German Air Defense by Generalmajor a. D. Walter Gr[...]
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GERMAN AIR DEFENSES

CHAPTER 2

1 September 1939-21 March 1941

BEGINNING OF THE WAR TO ESTABLISHMENT OF AIR COMMAND CENTER

PLAN WEISS, 1939

The political events of the summer of 1939 which, after a period of dramatic tension between Germany and Poland, culminated on 1 September 1939 in the invasion of Poland by the German military forces, naturally gave rise at an early stage to thought and planning for possible German military operations in hypothetically stated cases.

The political concepts of Germany's Reich Chancellor, Hitler, were clearly directed primarily towards a solution of the problems in the East.

This implied that in the event of any reaction by Germany's western neighbor states to politico-military action taken against the East by Germany, planning for military operations in the West was accordingly based on defensive warfare on the ground and in the air.

This is perfectly evident from the directives contained in Volume II of Operational Study 1939, which defines the employment of the air defense forces in the West in the conjectured event of armed conflict with Poland. The following passages are quoted from those directives:

1. The overall situation requires that in Case Weiss [Fall "Weiss": more generally known as Plan Weiss, the code designation for all planning against the eventuality of war against Poland] measures must be taken immediately to protect the western frontiers, the North Sea coastline, and the air over these areas. The directives for air defense against "Weiss" are therefore so adapted that no matter what happens, the concentration of air defense forces against the West can take place.

When the strained situation between Germany and Poland became so acute in August 1939 that a peaceful settlement seemed no longer possible, movements commenced from mid-August on, consonant with the established concept of attack in the East and defense in the West, to deploy the air forces according to the plans worked out against this eventuality.

The importance attached to carrying out the necessary measures as inconspicuously as possible and in a manner which would not make their revocation impossible was considered so great that the units intended for employment in the East themselves had no knowledge of the real purpose of their transfer to different tactical airfields from their current stations. In fact the real reason was concealed intentionally through the furnishing of unimportant reasons.

For example, the official reason offered for the air concentrations commencing on 15 August 1939 in Eastern Prussia was that the air units concerned were to participate in an air parade as part of the celebrations of the anniversary of the Battle of Tannenberg [in which German forces inflicted a shattering defeat on the Russians in 1914] to be held at the monument erected there.

The reason given for the order that the units would take along their field equipment and their basic issue of ammunition was that while crossing the Polish Corridor level with Danzig they might come under attack by Polish fighters even though on their prescribed route across the sea and outside of Polish territorial waters.[163]

DISPOSITION OF AIR DEFENSE FORCES IN THE POLISH CAMPAIGN

In accordance with the appraisal of the Polish air forces, namely that most of their equipment was out-dated--it was mentioned previously, above, that out of a total of 270 fighters only 30 were considered as Class 1--[164] it was considered unnecessary to allocate large regular defense forces, in the form of fighter and antiaircraft artillery units, for participation in any possible military operation against Poland, so that a concentration of air defense forces could be built up in the West without difficulty

by allocating the bulk of these forces for that purpose.

The two air fleets, First and Fourth, assigned the mission of conducting air operations against Poland had available for attack and defense in the East the following forces:

1. Fighters: 5 groups, namely the 1st Groupsof the 1st, 2/st. 76th, 77th Fighter Wings, and of the 2d Training Wing, the 1st squadron of the latter also bei being a fighter unit.

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163. Source 3.

164. Source 85.

2. Twin-Engine Fighters: 5 groups, namely the 1st Group each of the 76th & 1st Twin-Engine Fighter Wings,& of the 1st Training Wing, plus 101st & 102d Groups.[165]

3. Antiaircraft Artillery Forces: 10-12 battalions for mobile employment in the Army zones of operations.[166]

The fighter groups were intended initially exclusively for defense missions in the in the areas of the strategic concentration in the East. The 1st Group each of the 1st and 21st Fighter Wings were responsible for the air defense of Eastern Prussia, the 1st Group (including 1st 1st Fighter Squadron), 2d Training Wing, for that of central areas, and the 1st Group each of the 76th and 77th Fighter Wings for that of Silesia.

After the first few days of the campaign, however, during which the eastern opponent, Poland, attempted no air attacks against German territory, all fighter groups were relieved of their defensive missions and employed in offensive missions. The purpose here was to achieve air supremacy and thereby protect the ground forces advancing into enemy territory against air attack and air reconnaissance.

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165. Source 130.

166. Source 88.

The concentrated bombing attacks launched against the Polish air forces in their bases and against their ground service organization in general almost completely paralyzed them within the first few days of the campaign so that the air threat was practically non-existent. The fighter forces therefore were employed increasingly in low-level attacks in direct support of the ground forces. When the time arrived that hostile units hardly put in an appearance any more at all, Polish pockets of resistance on the ground, troop and transport columns, supply depots, and rail and road traffic became the targets for attack by German fighters.

So far as the fighter arm was concerned a condition of total air warfare developed which closely resembled the operations of the Condor Legion in Spain in early 1939.[167]

Apparently, the intellectual influence of General von Richthofen, last commander of the Condor Legion in Spain, was very effective in favor of the tactics of all-out commitment of air power to bring about the speediest possible end to an areally confined campaign.[168]

What happened in the first week of the Polish campaign had fully vindicated the basic views established in the manua THE CONDUCT OF AIR OPERATIONS in Paragraph 16: that the danger of an air threat could never be countered adequately

167. Source 3.
168. Source 13.

through air defense activities in the homeland alone and that it makes offensive operations against the hostile air forces on enemy terrain from the very outset of war a compelling necessity.

That the fighter arm was given such an important role as an offensive weapon in this scheme it would be hard to conceive were it not for the experience of the Condor Legion in Spain.

Of the 5 twin-engine fighter groups assigned in the East only three had Me-110 planes, namely, the 1st Group each of the 1st and 76th Twin-Engine Fighter Wings, and the 1st (Heavy Fighter) Group of the 1st Training Wing.

In each of these three groups the headquarters units and 2 squadrons had Me-110-C aircraft, powered by 2 DB-601-A engines, while the other squadron still had Me-110-B planes, powered by 2 Jumo-210 engines, with considerably less satisfactory performances.

One group, the 102d, still had its old Me-109-D planes with a two-and-one-half hour in-the-air capability, and one group, the 101st, was equipped with Me-109-Es with an in-the air capability of only 90 minutes.

Since these groups actually only had the combat value of normal fighter units, their original designation as the 1st Group, 2d Twin-engine Fighter Wing and 2d Group, 1st

Twin-Engine Fighter Group was changed on 1 September 1939 to 102d and 101st Fighter group, respectively. The purpose here was to facilitate recognition of the genuine twin-engine fighter units by the commanding headquarters.[169]

According to the operational plans prepared against the eventuality of implementation of Plan Weiss, the five twin-engine fighter groups were intended from the outset to provide escorts for the bomber and dive-bomber forces.

That no reserves were withheld from these units to reinforce the air defenses against the East can be explained by two reasons:

(1) The German appraisal of a possible air threat through the Polish air forces was that this threat was very small. Thus, it was assumed that out of a total of 170 Polish bombers only 130 were Class 1 aircraft.

(2) Experience in Spain had shown that friendly

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169. Source 18.

bomber forces, if they were to execute their strategic missions required protection by friendly fighters (twin-engine) at least until air supremacy was established over enemy territory through annihilation of the hostile air forces.

At the end of the first week of the campaign the twin-engine fighter groups, because the Polish fighter defenses by then had been reduced to insignificance, also were committed principally in low-level attacks against rail and road targets in the Polish rear but also at times in combined attacks with fighter and dive-bomber units in areas of main effort in the battle on the ground.

The tremendously destructive fire of the six weapons--2 cannon and 4 machine guns--mounted rigidly within a small space in the cockpit against all types of targets on the ground produced spectacular results in these attacks.[170]

The final reports on a single twin-engine fighter group, the 1st (Heavy Fighter) Group, 1st Training Wing on operations in the Polish campaign show the following figures:

Complete unit missions were flown on 12 days

In 18 air battles 30 Polish aircraft were shot down and two were destroyed on the ground;

8 annihilating attacks were flown at low altitudes against Polish troop assemblies and moving columns

170. Source 3.

In 8 attacks at low altitudes against rail targets units of the group

shot 6 rail trains on fire and

destroyed 35 locomotives.[171]

The superiority of the German fighters and twin-engine fighters over the Polish fighter defenses was impressively proved.

In the first few days of the campaign the German force of only 5 twin-engine fighter groups totalling 150 aircraft were opposed by an estimated force of 170 Polish fighters equipped with Types PZL-23 and 24 planes, of which the latter although outdated in their construction as high-decker monoplanes had powerful engines which gave them the performances approximating those of the Russian Rata model. Within a few days the Polish fighter defense forces were annihilated through destruction caused on the ground by German bombing attacks and through the large numbers shot down in air combat by the fighters escorting the German bomber forces, at the cost of hardly appreciable losses in German bomber or twin-engine fighter units.

From that stage on absolute German air supremacy over the Polish territories made it possible for the German commands to employ their air forces to the limits of their capabilities and finally turned the whole campaign into

171. Source 89.

a blitz war of unprecedented shortness.

It is obvious that the events of the Polish campaign gave the concept of "The attack is the best form of defense" added impulse so far as the future use of the fighter and twin-engine fighter arms were concerned.

In the eighteen days that the Polish campaign lasted the antiaircraft artillery units attached to the various Army corps artillery forces had few opportunities to prove their efficacy in their mission of air defense.

The unit commanders, most of whom came from the army and a number of whom had served with the Condor Legion in Spain, were dissatisfied with merely accompanying the corps artillery forces during the advance. Pointing out the excellent ballistic features of their weapons for ground combat missions, in which their rapid-fire guns were superior to the normal army artillery, they offered their services against ground targets.

Wherever these offers were accepted the use of the antiaircraft guns resulted in quick and complete success, as was the case in the battles for Graudenz (1st Battalion, 11th Antiaircraft Regiment), at Mlava and Warsaw (2d Battalion, 11th Antiaircraft Artillery Regiment), in the Narev line (1st Battalion, 11th Antiaircraft Artillery Regiment).

Among the actions fought by the antiaircraft artillery

in this brief campaign a particularly conspicuous case is that of the action carried through by the 1st Battalion, 22d Antiaircraft Artillery Regiment, at the Bzura River at a heavy cost in losses and under the most difficult combat conditions. Thrown back completely on its own resources the battalion, in close combat action in closed terrain repelled the bitterly tenacious breakout attempts of of vastly superior enveloped Polish forces and thereby made a decisive contribution toward victory in one of the most important and successful battles fought in the whole campaign.[172]

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172. Sources 88, 185.

Coupled with thourhts of the principles of power concentration this purely offensive use in ground combat of a weapon intended initially for air defense missions, a use which had proved so und repeatedly in Spain and achieved decisive results in the Polish Campaign, produced the foundation for a concept which was to materialize only a few weeks later in the consolidation of motorized antiaircraft artillery units to form antiaircraft artillery corps as a strategic reserve of the Commander-in-Chief of the Luftwaffe, a subject which will be dealt with more fully later in this study.

It can be established here that the most prominent features of Polish campaign were (1) the extreme value of the fighter and antiaircraft artillery arms in the offensive and (2) the resultant ability of the German side to retain the initiative in solving the air defense problem by denying the enemy any chance from the first day on to play out his cards of air attack.

GERMAN AIR DEFENSES IN THE WEST AT THE OUTBREAK OF WAR

It is now time to consider the air defense situation in the West asit existed at the beginning of the war.

The basic principles had been established in Operational Study 1939, Volume III, and these principles

were the governing factor in the disposition of the air defense forces against the West.

Parts of the study stated as follows:

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2. In air defense the mission is to protect all installations and establishments vitally important for the conduct of the war within all German territories....

Air Command North (Second Air Fleet) will be responsible primarily for protection of the air defense areas within its command zones. Furthermore, protection will be provided for air defense targets of Categories 1 and 2.

Protection of the gunpowder and other explosives industries is of particular importance.

Protection of the waterways important for supplies to the Ruhr region will be insured in accordance with the forces available for this purpose.

In providing protection for communication facilities main emphasis will be on protection for transportation roads. In particular light reserve antiaircraft (machine-gun) platoons will be assigned to protect road bridges over the Rhine and Weser Rivers wherever the defensive powers of the local individual target protection services are inadequate. The Commanding General, Air Command

North, is responsible for the protection of the Rhine River bridges within his command zones against both high and low altitude attacks.

Main emphasis in defense of the ground service organization is at the air bases of the strategic concentration. Adequate forces will be committed for this purpose. In accordance with the forces available the more important other military installations will also be protected.

Air Command West (Third Air Fleet) will defend the most important armament factories and cities within its command zones. Main concentrations will be developed to protect the cities of Frankfurt, Mannheim, Stuttgart, Nuremburg, and Munich, and their surroundings.

Among the factories listed as Category I and II in Reich Air Defense Target Register, particular importance attached to the gunpowder and explosives factories.

The antiaircraft artillery forces committed in Air Defense Zone West will be placed, already in times of tension, under the air district commands within whose command areas they are. The Commanding General, Air Command West is authorized for this purpose to withdraw units from Air Defense Zone West for assignment elsewhere.

If Air Command West is assigned reinforcements from other command zones, these may be used to improve air defenses in a line extending from Pforzheim through Rottweil to Singenas an extension of Air Defense Zone West apart from the forces assigned to protect specific targets. Such measures to reinforce the general air defense shall only be taken, however, after adequate provisions have been made for the execution of all other missions.

In other respects it a responsibility of the Commanding General, Air Command West, to take measures to compensate for the lack of forces through maintaining a firm control of all available forces and through developing power concentrations consonant with the current air situation.

In the protection of communication facilities main emphasis will be placed on protection of the transport roads. Power concentrations will be developed at the

transport road bridges across the Rhine and Danube Rivers.

Insofar as forces are available beyond the above requirements protection will be provided for other communication facilities classified as Category I or II.

The Commanding General, Air Command West is responsible for the defense of the Rhine River bridges within his command zones.

Measures will be taken to insure protection of the ground service organization, particularly of the bases for the strategic concentration....

One noticeable feature about these directives is that the southern part of Air Defense Zone West apparently is not accorded the degree of importance which would correspond to the large expenditure of effort its creation had cost. Possibly this is due to the low appraisal of the offensive capabilities of the French bomber forces, in contrast with which the threat which the British air forces constituted for the more northerly territories of German was considered more serious.

The fact that the main industrial regions were within these areas, for the preservation of which industries the antiaircraft barrier was of direct importance in the sense of direct target defense, gave to Air Defense Zone West a

particularly high degree of importance.

The practical results of these basic concepts, established as early as on 1 May 1935 for the strategic concentration in the West, were as follows mobilization:

Mobilization plans, as effective on 1 April 1939, provided for activation of the following units for the fighter arm in the event of war:

1. Fighter units	6 wing headquarters
	27 group headquarters
	81 squadrons
	4 replacement squadrons
2. Night fighter units	4 squadrons
3. Twin-engine fighter units	3 wing headquarters
	10 group headquarters
	30 squadrons
	2 replacement squadrons
4. Schools	2 fighter pilot schools
	1 twin-engine fighter pilot school[173]

At the time when these plans were prepared, 14 September 1938 the following units were in existence:

1. Fighter units	3 wing headquarters
	20 group headquarters
	60 squadrons
2. Night fighter units	none
3. Twin-engine fighter units	1 training group
4. Schools	1 fighter pilot school

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173. Source 90.

Mobilization plans valid from 1 April 1939 on thus provided for a total wartime strength in the fighter arm of

9 fighter wings with 47 groups

3 twin-engine fighter wings with 11 groups

4 night fighter squadrons.

With the units newly established on 1 November 1938 and the separation of the fighter forces in what were called light and heavy fighter forces in December of the same year a part of the mobilization plan program was already fulfilled.

The newly established units were as follows:

1. Fighters	1 wing headquarters
	1 group headquarters
	4 squadrons
2. Twin-engine fighters	7 group headquarters
	21 squadrons (taken from the existing fighter forces).

By 15 August 1939 the following additional units were established:

1. Fighters	1 wing headquarters
	1 group headquarters
	4 squadrons
2. Night fighters	3 group headquarters
	12 squadrons

3. Twin-engine fighters	1 wing headquarters 2 group headquarters 6 squadrons
4. Schools	1 fighter pilot school.

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A comparison of the status as of 14 September 1938 with that of 15 August reveals the following accretions and reductions:

Status	Fighter			Night Fighter			Twin-Engine Fighter		
	Wings	Gps	Sqds	Wings	Gps	Sqds	Wings	Gps	Sqds
9 Sep 38	3	20	60	0	0	0	0	1	3
15 Aug 39	5	14	~~44~~	0	3	12	1	10	~~30~~
Accretion	2				3	12	1	9	27
Reduction		6	16						

It is thus obvious that more than 50 percent of the increase in twin-engine and night fighter units was at the expense of the normal fighter forces, with the number of night fighter units showing an increase of 200 percent above the original authorization.

If in planning the normal and twin-engine fighter units had been considered as belonging to one and the same arm, the following program for new activations at the outbreak of war would have evolved:

6 wing and 24 group headquarters and 110 squadrons.

The actual situation on 1 September 1939 was, however, that there were neither enough personnel nor enough aircraft for a unit activation program of this size.

To give the air defenses in the West the greatest possible strength in fighter forces the following measures were taken:

1. The units intended as night fighters and just created for the purpose in August 1939 were transferred to the daylight fighter forces. These were the 1st groups each of the 20th and 21st Fighter Wings, the 2d Group (minus 1 squadron) of the 71st, and the 10th Squadron of the 72d Fighter Wings. The actual strength in fighter forces was thus increased by three groups.

2. The twin-engine fighter units not committed as such in the Polish campaign were allocated for employment in purely daylight missions. These were the 26th Twin-Engine Fighter Wing of 2 groups with Me-109-D planes, the 126th Fighter Group with Me-109-B/C planes, and the 152d and 176th Fighter Groups, both with Me-109-B/C planes. The three latter groups had been given these new designations to mark their small time-in-air capacities and were identical with the units formerly designated 3d Group, 26th, 1st Group 52d, and 2d Group, 76th Twin-Engine Fighter Wings. It should be borne in mind here, that most of the units intended for and designated as twin-engine units, still had single-engine planes, usually of the older types.

3. A group, the 1st Group, 51st Fighter Wing, intended for reequipment as a twin-engine unit remained with the normal fighter forces.

4. 1 Fighter group, the 2d Group, 52d Fighter Wing was newly activated in measures commencing on 15 August 1939. 175

After completion of the movements carried out between 15 August and 1 September 1939 the disposition of fighter and twin-engine fighter forces for defense against the West and, in the case of Air District Commands III and IV, simultaneously against the East was as follows:

A. First Air Fleet Zone of Command.

Unit	Tactical Base	Aircraft Type	Assgd Defense Area	Air District Command
Hq, 2d Fighter Wing	Doeberitz	Me-109-E	General area of Berlin	III
1st Group	"	"		"
1st " , 20th Wing minus 1 squadron	Brandenburg	Me-109-D		"
10th Sq, 2d Wing	Fuerstenwalde	Ar-68	" Night Defense	"
Hq, 3d Fighter Wing	Brandis	Me-109-E	Halle-Leipzig	IV
1st Group	"	"		"

175. Source 18.

B. SECOND Air Fleet-Zone of Command--cont.

Unit	Tactical T Base	Aircraft Type	Assgd Defense Area	Air District Command
Hq, 26th Fighter Wing	Duesseldorf	Me-109E	Ruhr	VI
1st Group	Koeln-Gymnich	"	Region	"
2d "	Duesseldorf	"	"	"
10th Squadron (Night defenses)	"	Ar-68	"	"
1st Group, 52d				
52d Wing	Boenninghardt	Me-109-E	"	"
2d Group, 26th Twin-Eng Wing	Werl/Stoermede	Me-109-D	"	"
Hq, 26th Twin-Eng Wing	Varel	Me-109-D	Helligo-	XI
1st Group	"	"	goland	"
2d Group, 77th Fight. Wing	Nordholz	Me-109-E	Bight	"
2d Group, 186th Fight. Wing	Kiel	Me-109-T	"	"
126th Fight. Group	Neumuenster	Me-109-B/C	"	"
11th Squadron, 2d Tng Wing	Greifswald(?)	Ar-68 Night Def.	"	"

C. THIRD AIR FLEET ZONE OF COMMAND

HQ, 52d Fighter Wing	Mannheim	Me-109-E	Mannheim-	XII
1st Group, 51st Fight Wing	"	"	Stuttgart	"
10th Squadron, 72d Fight. Wing	"	Me-109-D	Area	"
2d Group, 52d Fight Wing	Germersheim	Me-109-E	"	"
HQ, 53d Fighter Wing	Wiesbaden	Me-109-E	Frankfurt	"
1st Group	"	"	"	"
2d Group	Mannheim	"	"	"

C. THIRD AIR FLEET ZONE OF COMMAND--cont.

Unit	Tactical Base	Aircraft Type	Assgd Defense Area	Air District Command
152d Fighter Group	Biblis	Me-109-B/C	Frankfurt	XII
1st Group, 54th Fighter Wing	Boeblingen	Me-109-E	Stuttgart	VII
1st Group, 176th Fighter Wing	Hechingen	Me-109-B/C	Stuttgart	VII
2d Group, 71st Fighter Wing	Fuerstenfeld-bruck	Me-109-D	Munich	VII

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In order to convey an intelligible impression of the combat strength of the forces involved, the following information is offered on the composition of the units and their effective strengths on 1 September 1939:

1. Fighter Wing HQ : Authorized Strength 3 combat planes
2. Fighter Group HQ : " " 4 " "
3. Fighter Squadron : " " 12 " "

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Each fighter group was organized in a headquarters with headquarters company, including a signal platoon, and three squadrons.

The authorized strength of a fighter group thus totalled forty aircraft.

The total authorized strength of the fighter and twin-engine/fighter forces committed for air defense in the West was thus:

176. Sources 18, 49, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100.
177. Source 54.

A. FIRST AND SECOND AIR FLEET COMMAND ZONES.

4 wing headquarters,	each 3 aircraft	12 aircraft
10 2/3 groups "	" 40 "	428 "
3 night fighter sqadrons,	each 12 aircraft	36 "
Total		476 aircraft

B. THIRD AIR FLEET ZONE OF COMMAND

2 group headquarters,	each 3 aircraft	6 aircraft
8 groups	each 40 "	320 "
1 squadron		12 "
		338

The overall authorized strength of the fighter units stationed in the West on 1 September 1939 was thus 476 plus 338, making 814 aircraft.

The only sources from which the actual strengths and the effective strengths can be computed are the overall figures available on the subject, which include the forces committed against Poland, in the report of the Chief of Luftwaffe Supply and Administration dated 2 September 1939.

By applying the ratio of authorized to actual and effective strengths deducible from those figures, however, it is possible to arrive at a fairly reliable picture.

The factor being use in calculations here is the number of crews available, since these represented the actually available effective strength, even if a greater number of planes may have been available than crews. In the

authorized strengths the number of crews in each unit naturally equals the number of planes it had.

The Report quoted gives the following strengths in crews

	Authorized	Actual	Effective
1. Fighters	811	672	633
2. Twin-Engine Fighters	438	384	373

For the fighter forces the percentage of authorized strength actually in the units was 89.2, the effective percentage was 78 percent.

In the twin-engine fighter forces the actual strength was 87.6 percent of the authorized figure, the effective strength 85.2 percent.

For both the fighter and twin-engine fighter forces together the effective strength was $\frac{78 \text{ plus } 85.2}{2}$ and thus 81.6 percent of the authorized strength.

Applying this factor of 81.6 percent to the overall strength of the fighter and twin-engine fighter forces in the West, computed at the authorized figure of 814, an effective strength was thus available of 664 crews with aircraft.

Calculating this figure pro rata for the various defense areas produces the following picture:

Area	Number of Units	Authorized Strength	Effective Strength
General area of Berlin	1 wing and 2 1/3 groups	95	77

carried forward		95	77
Halle-Leipzig	1 wing and 1 group	43	35
Ruhr Region	1 wing and 4 1/3 groups	175	143
Helligoland Bight	1 wing and 4 groups	163	133
Frankfurt	1 wing and 3 groups	123	100
Mannheim-Stuttgart	1 wing and 4 1/3 groups	175	143
Munich	1 group	40	33
Totals		814	664

Accordingly, the main concentration of fighter forces in the West was in the central areas between Wesel and Mannheim. With the operating ranges of the units being what they were, between 350 and 400 fighters and twin-engine fighters could go into action against an enemy force within a very short span of time at any point within this area.

Here it must be borne in mind that the Me-109-B/C and E units, in spite of their short time-in-air capacities, had a striking range of approximately 240 miles from their take-off bases because of their high speed and because of the large number of airfields in existence in the western parts of Germany.

With the distance by air being only 180 miles from Hamburg to Dortmund and 180 miles from Stuttgart to Dortmund, it was possible to develop areas of main defense by moving forces from the flanks to the center or from the center to the flanks at any moment if the units took off early enough.

Even for the units stationed in the Berlin region, Helligoland Bight, the Ruhr region, and the Frankfurt area were just within striking range.

However, these possibilities are mere hypothetical conjectures. The conduct of air defense operations was in the hands of the various air district headquarters. As

previously described, these commands were governed by the 1939 combat directives which restricted them firmly to the defense of specific targets or target areas, so that it is doubtful that they could have reached any decision involving such flexible operations.

The decision to commit fighter forces from one air district command against an enemy penetration in another command area could only be taken at the next higher level of command, the air fleet, and for one air fleet to commit its forces in the command zone of another air fleet even required approval from the highest level, from the Commander in Chief of the Luftwaffe himself.

In view of the small forward reporting areaand, as already related, the complicated and time-consuming reporting methods of the radio intercept services, it is highly doubtful/at it would have been possible any time, if Germany's western opponents had launched a massed air attack directed against the industrial regions of Western Germany, to issue the appropriate operational orders/in time for the fighter and twin-engine fighter units stationed far from the target area of the enemy attack.

However, the estimated strength of the western bomber forces, comprising approximately 500 bombers of the Royal Air Force and 490 of the French air forces, gave no cause for great anxiety on this score. The limitations to

which bombing tactics and techniques were still subject at the outbreak of the war gave no cause to expect attacks by bomber forces of a size which only became possible during the war.

Against bomber forces in the strengths then possible it could definitely be assumed that a force of 150 fighters such as that which the existing disposition made possible at any point along the west front within a very short time, would be amply sufficient defense.

The antiaircraft artillery arm, in compliance with mobilization plans, immediately upon mobilization activated between three and four mobilization type units for every regular peacetime units in existence. Within a few weeks after mobilization the arm thus had a personnel strength of approximately 425 000, over four times its peacetime strength. The almost negligible air activities of Germany's western opponents over German territory during the first few weeks of the warallowed the antiaircraft artillery arm ample time to remedy without interference the training defects in its reserve personnel newly inducted. 179

After completion of the activation of mobilization type units, the overall strength of the antiaircraft artillery arm in September 1939 amounted to

650 heavy and 560 medium and light antiaircraft gun

batteries plus 188 searchlight batteries.

Owing to the lack of detail records on the subject it is not possible to compute the strength of the forces available for the defense in the West after September 1939.[180]

The first available authentic source on the distribution of forces is a situation map dated 31 July 1940, which can serve as a guide, since it reprrsents the final strengths after the mobilization type units had been activated and si since no further attivations took place until after August 1940.[181]

In 1940 the number of antiaircraft units available for home air defense was reduced by the establishment of antiaircraft artillery corps and because of the transfer of forces to the occupied territories of Western Europe. However, the effects of this reduction were hardly felt in the western home air defense areas, since the most of the units transferred were taken from air district commands deeper inside of Germany.

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179. Source 103.

180. Source 104.

181. Sources 105, 106.

According to the situation map maintained at Headquarters of the Commander in Chief of the Luftwaffe, status on 31 July 1941, the disposition of antiaircraft artillery forces was as follows:

	Heavy Bttrs	Medium & Light Bttrs	Searchlight Bttrs
1. Air District Command XI, Hanover	105	94	38
2. " " " VI, Muenster	141	92	35
3. " " " XII, Wiesbaden	65	60	25
4. " " " VII, Munich	36	40	7
Totals	347	286	105 183

Local control of the antiaircraft artillery forces of all types was a responsibility of the Air Defense Commands, namely, the Antiaircraft Artillery Groups (with regimental status), and the Antiaircraft Artillery Subgroups (battalion status), and forces were assigned to these headquarters in accordance with the size and importance of the assigned defense targets and the degree of their vulnerability to air attack.

On the whole it can be said of the results achieved in the activation of mobilization types of antiaircraft artillery, that the performances of the peacetime units, the recruiting centers, the industry, and the administrative authorities must be considered outstanding. With very few exceptions all points of the planned program were fulfilled.

The target set for heavy batteries was passed, but the number of 20-mm gun batteries and searchlight batteries was not quite achieved.

Both quantitatively and qualitatively the antiaircraft artillery arm in every respect was in the position to perform its missions in the air situation as it existed at the beginning of the war.[184]

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183. Source 107.

184. Source 65.

The Aircraft Reporting Service was activated at mobilization in line with the peacetime preparations.

The air observation posts, air observation centers, aircraft reporting centers, the latter at headquarters of the various air district commands, were manned by the reserve personnel earmarked for these duties, and the established telephone system was linked up by the postal authorities.

The antiaircraft artillery and fighter command posts were given their prescribed lines to their nearest air observation centers and aircraft reporting centers at the appropriate air district headquarters.

A command network of wire communications prepared for the purpose in peace was connected, and an emergency radio network established by the Air Signal Corps against the eventuality of a failure of wire communications was placed in operation.

This insured the proper functioning of the active forces of the air defense system, the fighter and antiaircraft artillery arms and the aircraft reporting system.

AIR DEFENSE COMMAND SYSTEM IN THE WEST

Technically, the air district commands were the headquarters controlling the operations of the forces of air defense quoted above. As previously described, control

over the fighter and antiaircraft artillery forces assigned in areas of main effort was consolidated under Air Defense Commands, local headquarters under the appropriate Air District Commands.

In addition to the existing Air Defense Commands 1, 2, 3, and 4, at Berlin, Leipzig, Hamburg, and Duesseldorf, respectively, Air Defense Command 5, Frankfurt on Main, was established on 1 October 1939. Up to 1 July 1939 Air Defense Command 6, at the time designated as Air Defense Command 2, was at Stettin, while the Leipzig command was originally designated with the digit "2." It has also been mentione previously in this study that the measure placing fighter units under the air defense commands did not prove a sound one.

This is best illustrated by the experience of the Commanding Officer, 3d Fighter Wing, who, together with his units, was placed under Air Defense Command 2, Leipzig: On reporting to his new superior officer, a colonel of antiaircraft artillery, the latter informed him quite frankly that he knew nothing of fighter operations and that it would be best for the wing commander to order the operations of hi his units as he himself considered wisest.

The fighter command in Helligoland Bight, under the Commanding Officer, 26th Twin-Engine Fighter Wing, also

was not placed under Air Defense Command 3, Hamburg, as it should have been according to the general directives given, but directly under Air District Command XI, Hanover, instead.

The reason for this deviation from general directives may have been the fact that the main area in which the fighter and twin-engine fighter units would have to operate was the North Sea, since the majority of them were stationed close to the coastline, with elements stationed on the North Sea Islands, whereas the Luftwaffe antiaircraft artillery units, because of the commitment of naval antiaircraft artillery forces in the coastal areas, were deployed f farther inland. For this reason to have placed the fighter units under Air Defense Command, Hamburg, would have been highly impracticable.[186]

These confusing circumstances were probably the grounds for a renewed order by the Commander in Chief of the Luftwaffe on 21 September 1939 clarifying the chains of command for the fighter forces.

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185. Source 108.

186. Source 109.

For the fighter forces the following changes in existing orders regulating chains of command will be placed in effect immediately:

1. Fighter units stationed within specific air defense command areas in local defense missions will be under the command of the appropriate Air Defense Command in whose areas they are stationed.

2. All other fighter forces will be under the immediate command of the appropriate air fleet headquarters, which, in turn, can assign them to their air divisions whenever necessary.

3. This order changes nothing in the status of air district command and defense matters controls.[187]

The order quoted above was signed by the Chief of the Luftwaffe General Staff, General Jeschonnek.

It is an established fact, however, that the requirements of the order were not applied in the cpmmand area of Air District Command XI, which moved its headquarters from Hannover to Hamburg in November 1939, which itself retained control over the operations of its assigned fighter forces.[188]

FIRST SUCCESS IN AIR DEFENSE

4 SEPTEMBER 1939

Only one day after the declaration of war by Britain

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187. Source 110.
188. Source 111.

and France the air defense system in the West was to be called upon to prove its efficacy.

During daylight on 4 September 1939 the British Royal Air Force started the first strategic mission of its bomber forces. Twenty Blenheim and Wellington bombers crossed the North Sea and the Bight of Helligoland to attack the battleship Scheer at Wilhelmhaven.[189]

Thanks to the timealy warning received through the naval radar instruments stationed on the North Sea islands German interceptor fighters were able to take off in time for action, with the result that twelve of the attacking bombers, making more than 50 percent of the entire force, were shot down.[190]

This successful defense action apparently sufficed to halt all intentions of the Western Allies to wage strategic air warfare for the time being and allowed the German air command time and opportunity to reinforce the air defenses in the West and improve the general standards of performance without interference.

REORGANIZATION OF AIR DEFENSES AFTER POLISH CAMPAIGN

After the end of the Polish Campaign a directive from the Commander in Chief of the Luftwaffe on 22 September 1939 ordered a changed disposition of the defensive air units

deployed in the West, which brought an important change in the command set up of the fighter arm, as follows:

1. The fighter forces to remain in the Berlin-Central Germany regions (2d Fighter Wing HQ with its 1st Group and the 1st Group, 20th Fighter Wing, and 3d Wing HQ with its 1st Group) were placed under Air Defense Command 1 (Berlin) and 2 (Leipzig), respectively.

2. All other fighter and twin-engine fighter units were allocated to the various air fleet headquarters and assigned by them to their air divisions.[191]

189. Source 112.
190. Source 113.
191. Source 80.

This measure is linked directly with the strategic concept for the continued conduct of air warfare.

The directive from the Commander in Chief of the Luftwaffe on 23 September 1939 governing the conduct of operations in the West emphasizes the requirement for general restraint in the field of strategic air warfare.

Second Air Fleet was to prepare for concentrated attacks attacks against London and Liverpool to be launched only in the event of British air attacks against the German civilian population.[192]

Retaliatory attacks of this type were in accordance with the regulations contained in the manual THE CONDUCT OF AIR OPERATIONS, PARAGRAPH 191 which, as previously explained provided for this kind of reaction to intimidation attacks against the civilian population.

In accordance with the mentality of the Luftwaffe Command, which was directed toward the execution of swift attack it was only logical that the fighter and twin-engine fighter forces therefore were assigned to the commands responsible for purely strategic missions of this kind, namely, the air divisions, since they were an important element required in the execution of such missions.

Furthermore, overall responsibility for air defense

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192. Source 115.

had always been with the air fleets within their zones of command anyway, just as they had overall responsibility for the conduct of offensive operations by the forces they controlled.

However, the circumstances logically developing from the measures taken could not be considered practicable and soon revealed a series of difficulties:

1. As a result of the purpose for which they had been established during times of peace, the air division command staffs were organized for the employment of reconnaissance, bomber, and dive-bomber forces in strategic operations and had no practical experience in the commitment of fighter and twin-engine fighter forces in air defense missions.

Being organized in consonance with their specific missions, the composition of these staffs was not appropriate for the condust of air defense operations uninterruptedly over a long period of time by day and by night.

2. The coordination of fighter and antiaircraft artillery operations was only possible at air fleet level, and was therefore a complicated and time-consuming matter.

The two air fleet headquarters committed in the West

did not adopt uniform solutions to cope with this dilemma.

In the zone of the Second Air Fleet Colonel von Doering in command of the 26th Twin-Engine Fighter Wing, was assigned in November 1939 to direct the operations of all fighter and twin-engine fighter forces within the command. He established his first headquarters at Dortmund, the peacetime garrison of the 26th Twin-Engine Wing.

On 1 January 1940 the position thus created was authorized under the designation of CO, Fighter Command (Jagdfliegerfuehrer) with the rank of brigadier general, and Colonel von Doering was appointed officially as CO, 2d Fighter Command.[193]

The 2d Fighter Command was responsible exclusively for the direction of the tactical operations of the assigned fighter and twin-engine fighter forces both in air defense and air attack missions.

The Helligoland Bight area was excluded from control

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193. Source 109.

by the 2d Fighter Command. Here, Lieutenant Colonel Schuhmacher, commander of the 1st Fighter Wing established in November 1939 was appointed inofficially as the commanding officer of fighter forces in Air District XI to control all fighter and twin-engine fighter operations, and all such units were placed under the headquarters of the 1st Fighter Wing.[194]

The fighter and twin-engine fighter units assigned tactically to the 2d Fighter Command remained in other respects under the air divisions to which they had been allocated.

The special arrangement made for Helligoland Bight was due in part to personality problems.

Lieutenant Colonel Schumacher had been a navla officer in World War I. During the build up of the new German military forces he was one of tne officers originally intended for the new naval air forces.

As previously mentioned in this study the mission of air defense within the naval fortifications and coastal areas was a responsibility of the Navy, with its own anti-aircraft artillery forces. This lack of uniform control in air defense matters in regions near the coast came

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194. Sources 109, 111.

justifiable criticism by the Luftwaffe, which claimed that it should be in control. This unavoidably resulted in friction between the Navy and the Luftwaffe in the settlement of air defense problems.

Lieutenant Colonel Schuhmacher had good personal relations with his former comrades in the Navy. It was thought that his appointment to head the fighter command would serve to relieve some of the tension. This was a particularly important factor since success hinged in a decisive measure upon smooth cooperation between the Luftwaffe Fighter Command and the Naval Antiaircraft Artillery Command, whose zones of operations overlapped.[195]

In the zone of the Third Air Fleet, the solutions initially adopted were different and less consistent:

1. All twin-engine fighter forces, were placed under the air divisions and were intended primarily for strategic missions in support of the bomber and reconnaissance forces. This included those units which still had only the combat value of normal fighter forces, namely, the 102d, 152d, and 176th Fighter Groups (also designated as the 1st Group, 2d, and 1st Group 52d, and 2d Group, 76th Twin Engine Fighter Wings, respectively).[196]

2. The fighter forces stationed in the areas

along the middle reaches of the Rhine River were placed under the air divisions, and were assigned tactically to the CO, 53d Fighter Wing, Wiesbaden, who thus inofficially functioned as the head pf a fighter command.

It was only in February 1940 his position was authorized and he was given the official designation of CO, 3d Fighter Command.[197]

3. The 52d Fighter Wing in the Mannheim region remained under Air District Command XII, the 1st Group, 54th Fighter Wing and 2d Group 71st Fighter Wing (redesignated 2d Group, 51st Fighter Wing in December 1939) in the Stuttgart region under Air District Command VII.[198]

4. With the establishment of 3d Fighter Command in February 1940 all fighter and twin-engine fighter units were assigned to this headquarters and remained under it in all respects up to the opening of the western campaign.[199]

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195. Sources 111.
196. Sources 3, 100.
197. Sources 3, 116.
198. Source 117.
199. Source 116.

It can thus be established here that, in spite of the clear-cut order of 21 September 1939, no clear cut-line of command existed in respect to the fighter and twin-engine fighter forces. This fact can be explained only by the mentality of the leading men of the times.

The Commander in Chief of the Luftwaffe himself, Field Marshal Goering, as a fighter pilot of World War I was averse to assigning responsibility for the operations of the fighter arm to the regional and district antiaircraft artillery commands. Practically all commanders of air district and air defense commands had come from the Army and the antiaircraft artillery arm.

As World War I air pilots Generals von Greim, Loerzer, and von Richthofen, commanding the 5th, 2d, and 8th Air Divisions, respectively, were far better qualified to control the operations of the fighter and twin-engine fighter forces than were the air district commanders and claimed such control, with which claim their commander in chief was in full sympathy.

That a command system so lacking in uniformity could continue to exist for such a relatively long time until the basic solution in the form of fighter commands was found in the autumn of 1939 was possible only because the small air activity of the western opponents did not make a

quicker solution of the problem absolutely essential.

The reasons for the problem doubtlessly resided in the dual nature of the fighter arm as a weapon to be committed in support of strategic air operations and at the same time a weapon of air defense. It could be compared with a child who has two fathers and therefore no father at all.

A solution in favor of the offensive was adopted as soon as it became clear that the western opponents were not yet in any positions to wage strategic air warfare on any appreciable scale.

SUCCESSFUL DEFENSE OPERATION ON 18 DECEMBER 1939

The fact that the Western Allies were not yet able to wage large-scale strategic air warfare was realized largely a a result of the second victory of major proportions achiev- by the German air defenses when a British bomber force attempted to attack the naval base at Wilhelmshaven on 18 December 1939.

In defensive operations directed by Lieutenant Colonel Schuhmacher, CO, Fighter Command Helligoland Bight, units of the 1st Fighter Wing shot down 34 of the attacking British Wellington bombers at a cost of only two fighters lost.

Here again the timely take off of the interceptor

fighter forces was due to the reliable advance warnings received through the naval radar instruments and two Freya type radar stations of the Luftwaffe aircraft reporting services established on the island of Wangeroog.[200]

FIGHTER UNITS ACTIVATED AT MOBILIZATION

One consequence of the assignment of the fighter and twin-engine fighter forces to the air divisions and the resultant expansion of these headquarters was that they were upgraded to air corps on 6 October 1939.[201]

As previously related above inadequate personnel and materiel made it impossible to increase the overall strength of the existing fighter and twin-engine forces to the preplanned figures.

Measures were taken to achieve what was possible, and the form of these measures characterizes the existing difficulties.

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200. Source 118.
201. Source 119.

Pursuant to orders from the Commander in Chief of the Luftwaffe, effective 8 September 1939, the following new units were activated:

Parent Unit	Newly Activated	At
1st Group, 53d Fighter Wing	7th Squadron	Wiesbaden
2d " 53d " "	8th "	Mannheim-Sandhofen
1st " 26th " "	7th "	Cologne
2d " 26th " "	8th "	Duesseldorf

The orders mentioned in each case that the intention was to organize the group headquarters and their 9th Squadrons as soon as the necessary personnel and materiel became available.

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Pursuant to orders dated 21 September 1939 from the Commander in Chief of the Luftwaffe 27th Fighter Wing Headquarters was organized at Muenster-Loddenheide under the command of Lieutenant Colonel Ibel.

The new wing was assigned the following units:

1st Group, 3d Fighter Wing, redesignated as 1st Group 27th Fighter Wing, and, after the end of the Polish campaign the

1st Group, 1st Fighter Wing

1st Group, 21st " "

1st Group (of which the 1st Squadron was a fighter unit), 2d Training Wing.

At about the same time 77th Fighter Wing Headquarters

was organized at Neumuenster under Lieutenant Colonel Manteuffel and assigned the following units:

2d Group, 77th Fighter Wing and, after the end of the Polish campaign the

101st Fighter Group (formerly 2d Group, 1st Twin-Engine Fighter Wing).[204]

The newly activated forces for the fighter arm under the mobilization plans thus did not amount to more than 2 wing headquarters and 4 squadrons of fighters.

No new twin-engine fighter units at all were activated at mobilization.

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202. Sources 120, 121. 203. Sources 77, 91, 123.
204. Source 95.

The actual possibility to mobilize 2 new wing headquarters and 4 new fighter squadrons compared with the required establishment at mobilization of 6 new wings and 24 fighter squadrons reveals clearly how little harmony existed between the political decisions taken and the practicability of military planning.

From the first day of the war on the fighter arm labored under improvizations, and this situation was to remain unchanged for the duration of the war.

THE NIGHT-FIGHTER ARM IN THE AUTUMN OF 1939

The month of October also brought an important decision in another field which was to prove a serious disadvantage later.

In a conference between the Commander in Chief of the Luftwaffe and the Chief, Fighter Inspectorate (Inspectorate 3), the establishment of a night fighter arm was discussed. The theoretical and practical groundwork for this purpose had already been done by the existing regular night fighter units, the 10th Squadron, 2d Fighter Wing, and 11th Squadron, Second Training Wing, both of them T/O units.

The situation created by the activities of the Western Allies up to October 1939 resulted in the consideration that there was no acute necessity to create a night fighter arm. It was decided therefore to refrain from building

up the arm in excess of the existing experimental squadrons.

REINFORCEMENT OF THE DAYLIGHT FIGHTER FORCES IN 1939-40

It was considered more important to increase the number of daylight fighter units in existence. It is safe to assume that this decision was taken under a misconception of the threat of air attack at night and, after the astonishingly quick end of the Polish campaign and the complete consolidation of the frontiers in the East, under the premises of continued warfare free of any threat in the rear.

One plan was in existence providing for a blitz campaign against France, similar to that conducted in Poland, to commence already on 10 November 1939. 206

In view of the significance of strong fighter and twin-engine forces, as evidenced in the Polish campaign, to achieve air supremacy as the means to bring a campaign to a speedy end it appeared highly important under the ruling aspects to create as speedily as possible conditions for the maintenance of air supremacy also over the opponents in the West.

All efforts were therefore made in the next few months to release personnel and materiel for the activation of fighter units.

As a result a start was made, after the 3d Groups of the 26th and 53d Fighter Wings had been brought up to

full strength in November 1939, at organizing the new 3d Fighter wing with one group (1st Group, 3d Fighter Wing), and the 1st Fighter Wing, under Lieutenant Colonel Schuhmacher, to assume command over the fighter forces in the Bight of Helligoland in place of Colonel Doering, in command of the 26th Twin-Engine Fighter Wing.

These were followed by the activation of the 2d Group, 2d Fighter Wing and the 2d Group, 27th Fighter Wing in January; 54th Wing Headquarters, the 2d Group, 2d Fighter Wing, and the 2d Group, 27th Fighter Wing in February; and the 4th Group, 2d Fighter Wing, and 3d Group, 3d Fighter Wing in March 1940.

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206. Source 124.

This series of activations came to a close in April with the establishment of the 51st Wing Headquarters which, curiously enough, was not assigned a single unit with its own designation number but three groups from three other wings, just as it will be noticed that all wings consisted of groups having different wing identification numbers. This can be taken as another sign of the improvizational nature of the expansion of the arm.

Altogether the mobilization forces it had proved possible to activate between September 1939 and May 1940 increased the strength of the fighting arm once again by 4 wing headquarters and 8 fighter groups, bringing the total strength of the arm up to 10 wing headquarters and 28 fighter groups.

With the exception of the 1st Group, 20th Fighter Wing, all units were equipped with Me-109-E aircraft.[207]

Their allocation for offense and defense will be dealt with later.

TWIN-ENGINE FIGHTER FORCES IN 1939-40

The measures directed at strengthening the twin-engine fighter forces were designed to equip all existing units uniformly with Me-110 aircraft and not at increasing their number. This

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207. Sources 18, 125, 126, 127.

program started in December 1939, when the 26th Twin-Engine Fighter Wing received its new aircraft and continued until all units had Me-110-C planes by April 1940. One complication developed here through the lack of DB-601-A engines, which were also required in the program to reequip normal fighter units with Me-109-E planes. As a result only Type Me-110-B planes powered by two Jumo-210 engines were available and these did not meet the requirements of modern air warfare. It was mid-January before the allocation of Me-110-C planes powered by two DB-601-A engines commenced and made it possible to place them in service in exchange for the outdated models currently in the units.[208]

The time left before the opening of the western campaign was extremely short for the twin-engine fighter force to cope with all the problems involved in the changeover from Me-109 to Me-110 aircraft.

The organization of the twin-engine fighter forces differed considerably from that of the normal fighter arm. Whereas the organization of the normal fighter units was designed to enable them to operate from any usable airfield without non-organic technical, personnel, or materiel support, the twin-engine fighter units were organized similarly to the bomber forces for flexible operations. Each unit had only its flight personnel, a few key technicians, and a

208. Sources 128, 93.

bare minimum of servicing equipment intended for tranportation by the transport aircraft organically assigned to each unit. To maintain their operability, the twin-engine fighter units, in equal measure with the bomber units, had to rely on the availablity of airfield operating companies, which restricted them to the use of base airfields. This facilitated their quick long-distance transfer at a speed equivalent to that of bomber units and was a feauture characteristic of their primary mission of strategic operations as escort units for the bomber forces.

For units still equipped with Me-109 planes the change-over to Me-110 planes thus necessitated a complete change of their technical services.

Retraining was also a large item, involving as it did a transition from handling a light single-engine plane to that of a heavy twin-engine plane, the techniques of flight in unit formation and radio controlled navigation, firing practice, and integration exercises to insure smooth collaboration between the pilot and the radio operator while in action.

That all these requirements could be fulfilled by the beginning of the western campaign on 10 May 1940 speaks well for the quality of the crews selected for the purpose.

In April 1940 the 2d Twin-Engine Fighter Wing Headquarters,

under Lieutenant Colonel Vollbracht, was organized at Mannheim, and 76th Twin-Engine Fighter Wing Headquarters, under Major Grabmann, at Langendiebach, and the existing groups were redistributed.

The reequipment of the twin-engine fighter units with Me-110 planes completely terminated their use as defense fighters. One evident sign of this change was that these units were no longer required to maintain aircraft under standby alert for defense missions. On the other hand, they were employed on some occasions, within the scope of their strategic purpose, to escort reconnaissance planes operating over enemy territory. It was during a mission of this type than an incident occurred which was to prove of enormous importance for the fighter and twin-engine fighter forces.

It was in February 1940 and a squadron of Me-110-C had escorted a strategic reconnaissance plane as far as the Charleville area, where it encountered a British squadron of Hurricanes at an altitude of 26 000 feet and a temperature of -67 degrees Fahrenheit. The encounter produced no results on either side, because all weapons were frozen. This showed that the lubricating oil used by the Luftwaffe was not proof against freezing temperatures. Immediate tests revealed that the weapons oil used by the Army did

209. Source 3.

not have this disadvantage, and a change was effected without delay.[209]

AIR SITUATION IN THE WEST

January-May 1940

After the costly and unsuccessful attempt of the British to attack Wilhelmshaven on 18 December 1939 the air situation in the West was marked by the following features:

1. During daylight Germany's western opponents restricted their air activities to reconnaissance in the near border and North Sea coastal areas, plus air patrols maintained by fighters in the vicinity of the border.

2. A small percentage of the reconnaissance flights were carried out by armed bombers--exclusively British--which attacked targets such as outpost patrol boats off the shores of the North Sea and airfields close to the coast.

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209. Source 3.

3. Out of 9 penetrations by enemy aircraft in January 1940 3 were at night. In February the ratio of night to daylight penetrations was 13 to 3, in March 23 to 7, in April 22 to 0, and from 1 October 1940 on 3 out of every eight penetrations took place at night.

4. Penetrating units dropped bombs on two occasions in January 1940, on one occasion in February, on six in March, on seven in April, and on three occasions from 1 to 10 May. No serious damage resulted. On several occasions the planes dropped leaflets in foreign languages.

5. The main areas of penetration were northwestern Germany and the North Sea coastal areas.[210]

The strain to which the German defense fighters were subjected was more in the nature of a sit-down warfare than in the form of combat operations. Having to rely exclusively on the vision and hearing of the personnel of the aircraft reporting service it was found exceptionally difficult to track the course of a reconnaissance plane at altitudes higher then 19 000 feet over the areas near the border closely enough to commit the alerted fighters properly against it.

Usually the fighters taking off on these fruitless missions exploited the opportunity to patrol challengingly

210. Source 129.

just across the border, over enemy terrain, in search of "their" reconnaissance plane. British and French fighters obligingly took off to repel them and almost invariably were shot down by the Me-109 fighter from its advantageous position. Particularly those fighter pilots were successful in these venture who were vastly superior to their opponents by reason of their combat experience in the Polish campaign and in the Condor Legion. By such means Captain Moelders, in command of the 3d Group, 53d Fighter Wing, for example, was able to add another 12 planes on the west front to his previous score of 14 shot down.[211]

Such proof of their superiority could not fail to influence views on the future role of the fighter forces.

THE ORGANIZATION OF ANTIAIRCRAFT ARTILLERY CORPS IN 1939

The experience gained with the antiaircraft artillery and the important successes achieved by this arm in action against air and ground targets within the operations zones of the Army in the Polish campaign resulted in an entirely new organizational measure: the organization of antiaircraft artillery corps as a mobile reserve under the Commander in Chief of the Luftwaffe.

Two such corps headquarters were established on 28 No

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211. Source 3.

November 1939, the I under General Weise, and the II under General Dessloch. These corps will be referred to in this study as "Flak corps."

Each corps headquarters was assigned two to three anti-aircraft artillery regimentstaken from practically all air district commands in existence.

The order authorizing the organization of the Flak corps headquarters established the following missions:

1. To establish and/or shift air defense concentrations in the operational sense; to provide antitank

tank defenses on wide frontages;

2. To take action against enemy bunkers;

3. To provide support, including ground action, in critical areas of combat;

4. To provide protection, subject to restriction in area and time, for the formost installations of the ground service organization of the flying forces.

From this statement of missions alone it is obvious that the consolidation of the antiaircraft artillery forces in the form of motorized corps units was designed as a solution for the mission of air defense in Army zones of operations, and as a means to exploit the advantage of the armor piercing capabilities of the antiaircraft weapons in action against enemy tanks and fortification works, with main emphasis obviously on action against ground targets.

This concept of the use of Falk corps is even more clearly evident in the wording of the mission letter for the I Flak Corps, which was to participate in a frontal attack against the Maginot Line on either side of the Saar originally planned to open prior to 10 May 1940:

To protect the attacking Army units against high and low altitude air attack, and toprovide direct support in the attack through action to neutralize enemy defense position systems and bunkers.

In practise the execution of this mission required that the antiaircraft artillery units would have to move forward within the attacking Army units. This was precisely the form of operations which had already proved so exceptionally successful in Spain and in the Polish campaign in the speedy crushing of local resistance.

When the planned offensive was postponed, the mission assigned the I Flak Corps remained unchanged for the future.[212]

The two Falk corps were assigned directly to the Second and Third Air Fleets, which in turn assigned them at the opening of the campaign in the west to support Panzer Group* von Kleist and/or the Fourth and Sixth Armies, in whose zone the corps were committed.[213]

This withdrew a large percentage of the antiaircraft artillery forces which, according to the revised edition of Paragraph 121 of THE CONDUCT OF AIR OPERATIONS, normally would have come under control by the tactical air support commands attached to army and army group headquarters from such control.

The advantages of the new solution are clearly evident:

1. The danger of any dissipation of forces is avoided.

2. The possibility of developing power concentrations in the operational sense is created.

3. Optimum exploitation of the existing possibilities for action were insured most advantageously under the control of antiaircraft artillery command staffs.

4. The dual mission of action against air and ground targets presupposed that command personnel would also have Army experiemce. Most of the command personnel in the antiaircraft artillery came from the Army and thus had far more army experience than the air officers usually assigned to head the tactical air support commands attached to various army headquarters.

5. The Flak coprs headquarters were not locally tied to any superior headquarters, had an independently functioning organic signal communications system, and thus could maintain very close contact with the spearhead units of attacking forces. This insured that the antiaircraft artillery units would keep pace with the spearheading panzer units.

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213. Sources 132, 152.

After final establishment the two Flak corps were organized as follows, status as of December 1939:

HQ, I Flak Corps Commanding General General Weise

Chief of Staff Colonel Schwabedissen GSC

101st HQ AAA Regt Commanding Officer Colonel Hintz

1st Battalion, 12th AAA Regiment

1st " 22d " "

1st " 51st " "

85th Light AAA Battalion

3d (Searchlight) Battalion, Hermann Goering Regiment.

HQ, 102d AAA Regiment Commanding Officer Lieutenant Colonel von Hippel

1st Battalion, 18th AAA Regiment

1st " 38th " "

2d " 38th " "

91st Light AAA Battalion

HQ, 104th AAA Regiment Commanding Officer Colonel Buffa

1st Battalion, 8th AAA Regiment

1st " 11th " "

2d " 11th " "

75th Light AAA Battalion

3d (Searchlight) Battalion, 9th (Condor Legion) Regiment.

101st Air Signal Regiment, Commanding Officer Colonel Schuetzeck

1st Sup and Admin Staff, Commanding General Brigadier General von Mackensen

Air Liaison Squadron.

HQ, II Flak Corps Commanding General General Dessloch

Chief of Staff Colonel Neuffert, GSC

HQ, 201st ~~AAA~~ Regiment Commanding Officer Lieutenant Colonel Roemer

1st (Composite) Battalion, 6th AAA Regiment

2d " " 26th " "

1st " " 64th " "

73d Light AAA Battalion

3d (Searchlight) Battalion, 33d AAA Regiment

HQ, 103d ~~AAA~~ Regiment Commanding Officer Colonel von Axthelm

1st (Composite) Battalion, General Goering Regiment

1st " " 7th AAA Regiment

2d " " 43d " "

4th (Light) AAA Battalion, Herman Goering Regiment.

102d Air Signal Regiment Commanding Officer Lieutenant Colonel Saul

2d Sup and Admin Staff Commanding General Brigadier General Seldner

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Air Liaison Squadron (Fi-156 Storch planes).

In the winter of 1939-40 and up to the opening of the campaign in the west the majority of the units of the Flak corps were committed in Air Defense Zone West, where they were prepared for their special mission of action against air and ground targets through systematic training and firing exercises.

Shortly before the western campaign elements of the

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214. Sources 107, 181, 182.

201st and General Goering AAA regiments were used to form a special groupment designated AAA Group Aldinger (Flak-gruppe Aldinger) to provide artillery support for the air-borne operation against Fort Eben Emael, near Luettich, planned as the start of the offensive.

AAA Group Aldinger consisted of 3 heavy antiaircraft artillery batteries (1st Battery, 6th AAA Regiment, 7th Battery, 43d AAA Regiment (General Goering), and 3d Battery, 64th AAA Regiment) plus 2 platoons of light antiaircraft guns from the 2d Battalion, 26th AAA Regiment.

This measure reveals with particular emphasis the high opinion held of the effectiveness of antiaircraft artillery fire to secure success in action to reduce strongly fortified positions on the ground.[215]

ANTIAIRCRAFT ARTILLERY AIR DEFENSE OPERATIONS 1939-40

The air situation in the winter of 1939-40 and in the spring of 1940 up to the opening of the campaign in the West was such that the antiaircraft artillery forces of the Luftwaffe had little opportunity to prove their capabilities in defense of the homeland.

The only two serious air attacks by sizable bomber units, on 4 September and 18 December 1939, had been repelled with resounding success by fighter forces of the

of the Luftwaffe and antiaircraft artillery forces of the Navy.

No important experience could be gained as long as the western opponents confined their air activities to the dispatch of a reconnaissance plane to the coastal and near front areas every day or two.

However, attention apparently was given to the fact that the enemy carried out roughly one-third of his penetrations during the night.[216]

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215. Source 132.

216. Source 129.

This circumstance served to focus attention on the problems of antiaircraft artillery fire at night with the optical instruments available at the time to aim in finding a target.

As mentioned previously above, the Commander in Chief of the Luftwaffe in October 1939 had considered that no acute necessity existed to build up a night fighter arm and had given final orders that the fighter groups initially intended for night fighting missions were to remain with the daylight fighter forces. It was evidently thought that the use of searchlights to light up targets at night and the use of sound locators for aiming by sound would be adequate for defense against night attacks. Given weather conditions favorable for searchlight operations the risk involved could be accepted since the enemy bombers with their aiming devices based on the optical instruments then available also required equally favorable conditions of visibility to find their targets at night and attack it with aimed bombs.

The fact that the Luftwaffe nevertheless at an early stage initiated measures designed to replace optical aiming by radio locators which could provide reliable firing data for antiaircraft guns is a sign of wise and providential longsighted planning.

It has been related before in this study that the first model of a short range radio aircraft locator developed under a development contract awarded in 1937 was demonstrated before leading men of the German armed forces in August 1939, and that it operated on a 50-cm waveband, registered the distance and altitude of the located target, and had proved usable at ranges up to 15 miles.

This instrument was not assigned to the aircraft reporting services but in late 1939 was turned over to the antiaircraft artillery arm and installed in a battery position at Essen-Fintrop to test its usefulness in computing firing data for antiaircraft artillery units. Although it still lacked the most essential elements required by the antiaircraft artillery, since it still had no beam locator properties, the principles of the instrument proved highly useful. For the time being the lacking beam locator was replaced by a hand operated maximum locator. A three-man servicing team relayed the necessary altitude, lateral, and range data by meand of a microphon to a fire-control director.

The Commander in Chief of the Luftwaffe gave orders for the procurement of 5 000 of these instruments of an improved, smaller model and with locator beam equipment. The first instrument of this production series was deliver-

delivered in May 1940*almost on the same day on which the Royal Air Force dispatched a force of Wellington bombers in the first air strike against the Ruhr region in a night attack.

The Royal Air Force operated generally on the principle of area bombing rather than precision bombing and very soon started night attacks even in weather conditions which made defense difficult because of poor visibility. The adoption of radio instead of optical locating of targets by the anti-aircraft artillery was therefore to play a decisive role in air defense.[217]

At the beginning of the war the following tactical requirements had been stated for the antiaircraft artillery:

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217. Sources 22, 45, 112.

* This was the Wuerzburg radar.

1. The objective in antiaircraft artillery air defense operations is to shoot down enemy aircraft be-. fore they reach the bombing run zone, or at least interfere with the operations of the enemy force to such an extent as to make aimed bombing impossible.

2. As a basis it is assumed that the targets for antiaircraft artillery fire will be at altitudes of up to 16 500 feet and will travel at speeds of up to 110 yards per second or 220 miles per hour.during daylight and at night.

3. Efforts must be made to provide a triple overlap of antiaircraft fire, so that each enemy plane will be exposed to fire from three heavy batteries at least at any point over the target area.[218]

The only aircraft which had to be reckoned with as suitable for strategic bombing operations were the British Hampden and Wellington bombers, and their speed was far less than the stated assumed speed performance of attacking aircraft.[219]

With a total strength of 650 heavy batteriesat the end of 1939 the requirement of a triple overlap of defensive fire could be met in the case of more than 100 defense targets throughout Germany.

The accuracy of fire of the 88-mm guns against planes

218. Source 114. 219Source 133.

traveling at the speeds achievable at the time had been demonstrated in firing practice and in actual combat in Spain.

Although the air situation resulting from the air activities of Germany's western opponents in 1939 and 1940 up to the beginning of the campaign in the west had not as yet put Germany's air defenses to any real test, the Luftwaffe had no reasons to doubt that, under the given and

Photo

88-mm AAA gun (motorized) on the march

Photo

88-mm AA gun (motorized) being placed in position

Photo

88-mm AA gun in position ready for action

Photo

Range finder for heavy AAA

Photo

Light 20-mm AA gun in firing position

Photo

Range finder for light 20-mm AAA

2578

Photo

37-mm medium AA gun in firing position

257

Photo

AAA Sound Locator

Used to direct Searchlight beam and for

firing by sound

known circumstances of the times everything possible had been done in the field of antiaircraft artillery to insure successful defense against air attack during daylight and at night.[220]

AIRCRAFT REPORTING SERVICES IN 1939-40

The small air activities during the period from the outbreak of the war up to the spring of 1940 also did little to promote development of the aircraft reporting services, improve training standards in aircraft recognition, or test the functioning of the service as a whole and of the reporting organization in particular under conditions of actual war.

As previously mentioned, the chief problem was that of identifying friendly and enemy aircraft. To facilitate matters in this respect special measures were introduced at the beginning of the war to regulate friendly air traffic. These measures were published by the Commander in Chief of the Luftwaffe on 19 September 1939 under the title REGULATIONS FOR AIR TRAFFIC AND AIR DEFENSE (Bestimmungen ueber Flugbetrieb und Luftverteidigung) and contained the following instructions:[221]

I. Regulations for Air Traffic.

1. These regulations are intended for current and repeated instruction of all pertinent crews and

servicing personnel in the offensive and defensive air forces as well as for aircraft crews assigned to schools, supply installations, transport units, and courier squadrons, and of air traffic supervisory personnel.

2. The entire territory of Germany has been declared as closed to air traffic for all aircraft not in the services of the German Government or military forces. Special approval is required for air traffic of any sort.

3. Furthermore, to secure air traffic and facilitate air defense certain areas are also declared closed to aircraft of the German Government and military forces, and specific approach and departure lanes have been prescribed for certain airfields.

4. In the case of military closed air traffic areas, which are ordered by the Commander in Chief of the Luftwaffe, there are two types of areas

a. areas in which a warning will precede weapons fire to inforce these regulations,

b. areas in which fire may be opened without warning.

In exceptional circumstances the appropriate air district commands may permit aircraft to cross such closed areas.

5. Military and Government aircraft are ordered, as far as their current mission permits,

a. to bypass areas protected by antiaircraft artillery, and military firing ranges and training grounds;

b. when flying by ground orientation to maintain a minimum altitude between 660 and 1 600 feet;

c. to burn position lights at night;

d. to detour warships as widely as possible, since naval ships when at sea open fire on principle without prior warning.

6. For instruction by schools of the Luftwaffe and for training flights the use of the following areas is authorized:

German territory east of a line extending from Luebeck-Lueneburg-Hannover-Kassel-Wuerzburg-Noerdlingen-Immenstadt, including occupied Poland to a line extending from Mlava-Lodz-Maehrisch Ostrau.

7. For civil aviation activities (testing grounds, National Socialist Aviation Corps, commercial aviation, regular air lines) use of the following areas is authorized:

Eastern boundary: Lebasee-Rummelsburg-Deutsch Krone-Landsberg-Reppen-Liegnitz-Maehrisch Ostrau-Vienna-Wiener Neustadt-Graz-railroad from Marburg to the German border;

Western boundary: Stade-western outskirts of

Bremen-Weser River up to Verden-Korbach/Waldeck-Fulda-Wuerzburg-Noerdlingen-Memmingen-Sigmaringen-Constance.

Night aviation is prohibited throughout German territories. Exceptions will be handled by the air district commands.

Test and acceptance flights will be restricted to specified "air base zones."

II. Regulations for Air Defense.

1. Antiaircraft Artillery.

a. Within Army zones of operations and within the zone of interior immediate fire is authorized against all targets identified as enemy aircraft.

Warning fire will be delivered against all aircraft which might be hostile over closed areas. If the plane does not leave the area immediatelyit will be taken under effective fire without further warning.

b. In areas in which effective fire is prescribed without warning, fire for effect will be opened against all aircraft not clearly identifiable as German. Warning shots will be fired against aircraft identified as German.

c. Aircraft with position lights at night will be lit up by searchlights.

2. Fighter Forces. In the execution of combat missions fighter pilots are not restricted to any specific route or altitude.

The crossing of closed areas by fighter units on missions is arranged by special regulations for the coordinated action of fighter and antiaircraft artillery forces.

Special arrangements will also be made for coordinated action between fighters and antiaircraft guns mounted on warships within military closed areas and naval fortifications areas.

Section III establishes the air traffic closed areas with and without warning fire, and special lanes of approach

and departure to the air district command areas.

The areas in which effective fire was not to be delivered without warning were as follows:

Within zone of Air District Command XI:	1. Western outskirts of Wesermuende-Jade (city)-Langerooge.
	2. A radius of 9 miles from the center of Kiel
	3. A radius of 12 miles from the center of Hamburg.
	4. A radius of 6 miles from the locks at Brunsbuettelkoog.
Within zone of Air District Command VI:	Within a boundary extending from Wesel-Hamm-Bonn-Muenchen Gladbach.
Within zone of Air District Commands XII, VII, and XIII:	Daily from one hour after sunset to sunrise the areas west of a line extending from Kassel-Coburg-Bad Aibling.

This regulation of air traffic over German territory insured that in all areas open to threat by western air forces with their current penetration ranges traffic by German aircraft was strongly reduced and that air traffic over closed air traffic areas would be restricted to fighter aircraft on current missions.

Furthermore, all flights outside of the areas authorized for aviation training had to be reported in advance.

The local air police or other air traffic control authorities were required to report each flight 30 minutes

before take off, stating the type of aircraft, take-off time, route and altitude, to the next air observation post. At these posts special air situation maps were maintained showing the movements of friendly aircraft.

The air observers themselves were not informed but were encouraged to report every aircraft seen or heard.

At the air observation post it was decided after an examination of the Air Situation Map of Friendly Aircraft Movements whether the aircraft so reported was to be reported to the center as hostile.

This basic regulation appeared the best arrangement to insure constant alertness on the part of air observers and to train them in the recognition of aircraft by sight and sound. Many difficulties were encountered in this field, a few of which now follow:

a. Weather conditions and technical failures frequently delayed intended and reported departures, and the reports on the changed time of take off arrived too late and caused confusion;

b. Weather conditions or faulty orientation frequently resulted in a plane leaving its reported course;

c. Aircraft landed at fields other than their reported destination due to causes such as inadequate fuel, weather conditions, faulty orientation, or change of

mind while en route;

d. If the route crossed the areas of a number of air observation posts the flight report had to be transmitted to each of them. Transmission of the report frequently took up more time than the flight itself;

e. Position posting was difficult in the case of friendly aircraft because their actual speed under the influences of wind and the route taken was an unknown factor and could onlt be estimated.

Owing to the quick activation of numerous new units after the outbreak of war, the training activities and flights carried out by front linesunits increased considerably. For this reason it was impossible to avoid the occasional case of a hostile reconnaissance plane entering the western areas being only incompletely tracked in the areas of friendly air traffic although it had been spotted while crossing the border.[222]

Apart from the measures to retrict the number of aircraft in operation, efforts were also made to solve the problem of aircraft identification through appropriate training.

As previously related above, the large number of various friendly and enemy aircraft types in existence had given rise to the idea of producing miniature models of the more important military types of aircraft as visual aids in

22. Source 3.

the training of aircraft spotting personnel.

The set of thirty miniature models of German, French and British aircraft delivered in December 1939 was approved and orders were issued to introduce these models.

A series of training courses was initiated in 1940 to which each motorized aircraft reporting company and each aircraft reporting reserve company was to detach four officers as well as 4 noncommissioned officers considered suitable as auxiliary instructors. In these courses instruction was given on the subject of aircraft identification, the previously referred to Aircraft Identification Volume and the miniature aircraft models being used as visual aids.

The personnel thus trained commenced giving instructions within their companies in February 1940, by which time the first deliveries of the miniature models had arrived. On 1 April 1940 a special Aircraft Reporting Service Training Regiment was established with the mission of centralized training for air observer teams in the subject of aircraft identification. This training was given in continuing courses.

Another step taken to improve identification techniques was the issue of blueprints for the construction of aircraft models with a scale of 1:50 to the air observers, who were then required to themselves construct models

of the various types of aircraft. This method proved particularly effective, since the construction required close attention to the details of each type, and since personnel usually handled the models they themselves had constructed more carefully than those issued to them.

Finally, atantion was devoted to the practicability of the required installations, parti ularly the observer post structures. Here it was found that, in order to obtain good listening results the air within the structure must be so still, even during heavy winds, that a match could burn.

Similarly to the Air Signal Corps, the antiaircraft artillery also took steps to improve aircraft identification. Training in this subject was given to antiaircraft personnel in the antiaircraft artillery schools. Close contact was maintained between the Air Signal Corps and the antiaircraft artillery in this field and all experience on the subject was exchanged. 223

On the whole it can be said that the full import of the problems of aircraft reporting **was** clearly recognized and that everything possible was doen to improve and raise the standards of the service.

As has been pointed out the air situation in the west from the outbreak of the war to the spring of 1940 was such that it placed no severe strain on the aircraft reporting

services and could not reveal any defects in the system or weak points in its functioning. The Luftwaffe Command therefore had good cause to assume that the aircraft reporting services, as part of the entire home air defense system, would also be able to meet all requirements when the time came.

The motorized aircraft reporting companies of the Air Signal Corps must be considered a separate subject in the field of aircraft reporting.

As preveiously said, these units were organized from regular personnel of the Air Signal Corps, were fully motorized, and, if German forces moved into enemy territory, were to extend the aircraft reporting network right up to the front lines.

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223. Source 7.

Plans provided for each air district signal battalion to have a motorized aircraft reporting company as its 4th Company, but this target was only reached in the spring of 1940.

At mobilization a II Air District Signal Battalion was activated in each air district command. The 5th Company in each of these battalions was a motorized aircraft reporting company.

By the spring of 1940 10 air district commands thus had 20 motorized aircraft reporting companies ready for operations.[224]

In the new field of radio locating it has been mentioned previously that the Wuerzburg A radar, an instrument for locating aircraft at short distances and originally developed for the aircraft reporting services, had been turned over to the antiaircraft artillery arm.

Since the end of 1938 the Air Signal Corps had one Freya radar instrument, of the same type as those supplied and installed on the North Sea islands, to the Navy, in its supply and training regiment at Koethen.

At the beginning of the war this instrument happened to be in the workshops of the manufacturing firm of GEMA, for r repairs to its mounting. On 20 September it was

224. Source 7.

installed on a 16-foot tower at Ploetzin, west of Berlin. One month later, by 20 October 1939, the Air Signal Corps had three Freya radar instruments in operation, one at Trier (Welschbelling), and two on the island of Wangeroog, one of the latter having been transferred from Ploetzin.

On 16 December 1939 the Air Signal Corps received a fourth Freya radar instrument, which was installed on Hauberg mountain near Landstuhl in the Palatinate and assigned to the 6th (Motorized Aircraft Reporting) Company of the 12th Air Signal Regiment.

Another three instruments received on 1 January 1940 were installed, one each, on Kandel Mountain in the Black Forest, north of Freiburg, on Heinsberg Hill, north of Aachen, and in the Reichswald Forest at Kleve.

In February another Freya instrument was installed at Vilsum and a month later another was installed at Stadtkyll in the northern Eifel (Schneeeifel) mountains. At the same time a second instrument was placed together with the first one installed there in the position at Landstuhl in the Palatinate, being taken from Kandel Mountain for

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the purpose.

Altogether the Luftwaffe thus had 9 Freya radar instruments in operation in the West by the spring of 1940, all of them allocated to the aircraft reporting services.

These instruments could cover the following areas in a depth of approximately 60 to 72 miles:

1. From Wangeroog the coastal areas of the Bight of Helligoland.

2. The Kleve/Rhineland area, being the outpost area forward from the Ruhr region in the north.

3. The Aachen area, being the forward outpose area south of the Ruhr region.

4. The northern Eifel mountains (Stadtkyll), being the outpost area forward of the northern sector of the middle reaches of the Rhine River.

5. The Landstuhl area, being the outpost area of the southern reaches of the Rhine, and the Frankfurt and Mannheim industiral regions.

A gap existed between areas 1 and 2, above, in the vicinity of the Dutch border east of Groningen to east of Zwolle. In all other areas the zones of possible radar observation overlapped.

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225. Source 7.

For the time being the gap which existed in the radar chain was no cause for serious concern since it was not to be expected that the Western Allies would infringe Dutch neutrality too lightly.

The salient features in the aircraft reporting services as they developed from the outbreak of war to the spring of 1940 are thus as follows:

1. The organization and the standards of performance based on visual and oral observation were improved by means of purposeful measures and methods of training.

2. The activation of motorized aircraft reporting companies organic to the Air Signal Corps insured mobile operations and reporting channels independent of wire communications.

3. The number of radar instruments serving to keep under observation the outpost areas of the main western air defense areas was increased. These areas were the Bight of Helligoland, the Ruhr region and the regions along the middle reaches of the Rhine River. The network thus established could be considered adequate for entire frontage in the West. Although this new system of mechanical observation was still in the process of development and only in the initial stages of practical experience, it could be assumed from events

in the Bight of Helligoland on 18 December 1939 that no hostile bomber force could penetrate into Germany without being detected by the radar instruments in service.

The big advantage of the new system was that, with instruments stationed near the frontiers it was possible to extend observation much farther into enemy territory than could ever be done by means of vision and hearing alone.

STAGES OF ALERT FOR FIGHTER UNITS IN 1940

To insure that fighter units would be ready for defensive action immediately on call, a generally valid system of stages of alert had to be established.

Initially three stages were carried over from peacetime pratices: "Rest," "Take Off Alert," and "Sitting Alert".

In the "Rest" stage units had to be ready to take off within two hours; in the "Take-Off" stage within five minutes; in the "Sitting Alert" within one minute. 226

In an order by the Commander in Chief of the Luftwaffe dated 15 February 1940 a new alert system was established. The order contained the following requirements:

1. Alert duties must be carried out just as conscientiously as guard duties.

2. It is necessary to differentiate between the following stages:

Take-off alert	Alert stage 1
Stand-by alert	" " 2
General alert	" " 3
Rest.	

3. Units under Alert Stage 1 and 2 have the mission of action against reported enemy penetrations.

Units under Alert Stage 3 must be ready to take the place of Alert Stage 1 and 2 within two hours.

4. Under Alert Stage 1 unit personnel will do nothing but maintain readiness for an immediate take-off. All other activities will cease.

Under Alert Stage 2 unit personnel may continue training and, to a limited extent, servicing activities, or may rest.

Under the Rest Stage units are not intended for immediate commitment. Neither in point of strength nor of time may they be counted on for action.

5. In accordance with the current air situation and weather conditions the command responsible for air defense will order from case to case the size of the units to be held under the various stages of alert.

6. Units under Alert Stage 1 must be ready to take off within three minutes, units under Alert Stage 2 within fifteen minutes.[227]

AIR DEFENSE SITUATION IN SPRING 1940

In an overall review of the air defense situation for Germany in the spring of 1940 the following can be established:

1. In Germany's rear, in the East, no threat existed after the occupation of Poland and in view of the pact with the Soviet Union and the insignificant

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227. Source 151

air power of the still neutral Balkan States.

2. The possibility of a threat from the South, from Italy, could be discounted because of the very friendly relations between Mussolini and Hitler.

3. Switzerland was traditionally neutral and could be counted on to remain so.

4. From Skandinavia there was still a gap through Norway and Denmark which the Western Powers under given circumstances might use as an approach route.

However, in view of the armament status of France and Britain compared with German strengths on the ground, at sea, and in the air, this possibility could not be considered as an acute threat.

5. The fighter and antiaircraft defense in Germany had been built up in such strength and equipped with such modern weapons that a considerable potential of advantage existed over the offensive air forces of Germany's western opponents.

6. A soundly organized and modernly equipped aircraft reporting servive insured that the air defense system would function smoothly and in time when required.

7. The Westwall and Air Defense Zone West represented a strong shield preventing the western enemy

from taking the initiative in any possible form.

From the viewpoint of this appraisal of the military situation it is selfunderstood that any logical planning for the continued conduct of the war must provide for the removal of the only flank threat still existing, north of Germany, before the territories involved were seized by the enemy.

OPERATIONS AGAINST DENMARK AND NORWAY

Military operations to occupy Denmark and Norway commenced on 9 April 1940 with support from Luftwaffe units under the X Air Corps.

For this purpose the X Air Corps was assigned 10 bomber groups, 1 dive-bomber group, 1 coastal patrol group, and 2 twin-engine fighter groups (the 1st Group each of the 76th and 1st Wings), plus 1 fighter group

and 14 air transport groups.

The missions assigned the air corps were

1. To seize all important military bases through a large-scale air operation;

2. To attack the British North Sea Fleet and prevent any sizable enemy attempts to land troops in Skandinavia.

3. To support and supply the ground and naval forces committed in the operation.

The resistance offered by the insignificant air forces available to Denmark and Norway could be counted as negligible. Because of the weak position of the British in point of air armament and because of the long distance from British air bases, the Royal Air Force at this juncture was also unable to interfere seriously with the German air operations involved. 228

This explains the fact that the defensive air forces, in the form of twin-engine fighters and fighter units, assigned to provide air protection during the operation were so weak. Their initial mission was to protect the bomber forces which would operate from airfields seized swiftly in Denmark and Norway. After first moving forward to Danish airfields at Esbjerg, Kopenhagen-Kastrup, and Aalborg the 2d Group, 77th Fighter

Wing and the 1st Group, 76th Twin-Engine Fighter Wing provided cover for the paratroopers and air-carried infantry landing on the airfields in southern Norway in the Oslo-Forneby region (with air cover from the twin-engine fighter group) and on airfields at Kristiansand (with air cover from the fighter group), and then proceeded to land on the newly captured airfields as soon these were cleared and occupied by the airborne troops.

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228. Source 130.

This again is a classical example of the offensive solution for a defensive mission in a strategic operation and undoubtedly served to support the conviction that any undertaking simply must succeed under the protection of fighters and twin-engine fighters, since these with their enormous fire power could neutralize all resistance both in the air and on the ground.[229]

From the antiaircraft artillery arm of the Luftwaffe four composite battalions were attached to the Army forces in the operations to occupy Denmark and Norway. These included also a composite battalion and a motorized infantry battalion attached by the Luftwaffe to the Army forces from the General Goering Regiment, committed specifically under the X Air Corps to protect forward airfields in Denmark. Since practically no resistance was encountered by the German forces, the antiaircraft artillery units found no opportunity to distinguish themselves in action, and immediately after the military operations were relieved by reserve and naval antiaircraft battalions and returned to the zone of interior.

A "Special Air District Command" (Feldluftgau) was established in Oslo for Norway, and was assigned the mission of air defense in south and western Norway.[230]

Besides 4-5 antiaircraft artillery battalions, the

Special Air District Command had available for this purpose the 2d Group, 77th Fighter Wing stationed on tactical airfields at Kristiansand and Stavanger. The two twin-engine groups were returned to the zone of interior.

The 1st Squadron, 186th Fighter Wing was stationed temporarily at Drontheim. In April 1940, after elements of the 2d Group, 77th Fighter Wing stationed themselves at Drontheim instead of the 1st Group, 76th Twin-Engine Fighter Wing, the squadron displaced to the 2d Group, 186th Fighter Wing at Aalborg after a brief stopover at Kristiansand.[231]

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229. Sources 95, 130. 230. Source 135.

231. Sources 136, 137.

PREPARATIONS FOR THE OFFENSIVE IN THE WEST

Although the battle for Narvik was still in progress the German Joint Command (Wehrmachtfuehrung) turned its attention to the strategic objectives in the West with remarkable alacrity. Within a few weeks the Luftwaffe units were reorganized and distributed in accordance with plans for the campaign against France.

In view of past experience and because of the lack of adequate forces, there seemed only one way to achieve success. This was the unconditional commitment of all fighter and twin-engine fighter forces, plus the antiaircraft artillery in the two Flak corps, in operational action, leaving home air defense to the rest of the available antiaircraft forces.

All twin-engine fighter units, without exception, were assigned to the air corps for exclusive use in escort missions protecting bomber units.

The fighter units were consolidated under Fighter Commands 2 and 3 of the Second and Third Air Fleets, respectively, and had the dual mission of air defense within the zones of operations of the Army and of providing escorts for bomber, dive-bombers, and airborne forces within their range capabilities.

The motorized aircraft reporting companies were

so stationed that they could follow immediately behind the spearheading forces of the Army and transmit information by radio to their own reporting centers, which in turn were connected with the nearest air observation post in the zone of interior.

This reveals the basic intention to move the protective belt of mobile air defense forces, the fighter and motorized antiaircraft artillery units, as far forward from German territory into enemy terrain as possible.

THE BUILD UP OF FIGHTER AND ANTIAIRCRAFT ARTILLERY FORCES IN 1939-40

In an examination to determine the basic views and basic planning for air defense it is also very revealing to consider the current and planned production of weapons of active air defense and to deduce from the figures arrived at compared with the figures for offensive weapons in air warfare the repercussions of the one on the other.

1. Fighters. No detailed records are available at writing on 1939 plans for production in 1940, but a very reliable picture can be reconstructed from figures on the actual monthly output achieved.

In 1939 449 Bf-109 aircraft were manufactured in the September to December period, equal to an average

monthly output of 112. The overall output in 1940 amounted to 1 693, or a monthly average of 141, and in 1941 to 2764 Bf-109 plus 228 Fw-190 making a total of 2 992 or a monthly average of 249 aircraft.[232]

It can therefore be assumed that plans after the outbreak of war provided for an average output of 150 fighters monthly in 1940 and of 250 monthly in 1941. These figures can be considered reliable in view of the fact that in September 1941 the Luftwaffe General Staff planned for a monthly output of only 360 fighters, and in its computations undoubtedly included increased requirements for the campaign against the Soviet Union.[233]

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232. Source 138.

233. Source 139.

The output of bomber aircraft was as follows:

Aircraft Type	Sep-Dec 1939	1940	1941
Ju-88	69	2208	2780
He-111	452	756	950
Do-17	231	275	-
Do-217	1	20	277
Ju-87	134	603	500
Totals	887	3862	4507
Average per month	222	322	375

The entire output in Bf-110 twin-engine aircraft up to July 1940 was allocated to the offensive branch of the Luftwaffe. The average monthly output during this time was:

September-December 1939 39 Bf-110 planes

1 January-1 July 1940 79 " "

From July to October 1940 the entire output in Bf-110 planes, minus enough to equip 4 groups, was allocated to the night fighter arm, meaning that roughly 60 percent went to the defensive air forces.

A comparison of the aircraft manufactured for the offensive and for the defensive air arms produces the following picture:

Period	OFFENSIVE Bombers & Twin-Engine Fighters	DEFENSIVE Fighters	DEFENSIVE Night Fighters
Sep-Dec 1939	261	112	-
1 Jan-1 Jul 1940	349	139	-
1 Jul-31 Dec 1940	351	143	59
1941	403	249	35

It is necessary to emphasize here that the above are actual production figures. They are not identical with the figures for monthly deliveries to the field units, in the computation of which the following factors must be taken into account:

a. Deliveries to other users, such as tactical and strategic reconnaissance units, ground-support units, and schools;

b. Rehabilitated aircraft from repair shops;

c. Aircraft not accepted because of defects detected prior to delivery to the Luftwaffe.

A comparison of the figures on bombers and twin-engine fighters produced for the offensive branch with those on normal and twin-engine fighters for the defensive branch reveals that up to 1942 emphasis was still clearly on the offensive air forces.[233a]

233a. Source 138.