLERY STRENGTHS IN 1941

According to the antiaircraft artillery situation map maintained in the Office of the Commander in Chief of the Luftwaffe, status as of 1 April 1941, the antiaircraft artillery arm in the spring of 1941 had the following forces available:

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Air District Command	Heavy Batteries	Medium & Light Batteries	Searchlight Batteries
I Koenigsberg, Eastern Prussia	19	2	0
II Poznan	9	0	0
III Berlin	92	48	29
IV Dresden	113	54	32
VI Muenster	132	95	26
VII Munich	38	52	7
VIII Breslau	28	7	0
XI Hamburg	110	115	36
XII/XIII Wiesbaden/Nuremburg	65	85	21
XVII Vienna	78	24	6
Total in all German territories	684	482	157
Norway	24	20	3
Holland	25	34	33
Belgium/Northern France	27	38	9
Western France	64	79	9
Rumania	48	62	3
Italy	18	5	0
Overall totals in non-German territories	206	238	57 [290]

289. Source 22.

290. Source 105.

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The overall strength of the Luftwaffe in antiaircraft artillery forces on 1 April 1941 was thus

890 heavy batteries, 720 medium and light batteries, and 214 searchlight batteries.

The explanation for the reduced antiaircraft artillery forces in the western areas is that the two Flak corps had been transferred to the zone of interior after final cancellation of plans for an invasion of Britain.

In mid-November the I Flak Corps was moved to the command zone of Air District Command III and its commander at the same time was assigned as Commander of Air Defenses in Air District Command III. This command authority was extended on 1 January 1941 to include the command zone of Air District Command IV.[291]

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The II Flak Corps was transferred in March 1941 to the Gruenau-Berlin area, where it was to prepare for the campaign against Russia.[292]

THE II FLAK CORPS IN 1940-41

After cancellation of the plans for an invasion of Britain the II Flak Corps was assigned an important air defense mission at the Channel coast.

An Order of the Day by Headquarters, II Flak Corps, on 31 July 1940 states the following mission for operations in the Lumbres (St Omer) region:

> The II Flak Corps will continue to provide protection for the ground service installations in operation within its zone of operations, for the ports of Ostende and Boulogne, the artillery concentration at the coast, with main emphasis between Calais and Boulogne, and for the Freya radar stations.

This clearly reveals the exceptional potentials of the antiaircraft artillery arm in operational missions if the forces are fully motorized and consolidated and controlled uniformly in large units. It provided the ideal combination of the spear and the shield.

At the time under discussion here Headquarters, II Flak Corps controlled the following forces:

292. Sources 99, 181.

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Unit	Area of Operations
HQ, 6th AAA Regiment	Ostende/Zeebrugge
1st (Composite) Bn, 231st AAA Regt	
1st " " 24th AAA Regt	
761st Light AAA Bn	
HQ, 136th AAA Regt.	Boulogne (?)
2d (Composite) Bn, 441st AAA Regt (a battalion from the Reich Labor Service)	
84th Light AAA Bn	
HQ, 201st AAA Regiment	Calais/Gravelines and airfields
1st (Composite) Bn, 6th AAA Regt	
2d Bn, 26th AAA Regiment	
1st " 64th " "	
1st " 701st " "	
73d Light AAA Battalion	
2d (Light) Bn, AAA Tng Regt	
3d (Searchlight) Bn, General Goering Regt	
3d Company, 201st Air Sig Regt	
3d " 202d " " "	
HQ, 202 AAA Regiment	Dunkirk, Nieuport, and airfields
1st (Composite) Bn, 19th AAA Regt	
1st Bn, 23d AAA Regiment	
2d Bn 24th " "	

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HQ, 202d AAA Regiment--Cont.

1st Bn, 37th AAA Regiment

1st " 61st " "

74th Light AAA Battalion

76th " " "

77th " " "

At the end of October 1940 the assigned units were reorganized, as follows:

II FLAK CORPS ORDER OF BATTLE

Status Late October 1940-15 December 1940

Unit	Assigned Area	Heavy Bttrs	Light Bttrs	Search-light Bttrs
HQ, 6th AAA Regiment	Ostende			
1st Bn (less 1 hvy bttr), 24th AAA Regt		2	2	
2d Bn, 24th AAA Regiment		3	2	
1st " 37th " "		3	2	
7th Company, Tng & Experimental Battalion		1		
3d (Searchlight)Bn, 36th AAA Regt				3
1st (Hvy) Bttr, 1st Bn, 24th AAA Regt	Zeebrugge	1		
84th Light AAA Battalion			3	
Totals		10	9	3
HQ, 201st AAA Regiment	Calais			
1st Bn, 701st AAA Regt		3	2	

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HQ, 201st AAA Regiment--Cont.	Area	Heavy Bttrs	Light Bttrs	Search-light Bttrs
1st Bn, 6th AAA Regt		3	2	
1st Bn, 19th " "		3	2	
352d Reserve AAA Bn (Tactically assigned)		3	2	
73d Light AAA Bn			3	
309th (Searchlight) Bn (Reserve)				3
2d AAA Bn, AAA Tng Regt	Graveline Airfields		3	
Totals		12	14	3
HQ, 202d AAA Regiment	Dunkirk			
1st Bn, 61st AAA Regt		3	2	
1st " 23d " "		3	2	
369th (Searchlight) Reserve AAA Bn				3
74th Light AAA Bn	Nieuport Airfields		3	
Totals		6	7	3

The total strength of the II Flak Corps along the Channel coast from the end of October 1940 on was thus 28 heavy batteries, 30 light batteries, and 9 searchlight batteries.

Of the batteries listed as light, 30 in number, 3 were medium 27-mm batteries.

On 16 December 1940 Headquarters, II Flak Corps displaced from Lumbres to Tours and was assigned the mission of

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protecting the naval bases along the Atlantic coast from St Nazaire to Biscarosse with newly allocated antiaircraft artillery units.

No fighter forces were moved into the area of this coastal sector, so that the antiaircraft artillery forces had the sole responsibility for air defense, a renewed proof of the high esteem in which they were held.

II FLAK CORPS ORDER OF BATTLE

STATUS 30 December 1940

Unit	Command Post	Assigned Area
HQ, VI AAA Brigade	Fontenay le Comte	St Nazaire-Biscarosse
HQ, 40th AAA Regiment	Nantes	St Nazaire-Nantes-Challans
1st (Composite) Bn, 701st AAA Regt	St Nazaire	
292d (Composite) Reserve AAA Bn	"	
991st Light AAA Bn	Chateau Briort	
309th (Searchlight) Reserve AAA Bn	still en route	
HQ, 45th AAA Regiment	Bordeaux	La Rochelle-Biscarosse
Task Force La Pallice (Tactically assigned)	La Pallice	
Task Force Royan (Tactically assigned)	Royan	
1st (Composite) Bn, 24th AAA Regt	St Germain	
75th Light AAA Bn (minus 1st Bttr)	Chateau Chrespy-Tallence	

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Unit	Command Post	Assigned Area
Hq, 45th AAA Regiment--Cont.	Bordeaux	La Rochelle-Biscarosse
83d Light AAA Bn	Bourg s.G.	
901st Reserve AAA Bn	Blanquefort	
923d Light AAA Bn	Pauillac	
298th (Searchlight) Reserve Bn	Blanquefort	
127th Reserve AAA Bn (Composite)	Bordeaux-Merignac	
1st Bttr., 75th Light AAA Bn	Bordeaux-Merignac	

The effective strengths available on 30 December 1940 were as follows:

Unit	Heavy Batteries	Light & Medium Batteries	Searchlight Batteries
40th AAA Regiment	7	8 3 (Army units)	-
45th AAA Regiment	7	14 1 (Army unit)	3
Task Force Pallice	1 (Army unit)	2 (Army units)	
Task Force Royan	2 (Army & Navy units)		
Total	15	30	3

In a Corps Order of the Day of 27 January 1941 the II Flak Corps assumed command over Naval AAA Brigade V, Lorient, as of 1 February 1941.

On 3 March 1941 Headquarters, II Flak Corps transferred to Gruenau/Berlin.

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A remarkable feature in the disposition of antiaircraft artillery forces, status 1 April 1941, is the heavy commitments in Norway, Rumania, and Italy. Totalling 90 heavy, 87 light and medium, and 6 searchlight batteries these commitments seriously reduced German air defense potentials in the zone of interior and in the western occupied territories. This shows clearly the vicious circuit that had developed of a large number of missions resulting in the necessity for an overhasty increase in the number of antiaircraft artillery units, which in turn reduced the quality of units on the whole and therefore necessitated greater expenditures to achieve success in the defense, so that the requirement again arose for increased strengths.

REORGANIZATION OF THE HOME AIR DEFENSE SYSTEM IN 1941

In the field of organization, responsibility for air defense of the territories of Germany at the beginning of 1941 still rested with the First, Second, and Third Air Fleets.

The areas most seriously threatened by air attack in the West were those of Air District Commands XI, VI, XII/XIII, and VII, and they were all within the command zones of the Second and Third Air Fleets, which devoted most

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of their thought to their missions of strategic air warfare against Britain.

In practice the air defense mission within Germany was left completely to the air district commands, and in areas of main concentration to the air defense commands. The big disadvantage here was that the air district commands were overburdened with responsibilities for the ground service organization and other logistical problems and also had not enough highly qualified staff officers who could have attended expertly to the needs of the fighter and antiaircraft artillery defenses. Furthermore, the triple subdivision of responsibilities within Germany resulted in a lack of uniformity which had seriously adverse effects on fire training, firing techniques, and fire discipline in spite of the centralized co-responsibility of the Inspectorate for Antiaircraft Artillery.

In view of these intolerable circumstances the Commander of Air defenses in Air District Commands III and IV, General Weise, took the initiative and in a study submitted on 31 January 1941 recommended a realignment of the air defense organization in the zone of interior.

His recommendations aimed at taking some of the burden from the Second and Third Air Fleets by relieving them of their command over Air District Commands VI, VII, XI, and

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XII/XIII and suggested three possibilities to this end:

1. Establishment of a central command, such as a "Home Air Fleet" and the assignment of all air district commands within Germany to this headquarters.

2. Direct control of the air defsense districts and of home air defense by the Commander in Chief of the Luftwaffe.

3. Establishment of a "Home Air Defense Command" responsible exclusively for air defense and comprising only antiaircraft artillery corps, divisions, and brigades, fighter commands, and chiefs of passive air defense systems. This wouldhaverelieved the air district commands of their tactical air defense missions and left them responsible exclusively for the ground service organization and other logistical support.

After a careful study of all possibilities and probably in view of the impending operations in the east, southeast, and south, the Commander in Chief of the Luftwaffe on 3 March 1941 decided on the establishment of an Air Command Center.

This headquarters was established on 21 March 1941 and designated Luftwaffe Commander in Chief Center (Luftwaffe Befehlshaber Mitte) and will be referred to in this study as Air Command Center. The new headquarters was

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assigned control over

Air District Commands III/IV, VI, XI	in all respects;
Air District Commands VII and XII/XIII	in tactical matters of air defense concerning fighter, antiaircraft artillery, aircraft reporting, air traffic control, and passive air defense forces;
the night fighter division	in all respects. However, the commanding general of the division, General Kammhuber, was simultaneously responsible directly to the Commander in Chief of the Luftwaffe in his post as Inspector of Night Fighter Forces;
the Senior Commander of Air Service Units (Luftdienstverbaende)	

The air service units were closely linked with the antiaircraft artillery training program, since they were required to furnish the targets for firing practice.

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Air District Commands I (Eastern Prussia) and II (Poland) remained under the First Air Fleet, Air District Commands VIII (Silesia and the Protectorate of Bohemia and Moravia), and XVII (Austria) under the Fourth Air Fleet.[293]

These organizational changes insured the desired uniform control in air defense activities and in many fields gave new impetus to the development of the defense system.

At the same time, however, the changes reveal the realization of the Luftwaffe High Command that the strategic orientation of air power towards the east and south again brought the problems of defense against air attacks from the west into prominence, particularly so because the operational air forces would be committed in other theaters of operations.

Once the organizational conditions had been created for a firm control of air defense activities during day night it was purely a matter of the scope and nature of the means available which would decide whether decisive success could be achieved in the repulsion of air attacks.

THE AIRCRAFT REPORTING SERVICES IN 1940-41

With the occupation of the western territories the extensive mission evolved of expanding the aircraft

293. Sources 65, 173.

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reporting network to cover all territories between the borders of Germany and the Channel and Atlantic coasts from Holland to the Spanish frontier. The execution of this mission was ordered in the directive issued by the Commander in Chief of the Luftwaffe dated 30 June 1940 under the title "General Directives for Operations of the Luftwaffe against Britain" (Allgemeine Weisung fuer den Kampf der Luftwaffe gegen England). The instructions contained in the directive also dealt with agreements between the Second and Third Air Fleets on the one hand and various naval commands on the other concerning the organization of a seaborne aircraft reporting service, in the outpost areas off the Channel and Atlantic coastlines.

As a first measure five Freya radar instruments were moved from the zone of interior after the end of the western campaign to the Channel coast, as follows:

from Vilsum	to Bergen op Zee, Holland
from Kleve	to Hoek van Holland
from Stadtkyll	to Hamstede/Vlissingen
from Landstuhl (2 instruments)	to Cap de La Hague, Normandy.[294]

Radar observation by these instruments was to be supplemented by the coastal patrol activities of tactical air reconnaissance units, also ordered in the directive of 30

294. Source 7

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30 June 1940. The purpose of these coastal air patrols was to detect enemy air forces approaching at low altitudes, which could only be detected at very close ranges by the radar instruments, which operated on the direct line of vision principle.

The air units assigned for these patrol activities were as follows:

Under	Unit	Strength & Aircraft Type
Air District Command Holland	4th Squadron, 23d Tac Recon Group	6 Hs-126 planes
Air District Command Belgium	1st Squadron, 21st Tac Recon Group	6 " "
	2d Squadron, 21st Tac Recon Group	6 " "
II Air Corps	4th Squadron, 31st Tac Recon Group	9 " "
	5th Squadron, 32d Tac Recon Group	9 " "
V Air Corps	HQ, 21st Tac Recon Group	
	1st Squadron, 12th Tac Recon Group	9 " "
	5th Squadron, 13th Tac Recon Group	9 " "
	4th Squadron, 21st Tac Recon Group	9 " "
IV Air Corps	HQ, 31st Tac Recon Gp.	
	2d Squadron, 12th Tac Recon Group	9 " "
	1st Squadron, 41st Tac Recon Group	9 " "
	4th Squadron, 22d Tac Recon Group	9 " "
	2d Squadron, 31st Tac Recon Gp	9 " "
	2d " 13th " " "	9 " " 295
	2d " 41st " " "	0 " "

295. Sources 149, 174.

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In December 1940 the above squadrons were withdrawn from their mission since they were at a hopeless disadvantage with their Hs-126 planes against the British fighters.[296]

The development of a colpletely integrated aircraft reporting network in the territories between the Channel and Atlantic coastline and the borders of Germany was a responsibility of the air district commands established after the opening of the western campaign.(Appendix 5), as follows:

Air District Command	Headquarters	Commanding General
Holland	Amsterdam	General Haubold until 1 Jul 40, then General Siburg
Belgium and Northern France	Brussels	General Loeb until 1 Aug 40, then General Pflugbeil until 29 Aug 40, then General Wimmer
Western France	Etampes	General Dr. Weissmann.[297]

296. Sources 150, 159.

297. Sources 154, 175.

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During the initial phases of the work the motorized aircraft reporting companies of the Air Signal Corps were available for the purpose. With the establishment of wire communications they were supported and in some cases relieved by reserve units.

A highly important factor for the compilation of the air situation was the employment of field agencies of the Radio Intercept Service in the occupied western territories. Field centers controlling a number of intercept stations were established at the following points:

Oslo	as Weather Service Center 5 (W-Leit 5)				
Schepdael/Brussels	as	"	"	"	2
Paris	as	"	"	"	3

Direct communication lines between the fighter command posts in the west and their nearest intercept stations insured the prompt transmission of the information obtained in this way.

In the case of the 3d Fighter Command, with its command post at Cherbourg/Théville, for example, cooperation was perfected to such a degree that data from the intercept station on the position of British fighter units--gathered from their radio communications--could be translated immediately into orders for the fighter units with the objective of placing them in favorable attack positions

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to attack the British fighters from the rear and above and from the direction of the sun.[298]

For the night fighter forces a local agreement was made. The Weather Service Center 3 had an intercept station at Zeist. This station passed on to the night fighter division, inofficially, all intercepted information which might prove useful for night fighter operations. This obviated the time-consuming reporting channel through Weather Service Station 3-ZA at Berlin.[299]

AIRCRAFT REPORTING MISSION OF THE NIGHT FIGHTER DIVISION

From its inception the signal organization of the night fighter division developed into a special aircraft reporting service within the general aircraft reporting service. With its Wuerzburg A radar instruments the division was able to obtain a far more accurate picture of the current air situation than could be obtained by means of the general reporting service which relied on visual and oral observation.

Initially, the need for secrecy prohibited the inclusion of the radar system in the reporting system of the general aircraft reporting services in order not to reveal the technical aspects of night fighter operations. However close cooperation with the antiaircraft artillery insured

299. Source 177.

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that the antiaircraft artillery forces were also kept informed on the air situation as interpreted at the command post of the night fighter division. Since the antiaircraft artillery was responsible for the air raid warning system there was no necessity to inform the aircraft reporting centers on all details of the air situation. If the night fighter arm had been required to do so during its build up, this would have involved an extra burden because of the necessity to develop the required signal communications.

The aircraft reporting authorities criticized these circumstances severely and it is impossible to overlook the fact that the dual channels resulting as time passed produced conditions in which differing air situation intelligence and differing interpretations of the air situation occurred.

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299. Source 177.

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This was because of the different means available for the gathering of information. The night fighter division interpreted the air situation according to the reports received from its network of radar stations, which as time passed was built up to cover all areas without a gap. The antiaircraft artillery added to this the information received through its own specialized radar reporting system to obtain a local interpretation in each area. The general aircraft reporting service, in turn, computed its own interpretation based on the reports received from its own organization, which were based on visual and oral observation. This resulted in three different interpretations which did not always correspond.

THE PASSIVE AIR DEFENSE SYSTEM IN 1941

In the field of passive air defense a better working basis was provided in 1941 through the establishment of a special inspectorate, the Passive Air Defense (Home) Inspectorate, Inspectorate L IN 13, in the Office of the Commander in Chief of the Luftwaffe to control all activities of this type.

The inspectorate was organized in three branches, as follows:

Branch I . Responsible for control, organization, and operations; Protection of special

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official establishments (sonderen Verwaltungen); Motorized air raid protection units; The air raid warning system; Signal communications within the passive air defense system.

Branch II. Responsible for the implementation of general passive air defense measures; Administration; Legal affairs; Procurement.

Branch III. Technological affairs; Fire fighting; Gas protection; Construction for passive air raid purposes; Camouflage, concealment, and black out measures.

Passive air defense measures were carried out within Germany under control by the air district commands by the local civilian authorities of the conties, cities, and villages.

The air district commands had direct control over the motorized air raid protection units, the air defense commands, and the technical troops employed in the

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construction and operation of dummy installations, as well as the smoke screening units.

In the occupied territories the joint military commands were responsible for the handling of passive air defense problems for all three branches of the military establishment.

The results produced by enemy bombing attacks in 1940 and up to the spring of 1941 were still so insignificant that they could be handled without difficulty by the passive air defense forces organized at the beginning of the war in the form of motorized air raid protection units, factory air defense systems, individual air raid precautions, and t the fire fighting police.[300]

GERMAN AIR DEFENSES, 1939-41

SUMMARY

In summarizing the following can be said of developments in the German air defense system during the period from the beginning of the war up to the establishment of Air Command Center on 21 March 1941:

1. The pre-war doctrine "Attack is the best form of defense" had proved sound in application against all enemies within the striking range of German air power. This made it possible to rely on the antiaircraft artillery for the local defense of targets

300. Sources 64, 179.

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within Germany against air attack, and to employ the fighter forces primarily for participation in and protection of strategic air operations.

2. The resounding success achieved by the German fighter arm in repelling British bombing attacks during daylight in the few encounters which occurred compelled the British Royal Air Force to revise its concepts of strategic air warfare in line with the possibility of night bombing attacks.

For the German air defense system this meant that it was confronted with a problem for the solution of which neither the fighter nor the antiaircraft artillery forces were prepared.

With circumspection and energy conditions were created within a short space of time to insure the development of a well founded night fighter arm and of night firing techniques for the antiaircraft artillery which held out prospects of success.

3. The eastward, southeastward, and southward expansion of the areas of military operations placed a heavy burden on the air defense forces. For the fighter arm this resulted in the necessity already at this early stage to use in home air defense tactical units taken from the training forces. For the antiaircraft

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artillery it resulted in a general lowering of performance standards due to the quick activation of large numbers of units necessitating emergency expedients in the assignment of personnel and materiel.

These developments can be viewed as linked causatively with continued adherence to concepts in which the employment of offensive air forces in operational air warfare was still considered the best way to serve air defense purposes.

The improvements brought about in the command organization of the air defenses necessarily could produce no advantageous results as long as the command lacked the forces required for the execution of its missions.

However, the current air situation in the West provided some justification for the views held at the time, since the British Royal Air Force apparently was not yet in any position to repeat its attempts at attacks during daylight or to increase the scope of its night attacks.

Whereas the requirements of the antiaircraft were just about met in the fields of industrial output and planning, no measures were taken to create conditions favorable for a continued expansion of the daytime

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fighter forces. This applied both to manufacturing capacities and to the training program.

This neglect or omission was probably due to an overestimate of the expected superiority in technical performances which would result with the introduction of the new fighter models, the Me-109-F, and the FW-190, which were placed in serial production in 1941.

A reestablishment of superiority in point of quality without fail would have compensated for numerical inferiority, as had been proved in Spain, Poland, and France.

In planning for the expansion of the night fighter arm advantage could be taken of the ambitious production program for the Me-110 twin-engine fighter model and, so far as strategic night fighters were concerned, of the large scale production program for bomber aircraft, since the Ju-88 and Do-17 models could be adapted for the purpose.

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