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Appendix 3

(To Page 32)

Copy

Teletype Message
6 December 1943
- Kr Asien 0818/12 2110=

To: The Secretary of State for Air ans Inspector General of the Luftwaffe, Generalfeldmarschall Milch, Reich's Air Ministry = Top Secret Military Document —

The Fuehrer pointed out again the importance of the accelerated production of the Me 262 and Ar 234 in the following teletype message:

Kr of 5 December 1943, 16:35 hours: The Fuehrer mentioned again the immense importance of the production of jet-propelled aircraft for employment as fighter-bombers. By all means, the Luftwaffe must succeed in employing operationally at the front a number of jet-propelled fighter-bomber aircraft during the spring of 1944. The Luftwaffe and the air armament industry must, by making use of their own resources, overcome all difficulties resulting from shortage of personnel and material to accomplish this most important task until new forces can be made available. Any delay in the jet aircraft production program would indicate an irresponsible inability to face reality. - The Fuehrer directed that, beginning on 15 December 1943, a short written report on the progress made in the production of the Me 262 and Ar 234 aircraft be submitted to him every two weeks. -

Wehrmacht Aide of the Fuehrer, Operations Officer, von Below, Lieutenant Colonel, Registered under 650/43 Top Secret Military Document.

In addition, the Reichsmarschall requests the following reports:

1.) An instantaneous report on the progress achieved so far in the production as well as on the measures ordered immediately to overcome the difficulties encountered.

2.) The submission of a teletype deadline report on the progress made in the production of the Me 262 and ~~234~~ Ar 234 aircraft for further submission to the Fuehrer on the 12th and 27th day of each months.

Office of the Aide of the Reichsmarschall, Registered under 2536/43 Top Secret Military Document of 6 December 1943.

Appendix 4

(To Page 60)

Copy

The Development of the German Twin-Engine Fighter Aircraft

(The Types Me 110 - Me 210 - Me 410)

In connection with the concept of the strategic employment of the bomber arm, the then Chief of the General Staff, ~~Generaloberst~~ Wever, logically and farsightedly enforced, in 1935, the demand for a strategic fighter aircraft with a cruising range of 2 000 kilometers. The result of his endeavors was the aircraft Type Me 110.

The concept of a long-range fighter aircraft for escort purposes and for operations to gain air supremacy was as right as the technical solution of this problem was bad.

When the Me 110 appeared its flying performance was so bad that this aircraft was inferior to any other modern fighter aircraft. The intended installation of the Jumo-engine no longer justified the large-scale serial production of this aircraft. The new Type DB 601 engine brought about a satisfactory speed performance. The cruising range, however, was considerably reduced to approximately 1 100 kilometers owing to the greater fuel consumption so that the penetration achieved by the Me 110 C did not amount to more than 450 kilometers. The demand raised by Goering in 1938 that a heavy fighter aircraft should be developed which was to be able to cover all of England was not fulfilled by this type of aircraft.

The performance of the Me 110 was not adequate to meet the requirements of the tactical air warfare in 1938. The new demand called for a twin-engine fighter aircraft with a cruising range of 2 500 kilometers which corresponds to a penetration performance of 1 000 kilometers and, in addition, a fuel consumption for open-throttle flight of 30 minutes for combat ~~xxxx~~ at the target.

The ability to carry a bomb of a minimum weight of 500 kilograms was a further objective of the development.

The Messerschmitt plants developed the Me 210 which was to fly as early as in the year of 1939. The flying performance and speed of this type was to be superior to such an extent that it promised to replace the Ju 88 as long-range dive-bomber aircraft. However, the Me 210 was not ready for serial production by the beginning of the war, as it had been hoped, but appeared as a test model for the first time in 1941.

Milch reproached Professor Messerschmitt. The promises regarding the performance of the Me 210 and its most rapid delivery for employment which were not kept placed the German Luftwaffe Command in a precarious situation.

The German Luftwaffe Command had counted on the appearance of Me 210 in due time. Now, old types of aircraft used at flying schools had to be taken instead of the Me 210 and the crews had to be committed with these aircraft which were absolutely obsolete. The losses thereby caused were considerable.

As early as shortly after the beginning of the war the Me 110 proved to be unequal to the tasks assigned to it. The escort missions flown against England in 1940/41 proved with drastic clearness the unsuitability of the Me-110 twin-engine fighter units for operations against enemy forces which were still numerically inferior but technically extremely well equipped. When the "Battle of Britain" reached its climax these units had to be withdrawn from commitment owing to their losses which were no longer bearable.

Some of the Me 110 aircraft were employed as night fighters, others were used for coast defense purposes outside the range of the British fighter forces. The rest of them was employed as fast bombers or ground-attack aircraft.

The twin-engine fighter arm which Goering called his "Elite Guard" did not prove to be a valuable force. The completely failure of this arm was not uncovered immediately upon the outbreak of the war since during the so-called "Blitz Campaigns" no enemy forces of equal quality were encountered.

The Me 210 which was to replace the Me 110 was presented as a test model by skilled test pilots in an air show in 1941 in the presence of Hitler and Goering. The aircraft showed a good performance in respect to climbing ability, speed, and maneuverability. The Me 210 seemed to be the very aircraft which far exceeded all hopes.

After in addition, Goering's adviser, the later Generalmajor Storp, had confirmed in a report that this aircraft would be suitable for employment as fast bomber, the Me 210 was put to serial production at once without further testing with the air units.

From July 1941 up, to the end of the year a total of 92 aircraft were built of which 43 were immediately accepted by the Luftwaffe for operational employment at the front.

During the operational employment this aircraft turned out to be so defective that, after another report submitted by the then Major Storp who was mentioned previously in the text, the then Chief of the General Staff, Jeschonnek, declared the following on 6 March 1942:

"The crews cannot be expected to fly the Me 210 in its present construction. This aircraft is very liable to flat-spin for reasons unknown to us. The installation of the engines, in addition, involves great difficulties. It happened twice that engines broke out of their casings in the air. The overturning of the aircraft caused the death of the crews. It is extremely questionable whether we can still count on the Me 210 for operational employment. This aircraft is not suitable for the purpose intended."

As a result of this statement Milch told the firm Messerschmitt that

"the testing could not be terminated before the end of May and that, even if everything were clear at the present time, the first aircraft could not be completed before 1 October 1942. He was sure that the Me 210 could not be available in adequate numbers by 15 September 1942. The Me 210 was to be taken into consideration only for employment in the East; the employment of this aircraft in the West and in Africa was not planned. For this reason, he ordered to continue the construction work only on these 16 aircraft. All the other work should be discontinued. Instead, more Type Me 109 fighter aircraft could be built. Manpower thereby released was employed for the construction of the Me 110 twin-engin e fighter and the Me 323 and Go 244 transport aircraft. An order of the Reichsmarschall for the scrapping of the aircraft existed, though."

(Literal excerpt from the shorthand notes of the protocol of a conference of Milch with the president of the board of directors of the Messerschmitt firm on 28 April 1942)!

At this date, the following aircraft of this type were completed: 300 aircraft (including test models)

Material was prepared for 800 aircraft

The total was 1100 aircraft

By lenghtening the fuselage, changing the tail unit, and by installing slots the flying performance of the Me 210 aircraft was to be improved.

After having discussed this question with General Jeschonnek, Goering decided on 9 May 1942 that the Me 210 was to be tested by an experimental squadron. Its suitability for the following employments was to be tested:

1. In particular, its suitability for use as fast bomber (fighter-bomber).
2. Its suitability for employment as night fighter.

The Me 210 did not seem to be suitable for employment as twin-engine fighter aircraft since its speed exceeded that of the Me 110 only by 20 to 30 kilometers.

The office of the Chief of the General Staff released the following statement on 22 May 1942:

1. The employment against the Island of Britain, in particular against objectives which are to be destroyed, will be ruled out.
2. The employment in the East or in sectors of the front far remote from the home base during mobile warfare is not considered advisable since the question of the readiness of these aircraft for action is still open.
3. The employment in night and bad weather fighter operations is desired and important in view of the total defense situation and of the reinforcement of the night fighter defenses which will certainly be necessary in 1943. For this purpose, the result of the tests should be submitted by the XII Air Corps as soon as possible.
4. To create a solid basis for the experimentation regarding the construction programm and the production which is to begin at the G.L./A*now, the intentions of the Chief of the General Staff are clearly defined as follows:

   a) The intention to organize a Me 210 squadron for commitment against water-borne targets in the Channel

.....

Note: * G.L./A :

and at the coast of East and South England within the framework of a fighter-bomber group is upheld. According to a verbal agreement between the Secretary of State/Inspector General of the Luftwaffe and the Chief of the General Staff the aircraft required for such units are to be made available as soon as possible.

b) .....The bomb equipment is to consist of 2 x 250 or 2 x 500-kilogram bombs for diving, gliding, and low-level attacks. Therefore, the bomb suspension devices for 8 x 50-kilogram bombs will for the time being, not be required in addition to number of such devices already manufactured.

Armament: Remains the same. It must be made sure that the armament functions safely during operational commitment.....

However, the Me 210 could not be used as night fighter aircraft either.

This aircraft type upon which the Luftwaffe Command had placed such great hopes was now produced only in small numbers for employment as twin-engine fighter aircraft in Russia.

The Me 210 production (aircraft delivered to the forces) amounted to:

1941	92 aircraft
1942	93 aircraft
1943	89 aircraft
1944	74 aircraft
Total	348 aircraft

The German Luftwaffe Command had put the Me 210 to large-scale serial production when this aircraft was not yet ready for such production . The defects of the tail unit were not yet eliminated which resulted in the dangerous flat-spinning of the aircraft.

The Me 210 aircraft manufactured now and in the following years were employed in the East as twin-engine fighter aircraft, in particular as ground-attack aircraft. The necessary armor protec- caused further difficulties during the commitment.

List of Appendixes

Appendix 1
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Copy

Teletype Message:

Teletype Station: G-Rob.
01673/Bd
25 October 1940

+ Kr.-GLFZ No. 0163 24/10 2325 =

To: Commander in Chief of the Luftwaffe, Chief of the General Staff, Robinson
Signal Office =

Top Military Document ---

As a summary of the oftern verbally discussed possibilities for the attrition raids against London, I establish the following guiding principles for the light bomber forces (fighter bombers):

1.) The light bomber forces, too, must be employed to produce current nuisance effect. This necessitates current changes in the strengths of the offense units and in the time schedules for these operations.

2.) During the present weather period it will become less frequent that good weather conditions lasting several hours on both sides of the Channel facilitate the conduct of such operations. For this reason, also the light bomber forces must be flexible in respect to the methods they employ during their operations. It is of minor importance that, in such weather conditions, one or several wings attack London at the same time. The point is that bombs are dropped on London over a period of time as long as possible. Whenever difficulties are encountered due to weather conditions while the forces assemble, the strength of the forces committed will be reduced as far as necessary to make it possible to overcome such difficulties.

The commitment of single flights, squadrons, and groups is always possible in the form of a surprise attack.

3.) In the course of the past weeks the light bomber forces have achieved an extraordinary cleverness in flying above the clouds.

skill
I expressly appreciate this xxxxxxxxx and xxxx exhort these forces

to make full use of it in particular in these attrition operations. The flight should not be discintinued because of a cloud bank right behind the Channel coast when xxxxxx cloud breaks or cloudless weather exists over London and its surroundings. Necessary information on the weather conditions in respect to air operations xxxxxx which are based on reports of weather reconnaissance aircraft and offense bomber units will be currently forwarded to the fighter forces. I order the commanding officers of the fighter forces to make full use of all radio direction finding equipment available to insure that the aircraft will find their way back to their home bases or to the Channel coast in bad weather conditions.

4.) I request that all crews be newly instructed on the importance of this air war of attrition. Any relaxation of the intensity of these operations at the wrong moment may exclude the achievement of xxx a rapid military success and thus make useless all the sacrifices offered so far.

The aggressiveness of the German fighter pilot will be demonstrated also during the bomber operations conducted unrelentingly.

5.) During the next days to come an order of the Commander in Chief of the Luftwaffe will be issued in which the deserved tribute will be paid to the bomber operations.

Cesar 2 - Operations Branch , Operations Officer, registered under No. 415/40 Top Secret Military Document !

Appendix 2

(To Page 23)

Copy

The Chief
of the Luftwaffe General Staff
No. 03720/42 Top Secret Military
Document

Headquarters, 28 October 1942

To: Generalfeldmarschall Milch
Reich's Air Ministry

..... The Fuehrer attaches decisive importance to the rapid formation of a number of fighter-bomber units and fast bomber units. The aircraft taken into consideration by the Fuehrer are the bomb-carrying FW 190, the bomb-carrying FW 191 with an improved penetration capacity, the type Me 410, and the improved models developed from it.

The Fuehrer made it harshly clear that, at present, he only demanded that the fighter-bomber or the fast bomber forces could, flying at top speed, release bombs on British territory without sustaining unacceptable losses. All improvements in respect to armament, navigational equipment, and bomb loading capacity should be neglected or ruled out completely in favor of a rapid output of these aircraft if they would entail any reduction of the flying speed.

.....

Jeschonnek

Reply of the Secretary of State for Air, Generalfeldmarschall Milch, to Generaloberst Jeschonnek:

Copy

The Secretary of State for Air and Inspector General of the Luftwaffe

Berlin, 11 November 1942

Subject: Chief of the General Staff, No. 03720/42 Top Secret Military Document of 28 October 1942

To: Generaloberst Jeschonnek

1. .....

2. The Fighter-Bomber

100 to 120 aircraft of the fighter-bomber (normal equipment) can be operationally employed still this year.

According to a promise of Focke - Wulf, 80 aircraft of the long-range fighter bomber type will be delivered for employment still this year.

The long-range fighter bomber will be equipped with balloon cable cutter, Type "Moewe" (sea gull) radio direction finding set (Radio set 16 Z), as well as with automatic flight control from the spring of 1943 on. This special equipment will not have any delaying effect on the output of the aircraft.

3. .....

In a speech on 13 September 1942 Goering commented on the development of the Me 210 as follows:

" The Me 210 is an aircraft which caused me to order that the following inscription be engraved on my gravestone: He would have lived longer had not the Me 210 been constructed".

* * * * * *

The Development of the Me 410

The Me 410 was developed by some changes of the old type Me 210 to manufacture a useful aircraft out of the material already cut for this type of aircraft. The Me 410 was to be used as twin-engine fighter and fast bomber aircraft. The then General of the Fighter Forces, Galland, showed a great interest in this aircraft and termed the blue-print an excellent fighter aircraft.

The first completed aircraft were tested in 1943. These tests revealed that the Me 410 had almost the same defects as the Me 210 and that this type did not show the altitude performance required for a fighter aircraft (9 kilometers at night and 10,5 kilometers in daytime.)

Milch tried to dissipate the misgivings and to persuade Galland to accept this aircraft. In this endeavor, he told Galland in August 1943:

" You know that the Me 410 has never been my favorite, but what I found was something that we cannot give up. (He meant the construction of the Me 210 which had been developed under his predecessor Udet). We experienced the same with the He 177 in another sector, but A great capacity was established with ample material preparations. What can we do?

If it had been in peacetime we would have said: Let's stop it! Let's get something new! That would have involved an immense concealed reduction of the armament potential which would have been bearable in peacetime but not at war. For this reason I said: we have to make something of the 210 at whatever cost. Thus the 410 was developed by a great number of changes. Of course, it cannot be an ideal aircraft in this form. However, we have to make use of it now. It has, of course, also attractive qualities under specific circumstances. The gravest aspect for us is - we have to say that - its poor altitude performance. Its speed would be sufficient for combat operations against the bomber aircraft. Its armament could be made adequate. Today, the pilots do not encounter extremely great difficulties when flying their daytime missions. You can operate and fight with this aircraft in daytime. Its cruising range can be considered still adequate for this purpose. Thus, only one certain quality is missing at the moment - the most important ~~xxx~~ at this moment, of course. When we fear that the enemy will climb we want to climb, too. This is the most important factor, but this aircraft cannot reach the altitude desired".

Thus, the Me 410 was in no way an ideal fighter aircraft since it did not fulfill the most urgent requirement of the fighter arm, the air combat at high altitudes.

Milch also thought he could offer the Me 410 to the General of the Bomber Forces and Air Officer in Command of the Offensive Operations against England, Peltz, for employment as bomber aircraft. Thus, he declared on 18 March 1943: "The only possible aircraft with which the new Air Officer in Charge of the Offensive Operations can work is, in addition to the FW 190 fighter-bomber, the Me 410.

This type is the very aircraft with which he can conduct effective operations. It is the only aircraft with the speed performance of a fighter and which is fully suitable for daytime attacks. In this connection, it must be still found out to what extent this aircraft is suitable for night operations. The high flying speed of the four-engine aircraft can, of course, only be achieved by putting up with a high landing speed. There is one aspect of the 410 about which I am concerned. The adherence to the target dates does not seem to be insured. It will take too long until the aircraft can be put to serial production. I wish to point out again that this aircraft is no new construction but a conversion of the 210".

Peltz gave Milch the following answer:

"I would much rather do without the Me 410. However, it will be of decisive importance that somebody raises the demand for additional fast bomber aircraft and since the Ju 88 is not available for this purpose the 410 is demanded. Thus, this aircraft is urged upon me again and again. If it will be ordered to employ the 410 in default of another aircraft I cannot do anything about it. The performance of this aircraft is comparatively adequate. Bu the difficulties encountered during the employment ! Crash landings etc. !

By now, we have lost about 80 aircraft. Of this number 30 were lost in training activities, 30 during take-off, landing, transfer etc. and the rest was lost in combat operations. The enemy losses have been comparatively slight. What a great expenditure is dissipated to carry a 500-kg bomb to the target!"

Milch replied:

"But today you have to take what you can get. You must realize how often such an aircraft can fly its mission and what a number of bombs a crew carries to the target. Perhaps, the 410 is not so good because of its other characteristics. Its performance as twin-engine fighter aircraft is fantastic."

Employed as day fighter the Me 410 was in no way so"fantastic", which Milch had to admit on 24 September 1943.

Milch said on this day:

"Regarding the question whether the altitude performance of the Me 410 can be improved I think that the 410 is built just for speed to such an extent that its altitude performance cannot be changed. If the aircraft would be given a more favorable surface, it would be a new aircraft with a new fuselage and a new landing gear. In brief, everything would then be new. In such case the engines would no longer be strong enough to show the same performance. In brief, the circle would be rotating again".

Hitler demanded "retaliation" against England in the autumn of 1943. He did not approve that the Luftwaffe also carried out the aircraft production necessary for home air defense purposes at the cost of a large output of bomber aircraft. Goering ordered on 14 October 1943 that, in addition to an increased Ju-88 output, the output of the Me 410 be increased to 600 and later to 900 aircraft per month despite the proved uselessness of this aircraft. However, the output of fighter and reconnaissance aircraft was not to be reduced. Goering was not familiar with the procedure of industrial manufacture but he wished to fulfill each of Hitlers desires without any contradiction. He demanded Milch to carry out this order immediately. Goering did not realize that such demand could not bring about immediate effects. The increase of the serial production necessitated a preparation of several months in respect to the delivery of materials as well as the preparation of a "Serienstrasse"* or the relief of other "Serienstrassen"* for the production of this aircraft.

In December 1943, the latest aircraft types were demonstrated. During this demonstration, also a Me 410 equipped with a 50-mm gun was shown. The fire effect of this aircraft was to be so strong that the latter could destroy a four-engine bomber with a few hits. Hitler termed this aircraft the "backbone of the home air defense". He now demanded that the Me 410 be committed as twin-engine fighter aircraft in the home

.....

Note: * Serienstrasse: production line

air defense and wanted two groups or a wing equipped with this aircraft be organized.

As a result of this demand Goering had to report to Hitler that only 2 to 3 aircraft could be equipped with this new gun since more guns of this type were not available. Since, in addition, the major part of the Me 410 output had been distributed among the bomber units for retaliation attacks, Goering demanded Milch, on 12 January 1944, to equip 2 groups each of a strength of 45 aircraft with the 50-mm gun.

Milch replied as follows on 14 January 1944:

"The first experimental aircraft were equipped with a 50-mm gun. Since this gun was no longer delivered, a conversion for a new 50-mm gun had to be carried out within a very short period of time. This new gun is installed in a different manner. The first delivery of 10 guns was to be made in December. This was not possible since the magazine feeding device constructed by us suffered stoppages due to broken belt links whereby the cartridge was hitched on the belt conveyor table. These defects have been eliminated by now. The required output for January amounts to 15 aircraft, the planned ouput for February amounts to the same figure. The original plan called for 20 aircraft. For operations in high altitudes a heating device is planned for the gun. All data and drawings were destroyed by fire at the Rheinmetall plants in Leipzig. Endeavors to get new data and drawings are being made.

No difficulties were encountered in providing normal explosives. The mine developed by us causes difficulties on account of casting defects in the casings and also in respect to the dispersion because of the rotating bands. Alterations are being carried out in the plants. The results still have to be tested. "

An aircraft type had been demonstrated which seemed to have extremely favorable qualifications. The production of great numbers of this type might have been possible. The command counted on the operational employment of this new equipment demonstrated. However, it was mostly found out later that "some defects" existed which had to be eliminated. Mostly, however, these defects could not be eliminated. The time required was so long that the favorable characteristics of this new equipment had in the meantime become obsolete owing to the development of the war which was considerably faster.

The same was true of the Me 410. We did not succeed in bringing about the smooth functioning of the 50-mm gun. Owing to its flying performance the aircraft was not suitable for its planned employment against bomber streams.

On 8 July 1944, it was decided that the Me 410 should no longer be produced in favor of the production of fighter aircraft and, from October 1944 on, the production of the former was discontinued.

This aircraft was employed only in a few nuisance missions against England. The successes achieved were negligible.

****

The production from 1939 to 1945 amounted to the following figures:

	1939	1940	1941	1942	1943	1944	1945
Me 110	156	1008	594	501	641	123	-
Me 210	-	-	92	93	89	74	-
Me 410	-	-	-	-	271	629	-
	156	1008	686	594	1001	831	-

(Sources: This text was based on the shorthand notes on the conferences of the Chief of the Luftwaffe Supply and Procurement Service. Further information was taken from documentary material of Generalfeldmarschall Milch).

****

There was, however, no lack of proper and logical consideration and appropriate tactical as well as technical demands on the part of the General Staff of the Luftwaffe.

Thus, the demand of the General Staff of 20 October 1942 regarding the development of a fast bomber aircraft (fighter-bomber), for instance, read as follows:

"Priority is to be given to the development of the fast bomber aircraft (fighter-bomber) which, with a service load of 1000 kilogram, a penetration preformance of 1000 kilometers, and a speed of 700 kilometers per hour, is able to cover the range of the present medium bomber.

Since the principle "speed outranks protection" is to be observed here, armor protection and armament can be reduced to a minimum weight in favor of a superior speed.

This class of aircraft should also provide twin-engine fighters, night-fighters, long-range night fighters, as well as long-range reconnaissance aircraft.

Since the enemy will attempt to catch up with our progress in the development of a fast bomber aircraft, this aircraft has to be currently improved in respect to its various methods of employment. The objective in view should be the development of a bomber aircraft with a speed performance close to sonic velocity.

To produce a bomber aircraft in a short period of time which, at least, is able to meet the requested speed requirements - even if under favorable circumstances - it appears advisable to develop a single-engine aircraft with an extremely strong power plant. Such aircraft should be constructed consistently along fighter-bomber lines.

Attention is called to the exploitation of all additional possibilities for an improvement of the performance such as G M 1*, alcohol-water injection, installation of jet power plants.

The following possibilities existed for the development of bomber aircraft with a superior speed performance:

1.) The completely new development of the type as a fast bomber aircraft (fighter-bomber) in small numbers to achieve a short-term superiority.

2.) Developments on the basis of types existing and tested by initial use, installing reinforced power plants as well as the of types manufactured in a large-scale serial production.

3.) Endeavor to increase the speed of standard bomber aircraft for defense purposes during a short period of time.

According to these considerations the fast bomber (fighter-bomber was further developed after Hitler, too, had demanded the air armament industry in 1942 to produce a fast bomber aircraft.

New developments of which 50 to 100 aircraft were available during the period of their superiority did not exist. The prohibition to carry out further developments which had been in force since the beginning of the war prevented the availability of an aircraft type ready for production. The Ar 234 was the aircraft of this kind of which the development was progressed most. It was an aircraft for reconnaissance

Note: * G M 1 :

in force equipped with jet propulsion and having a calculated cruising range of 2000 kilometers. Its cruising speed amounted to 730 kilometers per hour and its maximum speed allegedly was 800 kilometers per hour. This type, employed as bomber aircraft, was to be able to fly a calculated distance of 1500 kilometers carrying a 500-kilogram bomb. It was planned to place an order for the production of 50 to 100 aircraft of this type. These aircraft, however, could not have been employed until 1944. (It should be mentioned here, that the development of this aircraft did not proceed beyond the experimental stage by the end of the war, since the production was impossible owing to difficulties caused by its power plant with jet propulsion as well as for capacity reasons.

Further suggestions for development had been submitted by 1942 but were never carried out.

The He 210 manufactured by the Messerschmitt plants was considered as the possibility listed under 2.) This aircraft turned out to be one of the greatest failures of German aircraft development. It could not be operationally employed at the front.

Other aircraft developed such as the Ar 240 - an aircraft which was to be completed by 1944 - did not meet the requirements of the fast bomber (fighter-bomber) in this year. In addition, this aircraft had to be withdrawn from production later because of capacity reasons. The experiments carried out with the test models revealed such constructional defects that the data on its performance given in the blue-print of this aircraft by the Arado plants turned out to be wrong.

The development of aircraft to be put to serial production on a large scale and to be used as fast bombers (fighter-bombers) proved to be unfeasible, since within the period of normally 3 to 4 years (mostly 5 to 6 years) required for the completion of the development of such an aircraft an enemy fighter aircraft with a superior speed performance was sure to appear. The appearance of such enemy aircraft would have necessitated a reinforcement of the defensive armament which would have involved difficulties because it was not originally planned.

The further possibility to equip existing types with additional short-term power plants brought about a temporary improvement of the performance of the aircraft types concerned.

A short-term reinforcement of the power plants was effected particularly by means of the GM 1* -equipment (the GM 1 is a container for additional influx of oxygen above the full-pressure altitude). In this case, the speed could be increased at high altitudes only. At low altitudes any overstrain of the power plant exceeding the performance possible under normal conditions was not advisable.

The additional employment of jet power plants of light construction, simple structure, and reasonable fuel consumption showed good results. These power plants, however, could not be employed without reducing the cruising range. The tentative installation of such power plant in a Ju 88 revealed the possibility of improving the speed performance by 70 to 80 kilometers per hour. The disagvantage was a considerable loss of speed, 40 to 50 kilometers, when flying without this additional power plant. The cruising range was also reduced thereby since the fuel was in the case of necessity consumed faster and the loss of speed as well as the increasing resistance had a reducing effect on the cruising range when the additional power plant was switched off.

"Argus-Jet Power Plants" (additional rocket propulsion) which were of light construction, had a simple structure as well as a reasonable fuel consumption showed, when used as additional power plants with the objective previously mentioned, good results. The primary advantage of these power plants was that their endurance could be extended considerably - by up to 30 minutes - without essentially reducing the cruising range. The employment of the"Argus-Tubes" at the front was prohibited for a long period of time for the following reason:

.....

Note: * GM:

"This equipment which, when properly employed for different purposes must be on a large scale, promises considerable advantages, not brought to the enemy's knowledge by being employed singly for the achievement of minor advantages. Otherwise, it must be expected that because of its simple structure the same equipment will soon appear on the side of the enemy, which would frustrate any exploitation of a possible advantage provided by this technical innovation!

The solution of the problem was sought, after all, by resorting again to the fighter aircraft types Me 109 and FW 190. These aircraft were provided with additional tanks to increase their cruising range.

The installation of jet and rocket power plants in the airframes hitherto used did not lead to satisfactory results.

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(Prepared by Colonel (ret.) Greffrath, Historical Division Wiesbaden, from available documents, micro-rolls 27 and 33).

Appendix 5

(To Page 76)

Fighter-Bomber Commitment

Compiled from the reports submitted by the air fleets to the Luftwaffe General Staff on the operations conducted during the Battle of Britain in the period from 1 August 1940 to 31 December 1940

(As far as these reports contain information on this commitment).

August 1940

2 August : 210th Twin-Engine Fighter Group took off at 17:25 hours with 9 Me 110 and 4 Me 109 aircraft and landed at 18:20 hours. A convoy was attacked at 17:55 hours 35 kilometers north-west of Margate from altitudes of 300 to 400 meters. This attack was directed against a steamship of 8000 tons with 10 tug-boats and escorted by two destroyers. Steamer was hit by x 2 SC-250 bombs at the stern and by 1 SC-250 bomb at the bow. The stern was torn off. (Ammunition dropped amounted to 6 SC-500 bombs and 10 SC-250 bombs). New start with 8 Me 110 / and 4 Me 109 aircraft at 19:35 hours. The aircraft landed at 20:40 hours. New attack on 8000-ton steamer. Hit by a SC-250 bomb in the center. Steamer ripped up lengthwise; large, white dust clouds (potash and grain). Moreover, sinking of a 1000-ton steamer (painted light grey), apparently auxiliary warship, by two direct hits by SC-250 bombs.

11 August: 210th Twin-Engine Fighter Group with 18 Me-110 and 6 Me-109 aircraft attacking a convoy 15 sea miles south-east of Harwich at 13:00 hours. One 8000-ton ship received three direct hits by 1 SC-500 and 2 SC-250 bombs. One 5000-ton ship was set on fire by bombs.

12 August: Yesterday, the 210th Twin-Engine Fighter Group flew three missions against "Dete-Apparatus" * and airfields. The Dete-apparatus stations at Dover, Hastings, and Lewes were attacked

Note: * Dete: Radar equipment

by 12 Me-110 and 8 Me-109aircraft at 11:00 hours. The station near Lewes was attacked with eight 500-kilogram bombs, the building was destroyed by a direct hit. During the attack on the station near Hastings four 250-kilogram and six 500-kilogram bombs hit the target area. At Dover three 500-kilogram bombs hit the target area. Two barrage ballons were shot down over Dover. A new attack was flown by this group with 14 Me-110 and 6 Me-109 aircraft against the air base of Manston near Ramsgate at 13:45 hours. Four SC-500 bombs and two Type 250 oil bombs hit billets, eight SC-500 bombs and two Type 250 oil bombs hit hangars. Four SC-500 bombs were dropped on the landing field right into a group of Hurricanes taking off. 4 Hurricanes and 5 other aircraft were destroyed on the ground. 3 Hurricanes which had taken off already were shot down.

13 August: At 08:30 hours, the 210th Twin-Engine Fighter Group employing 5 Me-109 aircraft sunk by direct hits, two outpost patrol boats of 400 tons each near Goodwin.

On 13 August and during the night of 13/14 August, a total force of 485 bomber and 1000 single-engine and twin-engine fighter aircraft were committed. 9 airfields were attacked of which 5 were raided with very good success. These 5 airfields were practically put out of operation. The losses sustained by friendly forces amounted to 34 aircraft. The enemy suffered the following losses: 85 aircraft were destroyed in the air and 42 on the ground. 3 aircraft were shot down by antiaircraft artillery. Thus, a total of 130 aircraft and, in addition, 12 barrage ballons were destroyed. On 12 and 13 August the air rescue service rescued a total of 10 fighter pilots and yesterday 1 fighter pilot alive. The 210th Twin-Engine Fighter Group employing 16 Me-110 aircraft attacked the air base of Manston from an altitude of 800 meters at 13:00 hours.

15 August: The 210 Twin_Engine Fighter Group took off with 16 Me-110 and 8 Me-109 aircraft at 15:15 hours. Attack on the British airfield of Martlesham and the radio transmitting station of Ipswich. At Martlesham two hangars hit as well as workshops and the landing field were hit. The repairshop-building burned out. 6 aircraft were destroyed on the ground. At the radio station of Ipswich a building was hit and one mast was destroyed.

A total force of 1786 aircraft was employed on 15 August and during the night of 15/16 August. The ~~friendly~~ losses of friendly forces amounted to 55 aircraft. 111 enemy aircraft were definitely shot down and 14 were probably shot down. In addition, 2 balloons were shot down.

20 August : The 210th Twin-Engine Fighte Group employing 9 Me-110 aircraft attacked an ammunition plant south of Aldeborough with six SC-500 bombs. 2 Me-110 aircraft attacked the airfield south of Deal with four SC-500 bombs. 3 aircraft returned without having dropped bombs, ~~1 aircraft~~ 1 aircraft was overdue.

Fighter Commander II: A mission was flown from 15 to 17:10 hours. This mission included two low-level attacks against the airfield of Manston. Strafing raids were conducted against one antiaircraft artillery position, two Spitfire and three Blenheim aircraft. 13 further missions were flown with 137 Me-109 aircraft during the afternoon. 5 Spitfire aircraft were shot down, 1 Me-109 aircraft was missing.

21 August : The 210th Twin-Engine Fighter Group attacked the railroad station of Canterbury, the railroad station of Norwich Catton, an airfield 10 to 12 kilometers south-east of Cambridge, the gas plant of Chelmsfort and industrial establishments north of Ipswich, as well as the airfield of Feltwell.

22 August : At 13:45 hours, the 210th Twin-Engine Fighter Group attacked a convoy 5 sea miles north-east of Dover with twenty-three SC-500 and SC-50 bombs dropped from altitudes of 700 to 800 meters. According to reports, a steamer of 2500 to 3000 tons was hit at the stern by one of each bomb types. Other bombs hit the water close to the ship, no effect was observed.

24 August : The 210th Twin-Engine Fighter Group attacked Manston again (15:15 hours) with eight SC-500 and six SC-250 bombs. One hangar was destroyed by a direct hit and some billets were, too.

26 August : The 210th Twin-Engine Fighter Group employing 10 Me-110 and 6 Me-109 aircraft attacked the airfield of Ramsgate at 12:55 hours. Twenty SC-500 and six SC-250 bombs were dropped. Fires were observed in the target area.

September 1940

4 September: The 2nd Group/2nd Instruction Wing flew two missions against the airfield of Eastchurch with 25 and, the second time, with 28 Me-109 aircraft carrying bombs. The raids were carried out in the form of diving attacks from an altitude of 4000 meters down to an altitude of 1000 meters. 195 bombs of the type SC 50 were dropped and a lot of hits in the target area were scored.

5 September: At 16:53 hours, the 2nd Group/2nd Instruction Wing committed 28 Me-109 aircraft against the air base of Detling. 112 bombs of the type SC 50 were dropped on buildings and grounded aircraft. An explosion was observed at the north-east corner of the air base. A fuel dump was apparently hit.

6 September: Successful attacks of the 210th Twin-Engine Fighter Group against the airframe factory of Weybridge and the Hawker-aircraft plants.

7 September: The 2nd Group/2nd Instruction Wing committed 30 Me-109 aircraft against Thamehaven. The aircraft took off at 18:05 hours and landed at 19:25 hours. Three SC-250, ninety-six SC-50, and two oil bombs were dropped. The effects could not be observed owing to strong smoke screen development and fighter defenses.

11 September: The 210th Twin-Engine Fighter Group committed 9 Me-110 and 4 Me-109 aircraft against the Spitfire-plants at Southampton and against the Cuncliff-aircraft factory located east of the former as well as against the Super-Marine-Works. Hits were scored in the buildings of these establishments.

15 September: During 15 September 148 bomber aircraft reached the target area and dropped a total of 133 tons of demolition and oil bombs and 108 BSK* in the period from 12:50 to 16:00 hours. Most of the effects of the bomb hits could not be observed owing to the strong cloud formation. Only a SC-1000 bomb hit with incendiary effect in the gas plant of Bromley and hits in warehouses were observed. Strong fighter units (up to 80 aircraft) appeared over the target area. In addition to Spitfires and Hurricanes Morane and Curtis aircraft with French insignia were also observed.

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Note: * BSK:

The fighter aircraft attacked fiercely, flying either singly or in pairs, without any regard to the antiaircraft fire and pursued our bombers aircraft from the target area up to the middle of the Channel. Some of them pursued our bombers even up to the French coast. Heavy, sometimes extremely accurate antiaircraft fire was encountered over Chatham and Maidstone as well as over the London docks. The heavy losses sustained during the daytime operations were not only caused by the enemy pursuit operations extended up to the coast but also by enemy fighters intercepting our bomber aircraft. These returning fighter aircraft attacked our bombers which were flying in small groups without any fighter cover.

18 September: At 10:45 hours, the 2nd Group/2nd Instruction Wing committed 21 Me-109 in a bombing operation against the Tilbury docks. These aircraft dropped thirteen SC-250 bombs, one oil bomb, and twenty-eight SC-50 bombs. Two hits were observed in the rail triangle west of the docks. At 16:35 hours, a new attack was conducted by the 2nd Group/2nd Instruction Wing against the oil depot of Port Victoria. Two oil tanks were set on fire by bombs. A small tanker of about 600 tons was sunk.

20 September: Attack conducted by 22 Me-109 aircraft of the 2nd Group/2nd Instruction Wing against London at about noontime. Twenty-two SC-250 bombs were dropped and hits were scored in the City and in a railway center west of the bow of the Thames River. 7 Spitfire and 5 Hurricane aircraft were shot down. The losses of friendly forces amounted to 1 Me-109 aircraft.

24 September: 11 Me-110 aircraft conducted an attack on Southampton-Woulstone. Twenty-nine SC-500 bombs and five Type-250 oil bombs were dropped on the flying-boat factory Super-Marine. Hits were observed in the southern part of the target.

27 September: 10 Me-110 aircraft conducted a raid against an aircraft engine factory near Bristol. These aircraft, however, were diverted by Hurricane aircraft and released their bombs over the southern edge of Bristol (emergency bomb release). The enemy fighter aircraft pursued the unit up to the coast keeping it under constant attack.

Further attacks were conducted during this day against Dover, Maidstone, the shipbuilding yards of Chatham, Folkestone, as well as on a camp with barracks.

All offense forces which operated yesterday encountered tenacious and energetic enemy resistance. The units of the fighter wings which were employed to meet and cover twin-engine fighter aircraft repeatedly engaged in air combat. The attacking enemy fighter aircraft dived between the flights of the bomber units, climbed again and attacked from the rear below or from the rear above. In addition, strong and extremely accurate antiaircraft artillery fire along the coast up to Chatham was reported. All aircraft suffered hits by antiaircraft fire.

28 September: Aircraft flying singly or in pairs conducted daytime attacks against railroad installations near Hastings, the city of East Burn, Folkestone, Deal, Boxhill, Dover, Margate, Boston, and Canterbury.

At about 17:00 hours, a single aircraft attacked the airframe factory of Cricklewood located north-west of London. Incendiary effects were observed.

30 September: The 2nd Group/2nd Instruction Wing was assigned the mission of attacking the power plant of Poplar at London. The target could not be spotted owing to a closed cloud cover. 21 Me-109 aircraft dropped fifteen SC-250 bombs and three Type 250 oil bombs over London immediately west of the target. The 210th Twin-Engine Fighter Group was also ordered to attack the power plant of Poplar with 7 Me-110 aircraft. Because of the closed cloud cover over the target, these aircraft released eleven SC-500 and three SC-250 bombs over the central section of Hastings.

At 14:10 hours, the 2nd Group/2nd Instruction Wing repeated the attack against the power plant of Poplar with 19 Me-109 aircraft and dropped fifteen Sc-250 bombs and three Type 250 oil bombs on the target,

October 1940

1 October: 38 Me-109 aircraft of the 1st Group/2nd Instruction Wing attacked London at 16:40 hours. 8 of these aircraft carried bombs. The bombs were reported to have hit the target.

2 October: During this day, fighter aircraft of the 51st Fighter Wing and the 2nd Instruction Wing attacked with bombs Hastings and Gravesend and raided also London flying in four waves of attack.

5 October: On 5 October, the Fighter Commanders II and III conducted a number of fighter day operations against South England. Sometimes, aircraft in the strength of up to a squadron (Me 109) were employed in training bombing raids against London, Dover, the drill ground of Dunger, and road intersections. The attack on the railroad station of Deptford mentioned in the intelligence report was carried out by 8 Me-109 aircraft of the 1st Group/51st Fighter Wing.

6 October: In the course of this day, London was attacked at 08:00 hours, 10:00 hours, 11:50 hours, 13:00 hours, 14:00 hours, 15:15 hours, 16:00 hours, 17:50 hours, and 18:00 hours. The attacks were carried out by Me-109, Do-17, and Ju-88 aircraft flying singly as well as by strong units of up to 8 aircraft. Most of the bombs were dropped without visual observation of the ground.

7 October: The outcome of these day attacks against London was extremely noteworthy: Apart from four nuisance raids conducted by Do-17 and Ju-88 aircraft the major portion of the offensive effort was made by Me-109 and Me-110 aircraft equipped with bombs and belonging to the Second Air Fleet. Of about 15 offensive operations started against London 3 attacks conducted by Me-109 units did not succeed in penetrating to the target area though the attacking aircraft were covered by additional strong fighter forces. Some of them had to change course to attack alternate targets and other aircraft had to release their bombs over London too early. All units reported strong and tenacious fighter defenses. The Third Air Fleet, too, which committed 20 Ju-88 aircraft in a daytime attack on an airfield in Central England reported that enemy fighter defenses showed a tenacity unknown so far.

The following details are worthy of being noted:

2nd Group/2nd Instruction Wing : 20 Me-110 aircraft with fighter cover provided by the 27th Fighter Wing attacked London-West at 11:32 hours. Bomb impacts in the target area.

1st Group/51st Fighter Wing : 8 Me-109 aircraft attacked London-West at 11:00 hours. Enemy attack carried out by Spitfire aircraft. 3 Me-109 aircraft lost.

1st Group/3rd Instruction Wing : 9 Me-109 aircraft with fighter cover provided by the 3rd Fighter Wing attacked London at 10:45 hours. 6 aircraft attacked the railroad station of Dulwich. 3 Me-109 aircraft were forced to make an emergency bomb release and engaged in air combat with 10 to 15 Spitfire aircraft in the area of Dover.

2nd Group/2nd Instruction Wing : 19 Me-109 aircraft with fighter cover provided by the 26th and 27th Fighter Wings did not carry out their attack on London-West owing to strong fighter defenses. Bombs were dropped over the area south-west of the bow of the Thames River at 14:45 hours. Two Me-109 aircraft were lost. Two Spitfire and one Hurricane squadrons operated over the target.

1st Group/2nd Instruction Wing : 15 Me-109 aircraft raided London at 18:00 hours. The attack was directed against the docks in the bow of the Thames River. New fires were observed in several sections of the city.(Fighter cover was provided by the 26th and 27th Fighter Wings).

2nd Group/3rd Fighter Wing : 10 Me-109 aircraft attacked London at 17:00 hours. Hit were scored north-west of the West India Docks.

9 October: The main effort of the day operations on 9 October was made by light units (Me 109) of the Second Air Fleet attacking London. The major part of the attacks could be carried out systematically. Some of the units were forced to attack alternate targets in Hastings, Dungeness, Maidstone, Canterbury, Folkestone, Margate, Rochester, and Dover.

10 October :The main effort of the day operations on 10 October was again made by the light bomber forces of the Second Air Fleet. At about 10:00 hours, the 1st, 2nd, and 3rd Groups/3rd Fighter Wing

committed 17 Me-109 aircraft against London. Bombs were dropped through the clouds. The 1st, 3rd, and 2nd Groups/54th Fighter Wing attacked anti-aircraft artillery positions near Dover which served as alternate target. The 2nd Group/2nd Instruction Wing flew two missions, each with 12 Me-109 aircraft, against Ashford in the morning and against Folkestone in the afternoon.

11 October: The rapidly changing daytime weather situation on 10 and 11 October prevented offensive action. Therefore, only a number of nuisance raids was, in general, conducted. These raids were carried out mostly by light bomber aircraft (operating also in units up to squadron strength). Sometimes, the cloud cover prevented the observation of the effects. Some of the attacks had to be broken off because the weather cleared up immediately before or over the target. At noon, 3 to 4 Spitfire squadrons were reported as operating over London.

12 October: On the 12 October, in addition to a number of nuisance raids conducted by bomber aircraft of the Third Air Fleet, especially units and individual aircraft of bomb-carrying fighter units of the Second Air Fleet were in daytime committed against London and South England. The visibility varied at the time when the attacks were carried out. Visual observation of the ground was possible during most of the bombing raids over London. Noteworthy was the appearance of strong fighter units which, however, did not attack. 3 Spitfire squadrons, for instance, accompanied 20 Me-109 aircraft of the 1st Group/2nd Instruction Wing from the coast up to London. The unit released its bombs over target area II according to plan. During an attack conducted by 14 Me-109 aircraft of the 1st and 2nd Groups/51st Fighter Wing against target area II at 13:22 hours several hits were observed in the building of the parliament and in its surroundings.

13 October: The 2nd Air Fleet committed several Me-109 units in daytime attacks against London which were carried out with good success and under conditions favorable for offensive action. The main effort of the attacks was directed against the target groups located in the U-shaped bow of the Thames River, the docks, the power plants in target area II, and against the government district located adjacent to target area III. All units reported a good score of bombing hits. According to reports received so far the enemy fighter forces never succeeded in stopping our units.

15 October: The attacks against London and South-East England were carried in daytime by the light units of the Second Air Fleet. On the average, the 2nd, 3rd, 51st, 52nd, 54th, 26th Fighter Wings as well as the 2nd Instruction Wing escorted by fighter forces attacked, flying in two missions, London and alternate targets such as the barracks camp of Dungeness, the cities of Eastbourne, Folkestone, Maidstone, Ramsgate, Deal, and the city and airfield of Eastchurch.

17 October: The attacks which took place yesterday were carried out by the light bomber forces of the Second Air Fleet again. Most of the attacks planned aginst London could be actually carried out in spite of strong fighter defenses. Any observation of the effects, however, was not possible owing to bad visibility as well as to the enemy fighter defenses. Ashford, Dungeness, Folkestone, and, in particular, Canterbury served as alternate targets for the attacks. During the air battles which developed during these attacks 15 enemy aircraft were shot down and 1 Me-109 aircraft was lost.

19 October: 8 Me-109 aircraft of the 53rd Fighter Wing attacked London at 15:40 hours. The bombs dropped hit the target. The effects of the bombing were not observed.

20 October: During the period from 11:20 to 15:30 hours, London was raided by 4 light bomber units which were escorted by fighter forces and had a total strength of 44 aircraft. The attacking aircraft dropped forty-four SC-250 bombs .

22 October: light bomber units of the Second Air Fleet were, in the afternoon, prevented from raiding London by fighter defenses as well as by bad visibility and were forced to direct their attacks against alternate targets. Thus, their attacks were directed against Margate, Deal, Folkestone, Hastings, Dover, as well as against camps occupied by troops at Lyad and Dungeness.

24 October: The daytime attacks on 24 October were carried out by light bomber aircraft of the Second Air Fleet as well as by a number of bomber aircraft of the 53rd, 3rd, and 2nd Bomber Wings. The flight courses of this bombing raid were determined by dead reckonong.

25 October: The daytime weather situation permitted the most intensive action of the light bomber units of the Second Air Fleet against London during the period from 09:30 to 18:00 hours. The 27th, 51st, 53rd, 54th Fighter Wings and the 2nd Group/2nd Instruction Wing flew three daytime missions in formations up to the strength of group aginst the overall city area of London and were escorted by usually twice as many fighter aircraft as their own strength was. Frequent air combat developed during their approach flight as well as over London during which a total of 10 Spitfires and 7 Hurricanes were shot down. The friendly forces suffered losses of 7 Me-109 aircraft. The aggressiveness of the enemy varied. Sometimes, the air combat did not lead to any result though both sides engaged a total strength of about 100 aircraft. At 18:30 hours, the 24th Fighter Wing committed 13 Me-109 aircraft in a fourth mission against a convoy of about 35 ships which had been spotted during the third mission near Ramsgate at 17:00 hours. A merchant vessel was sunk by a direct hit into her central section. 567 Me-109 aircraft were employed in 18 missions to provide cover for the light bomber units.

26 October: The major portion of the daytime operations against London on 26 October was conducted by the light bomber aircraft of the Second Air Fleet again. In the morning, the units of the 52nd, 53rd, 54th, and 26th Fighter Wings encountered strong fighter defenses and the ratio of the fighter escort to the attacking enemy fighter forces was frequently 1 : 3, in three cases, it was even 1 : 6. During the daytime attacks which were conducted yesterday a total of 11 to 12 enemy fighter squadrons with about 120 aircraft were observed in the area of London. 2 friendly fighter aircraft were lost and 4 enemy fighter aircraft were shot down. 1 Hurricane aircraft was forced to made an emergency landing in the occupied territory and the pilot was taken prisoner.

27 October: Apart from the attacks conducted on 27 October by light bomber units of the Second Air Fleet against London and the alternate targets of Ramsgate, Folkestone and Whitby the following daytime attacks are worth noting:

Conjointly with a fighter operation conducted by the Fighter Commander III at 18:20 hours and in which 42 Me-109 and 14 Me-110 aircraft took part, 7 Me-110 aircraft carrying bombs carried out an attack against the port installations of Portsmouth. The effects were not observed. 2 Hurricane aircraft were shot down. One aircraft of the 2nd Group/1st Instruction Wing raided the blast-furnace plants of Middlenbrough. The series of bombs lay across the northern section of the plant. During the day, a total of 6 bomber aircraft and 159 light aircraft raided London. The attacks took place during the period from 15:00 to 18:30 hours (?). The city was almost continually covered by a closed cloud bank which prevented any observation of the bombing effects. In the South-East and North-West, the attacks were directed against the same districts of the city as on the day before. A total of about 53 tons of demolition and oil bombs were dropped. The enemy fighter defenses were very active during daytime. The friendly escort fighter forces repeatedly and successfully engaged in air combat with enemy fighter aircraft. A large conflagration, and six lasting xxxxx and several small fires were observed.

During the last hour of daylight of 27 October attacks on 14 airfields in East England were conducted with good success. These attacks obviously took the enemy by surprise. The major part of the enemy fighter defenses was tied up by the attacks on London so that only a small number of enemy fighters interfered. In addition, the friendly light bomber aircraft which flew only in small units or singly were spotted apparently only at a few places and were reported only to the nearest airfields so that on most of the air bases under attack the preparations for take-off for night operations were still under way and the ground defenses were not preapared for the attack. At all the airfields under attack bombing effects in the form of damages and destruction on buildings and grounded aircraft were observed. A total of 60 to 70 aircraft were destroyed or damaged on the ground.

28 October: On 28 October, a total of 9 bomber and 132 light bomber aircraft were committed in daytime operations. Of these aircraft, 2 heavy and 61 light bomber aircraft dropped 16 tons of demolition bombs during the period from 08:00 to 18:10 hours. The rest of the aircraft dropped its bombs on alternate targets in South and Central England.

29 October: On 29 October, the Second Air Fleet committed, under the codeword "Opernball" (Opera Ball), 52 bomb-carrying Me-109 and 99 Me-109 and Me-110 aircraft as fighter escorts as well as 71 Ju-88 aircraft with an escort of 31 Me-109 aircraft in a daytime attack on a number of airfields. At the same time, the Ju-88 aircraft carried out a mock attack against Portsmouth. During these operations, 12 Spitfire and 2 Hurricane aircraft were shot down and 9 Me-109 and 1 Me-110 aircraft were lost. The successes achieved during these attacks on the airfields can be considered as very satisfactory. Since the attacks were mostly carried out flying at a low altitude a good observation of hits was possible. Numerous hangars, billets, aircraft parking areas, and fuel depots were destroyed by direct hits. A total of 27 multi-engine aircraft were reported as definitely destroyed on the ground. The number of aircraft damaged on the ground was probably even higher. In addition to these attacks against the airfields, numerous daytime attacks were carried out by light bomber units against London. The ample other offensive action of friendly forces led to a dispersion of the enemy fighter defenses. Sometimes, the enemy evaded the friendly fighter aircraft and at other occasions enemy aircraft attacked hesitantly. Friendly fighter units intruding into the area of Portsmouth reported badly flying enemy fighters. During this operation 6 aircraft were shot down of a total force of 16 Spitfire and Hurricane aircraft. An additional report said that in the daytime attacks on London on 29 October 77 light bomber aircraft were committed which dropped about 25 tons of bombs on the area of the West India Docks and the Waterloo Station.

In the late afternoon of 29 October the airfields located between London and The Wash as well as north of The Wash were raided. During operations, these ~~attacks~~ 123 light bomber and 75 bomber aircraft escorted by strong fighter forces conducted successful attacks, mostly flying at low altitudes, against 15 airfields.

30 October : Beginning at noontime, light bomber aircraft conducted four offensive operations against London in the course of the afternoon. The bombs were released after navigation by dead reckoning. Numerous air battles developed with the 10 to 12 enemy fighter squadrons which had been expected to appear over the area of London.

During the daytime attacks on 30 October 52 light bomber aircraft dropped approximately 13 tons of explosives on London between 12:55 and 17:00 hours. In the course of these attacks thirteen major air battles developed with enemy fighter units the strength of which ranged from 9 to 40 Spitfire and Hurricane aircraft. During these air battles friendly fighter aircraft shot down 10 Spitfire and 2 Hurricane aircraft.

31 October : The daytime nuisance raids on 31 October were carried out by a number of bomber aircraft of the Second and Third Air Fleets. In addition to a number of bombing raids against London during which navigation by dead reckoning was used and which were conducted in the course of the whole day, successful operations were conducted against the airfield of Luton at which 30 aircraft were based, an airfield west of Oxford also occupied by a great number of twin-engine aircraft, the Gloster Aircraft Plants, the air base of Hamswell occupied by 12 twin-engine aircraft, the air base of Norwich-Catton, as well as a number of railroad installations in the areas of Bristol, Oxford, and Lowestoft.

November 1940

1 November: Light bomber units of the Secind Air Fleet covered by fighter forces carried out six operations against London. In the air battles which developed during these operations 6 aircraft of the types Spitfire and Hurricane were shot down.

At 12:35 and 15:50 hours, the Fighter Commander III conducted fighter operations against Portsmouth. The fighter aircraft were escorted by 4 bomb-carrying Me-110 aircraft. During the second attack a direct hit was scored in the electricity plant. The attacking aircraft encountered 80 to 100 Spitfire and Hurricane aircraft. No enemy aircraft was shot down. One Me-109 aircraft was lost.

2 November: Light units of the Second Air Fleet were employed against the convoys at the southern coast of England. The 54th Fighter Wing committed 11 Me-109 aircraft, the 51st Fighter Wing committed 43 Me-109 aircraft, and the 210th Twin-Engine Fighter Group committed Me-109 and Me-110 aircraft. However, no hit worth mentioning was scored and no evident success was achieved. In addition to these attacks on water-borne targets heavy and light bomber forces were committed against London during the day. On 2 November from 07:30 to 11:10 hours and from 17:31 to 18:48 hours 4 bomber aircraft and 33 light bomber aircraft dropped approximately 11 tons of demolition bombs on London. Weather conditions varied so that some of the aircraft which had taken off without fighter cover could not reach the target owing to inadequate cloud cover and had to direct their attacks to other targets or broke off their offensive action without releasing their bomb loads. The raids were primarily directed against the groups of supply targets located along the Thames River. The total losses on 2 November amounted to 9 aircraft. 2 enemy aircraft were shot down.

5 November: In the morning and early afternoon of 5 November light bomber units of the Second Air Fleet attempted to conduct two attacks on London. Owing to the strong fighter defenses, only some of these units succeeded in penetrating up to London. The major portion of the effort was directed against alternate targets such as Canterbury, Hornchurch, Folkestone, Deal, Ramsgate, as well as against the railroad line Dover - Deal - Folkestone.

In the air combat which developed during these operations 7 enemy fighter aircraft were shot down and 1 Me-109 aircraft was lost.

6 November : At noontime, the Fighter Commander III committed 6 bomb-carrying Me-110 and 65 Me-109 aircraft to intrude into the area of Southampton. A diving-attack was carried out against Southampton. Hits were scored in the docks and their large buildings. Air combat developed with 18 Hurricane and 24 Spitfire aircraft. 9 enemy aircraft were shot down and 1 Me-109 aircraft was lost.

7 November : The attack scheduled to be conducted by the 210th Twin-Engine Fighter Group against London at 14:30 hours was not carried out owing to icing. Instead, 10 Me-110 aircraft attacked the following alternate targets: A convoys at Harwich and at Claston on Sea, three freighters at North Foreland, the city of Briston, and Deal. The following results were achieved: 1.) No results at Claston on Sea, 2.) At Harvich a 5000-ton ship was hit, lopsided. 3.) At Oxfordness a hit on the bow of a freighter of medium size. 4.) At Southend a freighter was machine-gunned. 5.) Hit in the central section of Deal. 6.) Warehouses in Briston destroyed by direct hits. At about 18:00 hours, 20 Me-109 aircraft of the 27th Fighter Wing, 18 Me-109 aircraft of the 2nd Fighter Wing, and 12 Me-110 aircraft of the 26th Twin-Engine Fighter Wing took off for an operation against a convoy reported to sail off the Isle of Wight. The aircraft did not find the convoy and released their bomb loads over the Isle of Wight without observing particular results.

8 November : The 53rd Fighter Wing committed 12 Me-109 aircraft at 11:50 hours and 13 Me-109 aircraft at 14:45 hours with a total fighter cover of 77 Me-109 aircraft against London. At 17:35 hours, 12 Me-110 aircraft attacked a convoy at lightship Nore. Two freighters of 8000 to 10000 tons heavily were damaged by hits on their decks.

On 8 November, London was raided at 08:20 hours, 11:15 hours, and 14:45 hours by a bomber aircraft and 25 light bomber aircraft which released a total of about 7 tons of demolition bombs on the districts north of the Thames River extending from Hammersmith to the Tower.

9 November : The varying weather situation made it necessary again to employ extremely small units or single aircraft without any fighter protection. The II Air Corps committed 18 aircraft of which 11 attacked London. The rest of them directed the attacks against air armament plants. The aircraft committed against London reached their target and released their bombs after using navigation by dead reckoning. Those aircraft committed against air armament plants, however, had to direct a part of their operations against alternate targets and dropped their bomb loads on the suburbs of London. One aircraft raided the large power plant of Brighton with good success. A high darting flame which burst into a conflagration was reported.

The Fighter Commander II conducted the following operations:

From 11:30 to 16:05 hours 4 Me-110 aircraft were committed against London (4 tons of bombs were dropped).

2 Me-110 aircraft were committed against the city of Dover (2 tons of bombs were dropped). 5 Me-110 aircraft were committed to attack a convoy between Harwich and Southend at 14:13 hours. A 500-kilogram bomb hit was scored on the bow of a steamer of 5000 to 8000 tons. A 500-kilogram bomb hit the side of a 3000-ton steamer. The sinking of this ship could be expected.

The following is to be reported in addition: On 9 November between 11:30 and 19:05 hours, London was attacked by 24 bomber and 3 light bomber aircraft. A total of 19 tons of bombs were dropped.

10 November : The Fighter Commander II committed the 210th Twin-Engine Fighter Group against a convoy east of Southend. The target could not be located owing to an extremely low cloud cover, thunderstorm, and icing. As alternate targets Clacton on Sea, the central section of London, and the lightship at Barrow Deep were attacked.

The Fighter Commender III committed 10 Me-110 aircraft with a fighter cover of 48 Me-109 aircraft to intrude into the area of Portsmouth. A ~~c~~ camp with troops located 14 kilometers east of Weymouth was raided with good success. In air combat 2 Spitfire aircraft were shot down. The friendly forces did not sustain any losses.

11 November: The major portion of the nuisance raids scheduled to be conducted by the Second Air Fleet against London as well as against the air armament industry was not actually carried out. The attacks were directed against Ramsgate and the large power plant and warehouse at Brighton (6 hits in the power plant, strong development of smoke and explosion). Moreover the light-engine plant of Slough was attacked (the aircraft could not approach the targets undisturbed owing to the ballon barrage). Furthermore, a factory south-west of Braintree was raided (Hits in the factory, in the buildings and warehouses).

13 November : On 13 November, the Second Air Fleet reported that 40 Me-109 aircraft equipped with bombs and escorted by 130 Me-109 aircraft operated over England. The operation planned against London was not carried out owing to weather conditions. The following alternate targets were attacked:

By the 1st Group/2nd Instruction Wing: Fortification lines north of Ramsgate, the airfield of Manston, a large factory in the area of Herne Day, and a moving train near Deal. No enemy aircraft was shot down, no loss of friendly aircraft was sustained.

By the 26th Fighter Wing: Castchurch, railroad installations at Dover, Thumbridge, Cullingham, as well as the rail triangle at Folkestone. Air combat developed during these attacks and 2 Hurricane and 1 Spitfire aircraft were shot down. A number of single aircraft raided London and Brighton after using radio navigation and navigation by dead reckoning.

14 November : The Second Air Fleet committed 20 Ju-87 and 12 Me-109 (bomb-carrying) aircraft against water-borne targets in Channel, 19 Me-109 aircraft equipped with bombs against London, and 182 Me-109 aircraft to provide fighter cover and to engage in free fighter operations.

Water-borne targets were not spotted in the Channel. The radio station of Dover was raided instead. Three hits were scored in the radio station. Likewise, military installations west of Margate and two factories at the eastern and Southern edge of Margate were attacked. Hits were observed in the factories.

London was not raided because of a sudden deterioration of weather conditions and the failure to provide fighter cover. Instead, bombs were dropped on Canterbury and Ashford. Air combat developed during these attacks in the course of which 2 Hurricane and 5 Spitfire aircraft were definitely shot down whereas 2 further enemy aircraft were probably shot down. The losses sustained by friendly forces amounted to 2 Ju-87 and 1 Me-109 aircraft.

15 November: The following reports are available on the daytime operations on 15 November:

The Second Air Fleet committed 33 Me-109 aircraft equipped with bombs and 32 Me-109 aircraft as fighter cover for an attack on London. 22 aircraft dropped 5,35 tons of bombs on the central and south-western sections of the city. Because of the fighter defenses, 11 aircraft released 2,75 tons of bombs on Maidstone. The escort fighter forces were engaged in air combat. During the operations over Dover, Ashford, and London 2 Hurricane and 1 Lysander aircraft were shot down. 1 Me-109 aircraft was lost over London and 2 further Me-109 aircraft were missing.

13 Me-110 aircraft of which 6 were equipped with bombs conducted an attack against the camp occupied by troops of Frachan located 10 kilometers northeast of Porthmouth. The fighter escort consisting of 18 Me-109 aircraft did not contact enemy forces. 74 Me-109 aircraft intruded into the area of Portsmouth. 2 Hurricane and 1 Spitfire aircraft were shot down in air combat. 1 Me-109 aircraft was lost.

16 November: 69 Me-109 aircraft were committed in free fighter operations over the area of South-East England. Moreover, 10 Me-110 operated singly or in pairs against the alternate target of Southampton and against convoys. The result of the attack on Southampton: Hits in the group of warehouses north of the landing bridge. Strong development of smoke.

2 Me-110 aircraft attacked a 8000-ton tanker near Oxfordness. The bombs hit 50 to 100 meters beyond the target. A steamer of 4000 to 6000 tons was attacked. 4 hits beside bow and stern. The ship was listing heavily and could be expected to sink. 2 Me-110 aircraft attacked a 5000-ton steamer at Cromer. The results of the attack could not be observed owing to antiaircraft artillery defenses. A Me-110 aircraft scored a hit on a 2000-ton steamer north of Oxfordness. The ship's side was hit in the center upon which the steamer listed heavily and sank bow first. A 500-Kilogram bomb hit 10 meters ahead of the bow of a 4000-ton steamer. The ship was instantaneously turned by 90 degrees. An attack was carried out on a steamship with two funnels and sailing singly south of Lowestoft. The ships size could not be accurately established. Two direct hits in the central section of the ship were scored. The ship burst and sank immediately.

17 November: The following reports are available on the daytime operations on 17 November:

Second Air Fleet: The Fighter Commander II committed a total strength of 209 aircraft. Of these aircraft, 6 Me-109 aircraft carried out a bombing raid against ships at Chatham and Sheerness, 15 Me-110 aircraft raided the air base of Wattisham, and 188 Me-109 aircraft were employed for escort missions and for frre fighter operations. Big ships were not spotted, but the port installations at Chatham were attacked with 6 SC-250 bombs. The aircraft did not reach Wattisham because of the closed cloud cover. Instead, the port and naval air base of Harwich were attacked. Fires were caused in the warehouses and in the naval air base. The lightships "Cork" and "Shipwash" were set on fire by aircraft cannon and machine gun fire. In the morning, air combat developed in the area of the Thames River. In the afternoon, such combat developed in the area of Folkestone and north of Hastings. 3 Spitfire aircraft were shot down by the 26th Fighter Wing. 3 Me-110 and 4 Me-109 aircraft were lost.

Third Air Fleet: At 17:00 hours, the 26 Twin-Engine Fighter Wing committed 14 Me-110 aircraft escorted by 60 Me-109 aircraft against Newhaven. Hits were scored on the quay, and the railroad dam and in a number of buildings. 1 Me-110 aircraft was shot down and 1 Me-109 aircraft was missing.

18 November : The Fighter Commander II committed 19 Me-109 and 11 Me-110, as well as 5 Ju-87 aircraft against water-borne targets on the Thames River. 31 aircraft accomplished their missions and sank two ships of 3000 tons each and damaged five ships with a total tonnage of 16000 to 17500 tons. In addition, a number of ships was attacked with aircraft cannon and machine gun. During these attacks a steamship of 2500 tons and a lightship were set on fire. It was rather difficult to observe the effects of the attacks because the attacking aircraft which flew at low altitudes encountered strong defenses. The port installations of Harwich served as alternate target and were attacked by one aircraft which dropped two SC-500 bombs. Three aircraft broke off their operations.

19 November : A number of single light bomber aircraft conducted daytime nuisance raids against water-borne targets during which the 210th Twin-Engine Fighter Group raiding coal barges at Lowestoft scored hits on a steamer. The lightship "Smith Knoll" was attacked with machine gun and aircraft cannon.

21 November : The Fighter Commander II reported the commitment of 9 aircraft against water-borne targets off the south-east coast of England. 6 aircraft discontinued their operations owing to bad weather conditions 3 aircraft carried out an attack against a convoy 10 kilometers [illegible] north-east of Oxfordness. Any effects of the attack were not observed.

22 November : The Fighter Commander II reported the commitment of 6 Me-110 and 1 Ju-87 aircraft against London and water-borne targets. 3 aircraft broke off their operations because of bad weather conditions. 1 aircraft released its bombs on London, 2 aircraft raided convoys. At 10:50 hours, 1 Me-110 aircraft flying at an altitude of 500 meters attacked a merchant vessel of 2000 tons which was a part of a convoy at Harwich. One bomb hit directly beside the side of the vessel and another bomb hit within 10 meters of the side of the vessel. The steamer remained unable to proceed on its course.

The Fighter Commander III committed 1 Me-110 aircraft equipped with two SC-250 bombs to attack a destroyer east of Harwich at 12:40 hours. The bombs hit within 20 meters of the side of the ship. Any effects were not observed. During the attack the destroyer was also subjected to aircraft armament fire.

23 November: The Fighter Commander II committed a total strength of 277 Me-109 aircraft in daytime operations. Of these aircraft 4 attacked London with bombs in the morning while 29 aircraft were employed to provide fighter cover and 13 aircraft engaged in free fighter operations. An air battle against 25 to 30 Spitfire aircraft developed south of London. 1 Me-109 aircraft was lost.

13 Me-109 aircraft equipped with bombs and escorted by 77 aircraft operated against London. 5 of these 13 aircraft dropped one 250-kilogram bomb each on the central section of London north of the Thames River. Visual observation of the ground was possible. Owing to contact with enemy forces and weather conditions, 8 aircraft raided alternate targets. 6 of them attacked Chatham and 2 of them raided antiaircraft artillery positions near Dover. 40 Spitfire aircraft were encountered over London. 1 Me-109 aircraft was lost.

24 November: Reports on the daytime operations on 24 November:

The Fighter Commander II committed 11 aircraft equipped with bombs and 34 aircraft without bombs. 8 of them protected by fighter forces operated against London. 2 of these aircraft reached the target area, the others attacked alternate targets. During these operations, an unsuccessful bombing attack was carried out on a convoy consisting of 30 to 40 vessels and 4 destroyers proceeding in northern direction at Aldebourgh at 13:40 hours.

26 November: A small number of light bomber aircraft was committed in nuisance raids against London, against the air base of Feldwell, the airframe factory of Luton, and against a convoy in the north-eastern mouth of the Thames River. 13 light bomber aircraft located a convoy of 50 ships at 12:00 hours east of Southampton and at 14:20 hours south-east of Harwich. They attacked two times. A merchant vessel without cargo and another merchant vessel of medium size were hit. Further effects could not be observed owing to the fighter defenses. 1 Me-109 aircraft was missing.

27 November: In addition to the 5 Me-109 aircraft which had operated with bombs against London, the Fighter Commander II had committed 82 Me-109 aircraft which flew ten missions to provide fighter cover, to engage in free fighter operations, to scramble, or to search for missing aircraft.

During the attack on London, 6 Me-109 aircraft of which 3 were equipped with bombs were shot down in air combat against 2 Spitfire squadrons. The enemy suffered no aircraft losses.

28 November : The Fighter Commander II reported: Between 14:30 and 15:45 hours as well as between 16:30 and 18:00 hours, fighter forces intruded into the area of Southampton. 3 enemy aircraft were shot down and 1 Me-109 was lost during the first operation. 6 enemy aircraft were shot down during the second operation. A total force of 130 Me-109 aircraft was of which 6 aircraft carried bombs was committed.

29 November : The following aircraft were committed by the Fighter Commander II: 71 aircraft of which 17 Me-109 aircraft carried bombs, 19 Me-109 aircraft flew escort missions, 27 Me-109 aircraft engaged in free fighter operations, and further aircraft in operations against water-borne targets. 10 aircraft carried out the attack on London and 3 aircraft raided a convoy of 15 medium-size merchant vessels 30 kilometers east of Thames Estuary at 12:00 hours, Any effects of the latter attack were not observed. Numerous air battles developed over the areas of Thumbridge, Dungeness, and Ramsgate. 1 Hurricane aircraft was shot down according to reports.

30 November : In daytime, 6 light bomber aircraft operating over London in lightly overcast skies dropped a total 2,5 tons of demolition bombs on the government district, the district of Kensington, and the central section near London-Bridge.

December 1940

2 December : 98 Me-109 aircraft were committed in eight missions. 9 of these aircraft escorted by 25 Me-109 aircraft attacked London with bombs. Two aircraft were employed to provide fighter cover in the sea rescue service. The rest of the units was committed in free fighter operations. During the attack on London the bombs were dropped on the district of Bromley and on the southern edge of the city. Visual observation of the ground was possible during this raid.

5 December : The Fighter Commander II committed 9 Me-109 aircraft equipped with bombs and 7 Me-109 aircraft for escort purposes in an attack against Milton-Regis. Hits were scored in the southern section of the city. Fires were observed.

6 Me-109 aircraft equipped with bombs and 31 Me-109 aircraft providing fighter cover conducted an attack against the airfield of Hawkings. Any effects of the attack were not observed. One SC-250 bomb hit beside the side of a ship at Folkestone. Air combat with 15 Spitfire aircraft developed over the area of Dover. Further air battles developed against 15 Spitfire aircraft over Littlestone and with further 15 Spitfires over the area extending from Dover to Cape Gris Nez. 2 Spitfire aircraft were shot down. 1 Me-109 aircraft was missing

10 December : A considerable danger of icing existed in the entire area of operations during daytime. A small number of light bomber aircraft only was committed. 2 Me-109 aircraft of them carried out a bombing raid against a factory between Folkestone and Canterbury, while 8 Me-110 aircraft raided London after using navigation by dead reckoning and 1 Me-110 aircraft scored bomb hits in buildings and in the port of Frinton on Sea and in Harwich.

11 December : 17 Me-109 aircraft committed against London broke off their operation because of the weather conditions and raided alternate targets such as the oil depot of Port Victoria and the port installations of Hastings. A ship in the area of the lightship "Kentish Knok" received a hit in her screws and stooped. 9 Me-109 aircraft attacked water-borne targets at Clacton on Sea. At 16:20 hours, two direct hits were scored on a ship of 1500 tons. The ship sank. Another ship of 1500 tons was hit by two SC-250 bombs and listed heavily.

12 December : The 26th Fighter Wing attacked London with a number of single fighter aircraft carrying bombs. 2 aircraft were committed against Chatham and 1 aircraft was committed against Folkestone. 3 aircraft scored hits in an industrial establishment near Deal. During air combat with a Curtis squadron and a Spitfire squadron over Maidstone a Curtis aircraft was shot down. One Me-109 aircraft was lost.

Appendix 6
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Copy

Otto Weiss
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Report on the Fighter-Bomber Commitment with the 2nd Group/2nd Instruction Wing during the Battle of Britain in ~~the Event~~ Situations of Air Inferiority

The 2nd Ground-Attack Group/2nd Instruction Wing was, at the beginning of ~~the war~~ World War II, the only group available in the Luftwaffe for employment as a ground-attack unit, ~~to provide support to the ground forces.~~ After ~~mere~~ pure ground-attack commitment in the campaigns in Poland and France, the 2nd (Ground-Attack) Group/2nd Instruction Wing was, ~~when the campaign in France had come to an end,~~ committed as a fighter-bomber group in the Battle of Britain.

During the campaign in France ~~the ground-attack group was~~ had been equipped with the Hs-123 aircraft (armament: 2 machine guns; bomb load: four ~~50-kilogram~~ 110 pound bombs or one ~~500-kilogram~~ 1,100 pound bomb or one ~~250-kilogram~~ 550 pound bomb or ten ~~10-kilogram~~ 22 pound bombs or one incendiary tank). ~~and~~ Was re-equipped with ~~the~~ Me-109 E aircraft, ~~for the operations against England.~~ For operations against England it

An experimental squadron of the 210th Experimental Group had found out that the Me-109 aircraft was able to carry, in addition to its armament, a bomb load up to ~~500 kilograms~~ 1,100 pounds in weight. The bombs were being suspended on the outside of the fuselage ~~at the bomb release gear.~~ This method of suspension reduced the flying speed of the Me-109 fighter aircraft by about 20 to 30 kilometers. ~~The climbing ability~~ Its rate of climb and ~~the~~ its maneuverability ~~were, in the case of the fighter-bomber as compared with the mere fighter aircraft,~~ were also considerably impaired.

Shortly after the end of the campaign in France, the 2nd Group/2nd Instruction Wing was transferred to its home base at Braunschweig-Waggum for re-equipment and retraining. The pilots received their basic retraining at the flying school of Magdeburg. About 20 per cent of the pilots had to be relieved of their duty since the Me-109 aircraft with its then flying speed of ~~470 kilometers~~ 293 miles per hour was more difficult to fly than the Hs-123 aircraft with its speed of ~~230 kilometers~~ 143 miles per hour. The aircraft received their technical fighter-bomber equipment at the air base of Boeblingen. The combat training in ~~bombing approaches~~ (~~diving and~~ dive bombing; low-level attack ~~as well as attack from the side~~ and oblique attack) and in firing from ~~the air with~~ fast fighter aircraft against ground targets was also carried out at ~~this air base~~ Boeblingen.

The Me-109 aircraft received the following equipment for fighter-bomber commitment:

Armament: 2 machine guns and two 20-mm cannons.

Bomb load: One ~~500 kg~~ 1,000 pound bomb, or one ~~250 kg~~ 550 pound bomb, or four ~~50 kg~~ 110 pound bombs or ninety-six ~~2 kg~~ 4 and 1/2 pound fragmentation bombs.

~~According to~~ Because of its additional missions, the fighter-bomber group had to be assigned personnel different from that of a ~~more~~ fighter group with more specialized personnel requirements than the ordinary ones. ~~The number of armorers was reduced.~~ Fewer Special technical bomb personnel ~~was, instead,~~ were needed, however, assigned to the group. In addition, the group had to be equipped with larger supplies of tires, since the tires had to be exchanged after 7 to 8 take-offs owing to the heavy strain caused by the bomb load. Moreover, the required sets of supplies and spare parts for the bomb equipment had to be shipped to the operational air base.

After the 2nd Group/2nd Instruction Wing had been rehabilitated, converted, and re-equipped by the beginning of September 1940, it was transferred to the Channel coast for commitment against England. ~~The major part of the operations was conducted~~ It operated, for the most part, from Calais.

Since the enemy fighter forces operated ~~without interruption~~ with utmost intensity against each bomb-carrying unit flying to South England, the operations of the 2nd Group/2nd Instruction Wing could be ~~conducted~~ usually only under strong fighter cover with.

For this reason, the fighter-bomber group was stationed at Calais together with a fighter group (Commanding Officer was Captain Ihlefeld) and directed to cooperate most closely with the latter.

The operations were always conducted in strength of group (30 to 40 aircraft) in order to carry the greatest possible amount of bombs to the target.

The first missions were flown against the airfields located near the coast in South England. During these operations, the fighter-bomber group, protected by strong fighter forces, approached the airfield concerned flying at altitudes from 2500 to 3000 meters and dropped its bombs in a glide-angle attack. The individual aircraft used primarily four 50-kilogram bombs in raiding grounded enemy aircraft. After the bombing raid the squadrons conducted strafing attacks against the grounded aircraft and the gun crews in the antiaircraft artillery positions. The airfield to be raided was first subdivided into several sectors which were to the different squadrons. By this method, it was prevented that the squadrons would disturb each other during the attack and it was insured that the entire target could be raided by all elements at almost one stroke. Our escort fighters operated against the enemy fighters which had scrambled as soon as our units approached so that we could attack our ground targets unmolested. In all attacks against such targets protected by [illegible]-aircraft artillery and fighter forces it was very important that these targets were raided by as many aircraft as possible at the same time and from different directions. By this method the enemy defenses were dissipated. After a number of attacks against the airfields located near the coast in South England it was found out that the enemy had only alerted units at these airfields which were already up in the air when the group entered the combat area and that the aircraft parked on or near the landing field were only dummies.

Therefore, the attacks on the airfields had little effect only. The only result achieved was that the enemy fighter aircraft were provoked to replulse our attack.

For this reason. the fighter-bomber group was soon after assigned other targets of military importance such as oil depots, docks, railroad centers, and coastal naval craft in the area of Ramsgate and London. The targets and areas of attack were frequently changed to obstruct enemy defensive measures.

In view of the enemy fighter superiority existing at the time,the essential factor for the successful commitment of the fighter-bomber group was the friendly fighter cover. The latter required detailed and conscientious preparation. The increasingly strong enemy fighter defenses soon forced the group to approach the target and the combat area flying at altitudes from 6000 to 7000 meters since, in case the fighter-bombers flew at lower altitudes, the enemy alert units attempted to intercept the fighter-bomber units before the latter could reach the target.area. Although all ground-attack pilots had been trained also in air combat, it was the primary mission of the fighter-bomber group to attack the assigned ground target with utmost accuracy and without being engaged in air combat prior to the fulfilment of this task. If the enemy fighter aircraft would have succeeded in engaging the fighter-bomber group in air combat, the fighter-bombers would have been forced to release their bomb loads at random, since the Me-109 aircraft carrying bombs under its fuselage was inferior to the enemy fighter aircraft. High flying altitudes and adequate fighter cover prevented the fighter-bomber group from being engaged in air combat prior to the attack on the ground targets assigned.

In order to make it easier for the fighter cover to recognize the units to be protected, the fighter-bomber group approached in almost closed, at the most slightly dispersed group formation. Mostly, the headquarters flight flew in front (4 aircraft) and a squadron flew at the right and at the left sides. The third squadron followed at a distance of 200 to 300 meters from the headquarters flight at an altitude of about 200 meters higher than the preceding aircraft to be able easily to catch up with the other squadrons by pushing the aircraft down.

After take-off for a fighter operation it was of primary importance for the unit to assemble fast to an almost closed formation at departure altitude. As assembly point an especially conspicuous terrain feature located near the operational was selected. To avoid any needless loss of time for the assembly at departure altitude, it had to be demanded that, in spite of the bomb load, started if possible in squadron at least, however, in flight formation. A thorough training of the pilots of the fighter-bomber group in taking off in unit formation was a prerequisite for meeting this demand.

After the enemy fighter defenses had been considerably strengthened, the ground-attack group was committed as fighter-bomber group only with extremely strong escort fighter cover provided according to directives by the air corps. The time of departure of a fighter-bomber unit from the assembly area was designated X-Time which had to be adhered to by all units taking part in the operation to insure a smooth cooperation between the individual units.

Dependent on the air situation, fighter cover was provided by the following system:

At a certain period of time prior to X-Time, dependent on the location of the operational air base, a fighter wing proceeded into the target area to clear the approach route and the combat area of enemy aircraft for the fighter-bomber unit.

Direct escort fighter cover was mostly provided by the fighter group based at the same airfield as the fighter-bomber group or at a neighboring airfield so that as early as during the assembly direct fighter cover was insured. Indirect fighter cover was, in accordance with the air situation by a fighter wing flying to the right and another one flying to the left of the fighter-bomber unit. A third fighter wing flew behind the approaching fighter-bomber unit. If necessitated by the distance of the combat area, an additional fighter wing took off at X-Time minus ..... minutes to serve as cover and rear guard wing. The mission of this wing was to, after the fighter-bomber unit had carried out its raid and was leaving the combat area, to intercept enemy fighter forces pursuing the fighter-bombers and to provide cover for the latter during their return flight.

For this reason, the fighter-bomber unit had to integrate into an almost closed flying formation after its mission was accomplished to be easier to recognize as a flying object to be protected by the fighter aircraft providing cover. Moreover, fighter wings were in case of necessity appointed for providing extended fighter cover. These units engaged in free fighter operations at different altitudes and over different areas and were not bound to keep close to the approach route and the combat area of the fighter-bomber unit. Their time of commitment, however, was scheduled to conform to that of the fighter-bomber unit.

The escort fighter operations functioned excellently. As a result, the fighter-bomber group sustained only negligible losses due to enemy fighter action. Although, flying in a closed formation, our fighter-bomber group could be easily recognized by the enemy who continually attempted to destroy our bomb-carrying unit already during the approach flight, all enemy attacks were frustrated by the excellent fighter cover. Dependent on the situation, the forces providing such cover were employed in adequate strength as direct, indirect, and extended escort fighter cover or for the purpose of clearing the approach route of enemy aircraft and of protecting the returning fighter-bomber units.

In a few cases single enemy fighter aircraft succeeded in diving vertically from above through the friendly fighter cover thus forcing the fighter-bomber unit to fly through the cone of fire of these enemy fighters. Since these single raids had the character of mere nuisance attacks the losses sustained by the fighter-bomber group were extremely little. Mostly however, the single enemy aircraft which had broken through the fighter cover were later shot down by friendly escort fighters.

Owing to the well-organized and well-functioning fighter cover, the enemy fighter aircraft did not succeed only once, during the Battle of Britain, in preventing the 2nd Group/2nd Instruction Wing from accomplishing its mission or in dispersing the unit before it could carry out its attack.

After the mission was accomplished air combat sometimes developed between the fighter-bombers and sinle enemy fighter aircraft. Since the pilots of the 2nd Group/2nd Instruction Wing had been trained in air combat, these attacks by single enemy aircraft could be repulsed and the enemy aircraft could be shot down. During the return flight after the accomplishment of the mission the squadron commander could, provided adequate amounts of fuel and ammunition were on hand, order offensive action against nearby airborne targets.

The following points had to be taken into consideration by the fighter-bomber unit regarding the employment of signal communication facilities:

1.) Absolute radio silence up to the arrival at the target area.

2.) It had to be insured that evaluated reports on enemy forces reached the fighter-bomber unit on its radio frequency during the assembly, approach, and return flight.

3.) Possibility of communication between fighter-bomber unit and fighter aircraft providing direct fighter cover by using the same frequency.

4.) Any possibility of communication with the other fighter forces providing protection was undirable, since a frequency switched-on could not be changed in the air and the radio intercommunication of the escort fighter aircraft would have interfered too much with the radio intercommunication of the fighter-bomber unit.

5.) Radio-telephone communication with the sea rescue squadron.

After an attack on the ground target assigned the fighter-bomber unit assembled mostly at an altitude of 2000 to 3000 meters for the return flight to its base. This altitude was chosen to get out of the range of the small-caliber antiaircraft artillery. The aircraft often left the target area flying at low altitudes in order fly below the enemy effective radar altitude.

During a number of diving and glide-angle attacks against targets on the Thames River which were protected by captive balloons with wire-cable obstacles, no aircraft were lost or damaged. Consequently, a deterring effect only can be ascribed to these types of obstacles.

Fighter-bomber operations during the Battle of Britain were conducted in good weather conditions only. Therefore, the possibilities of commitment were extremely limited and decreased even more during the months of October and November 1940. Since, in good weather conditions, the enemy fighter operations were intensified and the provision of friendly fighter cover required thorough preparation, the fighter-bomber group could be committed twice, at the most three times, per day.

When, in November 1940, the bad weather conditions no longer permitted high-altitude approach flights with fighter cover, nuisance raids by small units (pairs) had to be conducted instead of the massed highly effective attacks carried out closed flying formations. Certain targets near the coast and the coastal shipping were raided by single pairs of aircraft approaching and attacking at extremely low altitudes. Any particular effect was not brought about by these nuisance raids, since the bombs had to be dropped with delayed-action fuzes to prevent the attacking aircraft flying at an extremely low altitude from being endangered by bomb fragments. In addition, the lack of adequate bomb sights made it impossible to aim accurately in bombing raids rather with Me-109 aircraft unless the aircraft dived vertically or in a gliding angle.

In conclusion, I wish to mention that during the Battle of Britain in which the ground-attack group was employed as fighter-bomber unit the latter operated against static ground targets or water-borne targets without having any contact with the ground forces or being missioned to provide support for them.

Appendix 7

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Combat Report of General Galland on a Fighter-Bomber Attack on London in January 1943

(Excerpt from the book by Colonel (ret.) Werner Baumbach titled: "Too Late" (German: Zu Spaet), pages 89 and 90).

" Yesterday at noontime the fighter-bomber operation against London was conducted. 28 FW-190 aircraft operated against the city area of London, conducted a diversion attack against a town situated 25 kilometers from the southern coast, and carried out a second diversion maneuver by intruding into Thames Estuary. All action was coordinated in respect to time, altitude, and area. A total force of at least 100 fighter aircraft was committed in the operation. The raid on London was carried out by the 96th and 2nd Fighter-Bomber Squadrons. These squadrons intruded with 28 aircraft of which 24 carried 500-kilogram bombs and 4 carried 50-kilogram bombs flying at low altitudes over the area of Beachy Head. Flying across this area they only encountered minor antiaircraft artillery fire while otherwise ~~xxxxxxxx~~, as soon as German aircraft approached or crossed the coast, the British used to fire rockets which came to a halt in the air thus optically alarming the forces concerned (sic). This was not done in this case. The aircraft penetrated to London without even seeing an enemy fighter aircraft. 30 per cent of the balloon barrages were up in the air and 70 per cent of them were grounded.

Our aircraft then buzzed ~~xx~~ over the roofs of London flying at an altitude as low as 5 meters above the roofs, as they said, and released their "eggs" south and west of the wide bow of the Thames River. They claim to have seen how the bombs pierced the houses. The bombs penetrated through two, and as one pilot said, three houses before the detonated. The few wire obstacles did not hinder the operations.

The aircraft turned back and climbed a little bit. Streetcars and buses were on their way and a considerable panic must have been caused. On their return flight they hit a gas-meter in the city area of London and shot down 7 barrage balloons. One aircraft was hit by antiaircraft artillery over London. The pilot lost his hand by this hit. However, he managed to fly home and make a clear landing using the other hand only. One of these 28 aircraft had to make a water landing probably owing to engine defect or hits by antiaircraft artillery. This aircraft was lost so that the total losses amounted to one aircraft lost and one pilot wounded. That's excellent! The others encountered two flights of enemy fighter aircraft. However, they were protected by a number of friendly fighter aircraft. The aircraft curved in the air during the engagement in which 1 British aircraft was shot down and we lost 2 fighter-bombers.

This fighter operation which was directed against Thames Estuary failed to some extent. This failure was not due to inadequate strength of our forces but resulted from operational mistakes in the air combat. One squadron took tactical measures which were completely wrong and received heavy blows by a Spitfire squadron. The squadron commander collided with his wingman in the air. Both came down and two other aircraft were shot down after as early as during the approach flight one aircraft had to make a water landing without being contacted by the enemy and disappeared.

During this operation the British lost 4 Spitfire aircraft which were shot down. Moreover, a sea rescue operation was conducted during which the British were extremely active. They all were aroused and curved wildly in the air. One fighter aircraft was lost so that the total losses amounted to a high figure. All the lost aircraft, however, lay on the coast. The exploitation of the element of surprise, however, proved to be a complete success."

Appendix 8

(To Page 84)

Copy

Otto Weiss

Colonel (ret.)

Commitment of Fighter-Bomber Aircraft in the Campaign in Russia

After its commitment in the Battle of Britain, the 2nd Group/2nd Instruction Wing was, in the spring of 1941, re-equipped with Hs-123 aircraft and committed in the campaign in the Balkans with these aircraft. Prior to the war against Russia the group was assigned three Me-109 squadrons and one reinforced Hs-123 squadron (20 aircraft. In this form the group was committed in the campaign against Russia as a pure fighter-bomber group.

During the phase of advance towards Moscow a Spanish fighter squadron was assigned to the 2nd (Ground-Attack) Group/2nd Instruction Wing. This squdron was assigned the mission of providing fighter cover to prevent enemy fighter aircraft from interfering with the operations of the fighter-bomber group. Such measure had become necessary, since at certain points of main effort at the front Russian fighter units flew on defensive patrol to provide protection for Russian troops. Although the ground-attack group was equipped with bomb-carrying fighter aircraft, a pure fighter squadron had to be assigned, since otherwise the unimpaired air support of the ground forces could not be insured owing to premature engagement of these aircraft in air combat. As a result of the training which its pilots had received, the ground-attack group was at any time in a position to engage in air combat. In such case, however, an emergency bomb release would have become necessary. Under circumstances, the bombs would have to be dropped even on friendly territory and the effective accomplishment of the fighter-bomber mission would have been jeopardized.

One flight of the fighter squadron usually flew ahead of the fighter-bomber unit and cleared the airspace over the sector of the front in which the ground-attack aircraft were to support the army of enemy aircraft. A second and a third flight of the fighter squadron were committed to provide direct cover for the approaching ground-attack unit.

After the fighter-bomber mission had been accomplished, the Spanish fighter squadron participated in the ground operations and operated against enemy troops and vehicles by conducting strafing raids, provided the air situation permitted such action. This method of commitment proved to be very successful in the areas of Mossaiks and Rusa.

It should be especially mentioned that the Spanish squadron operated without bomb-carrying equipment and without bombs, since otherwise its efficiency in air combat would have been considerably impaired in cases of contact with enemy fighter aircraft which could be expected at any time. After all, the Spanish squadron was very successful in its operations against ground targets, since the enemy troops left their cover when the fighter-bomber unit had disappeared and continued their march movements. Therefore, the surprise attacks of the fighter aircraft which had stayed behind in the combat area were extraordinarily effective.

The great advantage involved in these joint operations of ground-attack and fighter aircraft was the fact that ground-attack unit could accomplish its mission unmolested by enemy fighters, while the fighter aircraft could devote themselves to their proper mission of engaging in fighter operations. When their mission of providing cover was accomplished, the fighter aircraft did not need to search a long time for the frontline or enemy ground targets but could carry out surprise attacks against all targets located in the area raided by the ground-attack group or which reappeared.

In the accomplishment of its mission of providing escort cover the Spanish fighter squadron shot down a great number of enemy fighter aircraft. This squadron excellently fulfilled its tasks as pure fighter during fighter-bomber commitment
unit as well as ~~fighter-bomber forces~~ even though it was not equipped with bombs.

Appendix 9

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Tactical Experiences Regarding the Commitment of Fighter-Bomber Aircraft

(From the war diary of the 54th Fighter Wing which was committed in the East (Russia) from 1 November 1941 to 30 April 1942)

During the winter months, the commitment of fighter-bomber forces at the northern front became especially important, since adequate bomber forces which could have been committed against ground targets on a large scale were not available.

In addition to the aircraft armament which is available and provided with ammunition as in pure fighter aircraft, the following air-drop explosives can be used:

1.) 500-kilogram bombs against special types of targets provided a hard-surfaced runway is available (500-kilogram bombs were not dropped during the winter months).

2.) 250- kilogram bombs particularly against buildings of resistant construction, towns, railroad stations, bridges etc.

3.) 50-kilogram bombs. Each aircraft to be equipped with 4 such bombs. In particular to used against live targets, columns, positions, trains, runways, and grounded aircraft.

4.) SD-2 bombs. Each aircraft to be equipped with 96 such bombs. These bombs have not proved to be effective compared to the effort required for their use.

Almost in any case the SD-50 bomb can be used with the Type-53 fuze. If used in sticks consisting of 4 bombs a good dispersion pattern of hits can be insured and the fragmentation effect of this bomb is excellent. This bomb is dropped in a gliding attack with its fuze set at non-delay. Its handling is simple, since it can be loaded without lifting device and can be easily supplied.

Take-off with four SD-50 bombs is possible at any standard combat airfield. A landing with bombs should by no means be made, since the shock absorber legs would be overstrained in such case.

The Conduct of the Operations:

1.) Taxying and Take-Off:

No difficulties are encountered in taxying on an airfield coated with snow if the runway is hardened by rolling and the aircraft taxies at a high speed. Extremely rapid turns have to be avoided, since in such case the wheel on the outside is pressed into the ground.

The take-off on a rolled runway is carried out like in summer: The aircraft starts moving with its tail down. After a short while the undercarriage is lifted on the surface of the snow coating and the aircraft is stepped up like a seaplane. Subsequently, the aircraft is pushed down to bring about a normal taxying and take-off.

2.) Approach and Bomb Release:

The aircraft approach at altitudes of 3000 to 4000 meters. Before reaching the target the engine is throttled down and the aircraft glides down to an altitude of 2000 to 3000 meters.

The direction of attack is primarily determined by the dimensions of the target to bring to bear the entire stick of bombs if possible. The attack from the counter direction is to be taken in to consideration in the second place (optimum probability of hits). The solstitial point can be exploited in the attack. The element of surprise, however, can also be exploited in attacks from directions other than that of the sun provided the skies are clear, since the small Me-109 aircraft is mostly recognized too late.

For aiming the standard fighter "Revi"* is used which provides adequate data. Lag and wind correction which are subject to considerable changes according to the gliding angle and the flying speed can be correctly measured only on the basis of a long practice. However, the personnel concerned acquire such cleverness in this field that no more difficulties are encountered.

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Note: * Fighter "Revi" (German: Jagdfliegerrevi) : bomb aiming device

Crews with adequate experience score hits in almost any raid. The fighter-bomber attack is to be started from a high altitude. This involves the advantage that the target can be easily located and observed. To bring about an adequate non-delay effect it is necessary that have been released at the latest at an altitude of 400 meters. Subsequently, the aircraft must not continue diving in order not to come within the range of the fragmentation effect of the bombs. This mistake is made by almost every beginner. If the bomb is released at an altitude too low, a delayed-action ignition is effected. The bomb would penetrated into the ground and not detonate until 8 to 14 seconds after impact. In such case the entire pressure and fragmentation effects are directed upwards, which looks rather impressive but cannot be compared with the effect produced by non-delay ignition. (Exception: specific targets for delayed-action ignition. In such cases, the fuzes are set at delayed-action).

In assigning targets and giving the order for the attack the commander of the unit concerned must insure that the aircraft will not endanger each other. The aircraft attack gliding from an altitude of 2000 to 3000 meters. The determination of the gliding angle is the responsibility of the respective commander. He will base his decision on the following principles:

A steep gliding angle (45 degrees) would bring about high speed, short stay within the range of the antiaircraft fire, better exploitation of the element of surprise, good aiming accuracy owing to the high initial velocity of the bombs. The possibility of employing aircraft armament, however, is restricted to a very short period of time. Danger of break-ups in the air if the aircraft is flattened out too abruptly.

A flat gliding angle (20 to 30 degrees) would bring about a reduced approach speed but a better possibility of employing aircraft armament. However, the aircraft would stay longer within the zone of bomb release and the aiming accuracy would be diminished by the reduced initial velocity of the bombs and the bouncing of the latter after impact (up to 300 meters.)

If the aircraft dive at a gliding angle of more than 60 degrees the bombs would hit the airscrew. For the same reason, the "Einortstab"* cannot be used. The installation of a bomb sight in the Me-109 aircaft is to be rejected, since such extreme diving angles are not required.

The low-level attack is more difficult as far as orientation is concerned and provides too little possibility of surveying the whole target area. For this reason, in attacks on airfields, for instance, the approaching aircraft fail, in general, to direct their course accurately towards the parking area and their attack thus remains without any effect. In addition, the bombs would bounce incalculably and the delayed-action ignition thereby produced would eliminate the element of surprise. since everybody would take cover. It would hardly be possible to bring the aircraft armament to bear because the nose of the aircraft cannot be pushed down for aiming purposes and the cone of fire would thus be placed above the targets.

The high-altitude horizontal attack offers any prospect for success only in the case of extremely large area targets, since aiming is impossible and, in addition, the wind drift makes itself strongly felt.

The fighter-bomber attack in the rear area of the enemy is to be conducted in a single approach. This is especially so in the case of targets with strong antiaircraft artillery protection. Any repetition of the attack perhaps in the form of alow-level raid would mostly lead to hits in the aircraft and losses of friendly forces.

During the winter campaign in Russia the pair proved to be also the most suitable strength of the attacking unit in such raids. Fighter cover was not provided. During the attack one pilot keeps an eye on the other.

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Note: * Einortstab:

3.) Levelling-off:

If anti-aircraft defenses are encountered during diving or levelling-off, it is advisable to level off in a curve after the bomb release. Consideration has to be given to the fact, however, that considerable torsional moments occur owing to the high speed of the aircraft which entail a deformation of the surface of the aircraft. The surface of a number of fighter-bomber aircraft warped.

4.) Leaving the Combat Area:

Flying in the direction of the sun after the air raid impairs the defensive action. However, the aircraft should, in general, leave the area of the enemy defenses flying at an extremely low altitude and making use of the high rate of speed obtained by diving and climbs over an area with negligible defenses. The front should be crossed flying either at extremely low altitudes or above 2000 meters. The course used in leaving the combat area has to be determined beforehand to insure a rapid assembly. The comradeship between those pilots forming a pair should by no means be forgone.

5.) Commitment of a strong Fighter-Bomber Unit:

Whenever a strong fighter-bomber unit, at the most 4 to 6 aircraft - if more were employed together they would disturb each other, is committed, the aircraft should approach and leave in the same combat formation employed in normal fighter operations. The comradeship of the pairs is the supreme law also in a fighter-bomber operation. For this reason, the replacement squadron of the wing should employ its aircraft in pairs during training bombing attacks.

In the attack conducted by a strong fighter-bomber unit, the target is raided by two aircraft at the same time. In the case of attacks on static targets, the assignment of the targets by means of a target map prior to the attack is advisable. Otherwise, the assignment of the targets and the order for the attack is communicated by radio.

In general, all three pairs attack the specific target assigned to them at the same time. In case of weak defenses it is also possible to raid the target one pair after the other.

The fighter-bomber unit is, in general, escorted by at least one pair of fighter aircraft. This pair of fighter aircraft covers the air space while the fighter-bomber unit searches for the target. During the attack, the escort fighters stay at a high altitude above the target thus making it possible for the fighter-bomber unit to climb without any interference after the raid. The fighter cover is to be reinforced according to the situation.

6.) Selection of the Crews:

It is most advisable to select the crews from the pilots already available. These, however, should be repeatedly given opportunity to practise bombing to acquire and retain accuracy in aiming. Even so, their commitment as fighter pilots from time to time is necessary to keep in training in such operations. It should be understood that in the course of the same mission the pilot can switch over from free fighter operations to fighter-bomber operations. In practice, however, this is not possible since the pilot is absorbed by the preparation for and the concentration on the fighter-bomber operation to such an extent that most of the pilots do not succeed in adjusting themselves to the extremely different type of flying in the search for enemy aircraft in the air. It is self-evident that, in particular after an attack, any enemy aircraft encountered during the return flight is attacked according to the principles of fighter operations. Whenever a good opportunity for shooting down enemy aircraft arises, the bombs can be released, if necessary, and the aircraft can engage in air combat already prior to the fighter-bomber attack. This, however, is possible in independent air operations only.

In the case of operations conducted at the same time and by forces stronger than a group such as attacks on airfields to relieve those forces carrying out a large-scale attack etc., priority is to be given to the fighter-bomber mission under all circumstances.

Extremely ample differences of opinion have been existing on the organization of the fighter-bomber arm. What has been said so far makes it clear, however, that a separation of fighter-bombers and fighters is not conveivable without forgoing the concept proper of the fighter-bomber force. The activation of special fighter-bomber groups would turn the latter into ground-attack groups, since each of their commitments would be a bombing operation. The fighter aspect would rank second which would eliminate the ability to operate against enemy fighter aircraft. This ability, however, is absolutely necessary to accomplish the fighter-bomber missions. (In addition, the mutual interest and the possibility of common commitment is greater in one and the same group).

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Bombing Raids on Russian Railroad Installations.

Demolition Bombs on Russian Railroad Lines

Blastings and bombing raids were carried out at the railroad line Orsha - Lepel. The following results were shown in this action: The SC-10 bomb is unsuitable, since damages are caused only in case of an impact extremely close to the rails.

With SC-50 nose-spiked bombs Russian rails can be made unusable, provided the bombs detonate between or up to a distance of 1,50 meters from the rails. The damages can be repaired comparatively fast by filling the craters and replacing the damaged sleepers and rails.

SC-250 nose-spiked bombs would destroy the Russian rails more effectively than the SC-50 nose-spiked bombs do. In this case, the maximum permissible distance from the impact to the rail (difference of the crater diameters) can be greater than that in the case of the SC-50 bomb by 3 meters. Nose-spiked bombs are to be dropped from an altitude of about 50 meters with an angle of inclination of the flight path of about 10 to 15 degrees. In general, the bomb penetrates into the ground. Sometimes, however, it happens that bombs bounce off the ground.

The following number of SC-50 nose-spiked bombscan be used in the Me-109 aircraft : 2 bombs.

The following number of SC-250 nose-spiked bombs can be used in the Me-109 aircraft: 1 bomb.

The following number of SC-500 nose-spiked bombs can be used in the Me-109 aircraft: 1 bomb.

Appendix 10

(To Page 92)

Russian Reaction to the Commitment of German Fighter Units in Low-Level Attacks on Ground Targets

(Experiences of the Commanding Officer of the 54th Fighter Wing, Major Trautloft, Excerpt from the War Diary, Pages 10 and 11).

The well-known fact of the disproportion between losses and success in the low-level attacks conducted with Me-109 aircraft was repeatedly confirmed also during the winter operations. Of 7 total losses sustained over enemy territory 6 were due to ground fire encountered during low-level attacks. In addition, 36 aircraft received hits in their radiators. A few of them only could be flown back to their operational airfield and safely landed.

The following are the disadvantages of the Me-109 aircraft in respect to low-level attacks:

1.) Inadequate armament.

2.) Great vulnerability to enemy fire.

3.) High flying speed.

At a static front, the ground defenses consisting of infantry rifles, twin- and antiaircraft machine guns, as well as 20-millimeter antiaircraft guns are especially strong. The prerequisite for an effective low-level attack is, therefore, the exploitation of the element of surprise. Otherwise, heavy losses are sustained in low-level attacks against enemy forces in entrenchments and ready for defensive action. On principle, low-level attacks against columns on the march can be very effective, in particular in mobile warfare. However, such attacks are to be carried out only in cases of utmost emergency when the targets are located near the front and the enemy forces under attack are protected by strong defense positions.

The following targets were raided in low-level attack: airfields, tanks, trucks, sleds, columns, concentrations of troops at the points of main effort of ground warfare and on the ice road across the Lake Ladoga, as well as locomotives on the rear supply lines.

In all low-level attacks, particularly in the area near the front, the weather conditions, the solstitial point, the direction of enemy observation, the noise carried by the wind, and the direction of flight to the friendly frontline have to be taken into consideration. To insure surprise, it is not possible to reconnoiter the target for a long period of time or to observe it flying at a low altitude. For this reason, it is advisable to reconnoiter targets and alternate targets flying at an altitude of about 2000 meters and to dive at a steep angle when being out of sight of the troops to be attacked. Subsequently, the attack is to be carried out as a surprise, since even the Russian light infantry weapon defenses are so effective that damages on the aircraft have to be always expected. By these damages the aircraft would be put out of operation for at least a short period of time. The attacking aircraft are to leave the combat area always flying at extremely low altitude to escape enemy defensive action. The aircraft are to climb to fighter combat altitude over areas in which no enemy defenses exist in considerable strength (for instance swamps, forests).

Extraordinary difficulties were encountered in conducting the attacks ordered to be directed against targets located immediately ahead of the frontline of friendly troops. The primary requirement for avoiding to endanger friendly troops is the thorough knowledge of the location of the target and the front line on the part of the pilots.

The diversified winter equipment which was uniform neither with us nor with the Russian troops made the distinction between friendly and enemy troops extremely difficult. Ground signals did not correctly indicate the location of the frontline either, since they were fired by both sides. Ground panels were not employed by our troops. Such sort of operations might be ordered only in cases of utmost emergency. In all other cases it is advisable to to determine a border line up to which armament must not be brought to bear in a low-level attack.

On the grounds previously mentioned it occurred several times that the fire affected friendly troops. In addition to the direct losses which were caused, such incidents undermined the confidence of our soldiers in the Luftwaffe.

Operations against locomotives are most effective when conducted against moving trains in sections between stations. The railroad stations frequently crowded with trains were especially protected by strong antiaircraft artillery forces so that repeated effective attacks on the locomotives could not be conducted.

The extent to which the Russian supply service was disrupted by the air operations against the locomotives is revealed by the fact that Russian fighter aircraft were employed to provide protection over all major railroad lines. The attacks directed against vehicles on the ice road were extremely effective at the beginning of winter. Later on, however, this road, too, was protected by strong antiaircraft artillery and fighter forces.

Appendix 11

(To Page 93)

Copy

Memorandum No. 1

for the

Commitment of Fighter-Bomber Aircraft

I. General Information

A. Importance of Mission of the Fighter-Bomber Forces

B. Action and Armament of the Fighter-Bomber Aircraft

II. The Commitment of the Fighter-Bomber Aircraft

A. General Points of View

B. Commitment in Coordinated Action with the Army

C. Commitment in the Tactical Area

D. Commitment in the Framework of the Luftwaffe

E. Prerequisites for the Commitment

F. Methods of Attack

G. Reconnaissance

H. Methods and Chain of Command

I. Signal Communications

III. Commitment of other Types of Aircraft as Fighter-Bomber Aircraft

Commitment of Fighter-Bomber Aircraft
from
(During the Years of 1939 to 1945)

I. General Information

A. Importance and Mission of the Fighter-Bomber Forces

1.) The fighter-bomber aircraft is a means of combat important for the conduct and the support of the ground operations. The importance of the fighter-bomber rests in the extension of the range of ground armament in respect to area and cover, in its ability to recognize and combat the enemy in territory which cannot be observed or is covered, and in its capability of extending its operations deep into the enemy combat area and into the tactical area.

2.) The fighter-bomber aircraft is a means of combat of high value. This aircraft is committed at the points of main effort of the ground operations. The fighter-bomber is considered as a ground fighter with the primary mission of supporting the hard-fighting ground forces by offensive action against ground targets which is based on undaunted aggressiveness.

3.) It is the mission of the fighter-bomber to support the operations of the Army at the points of main effort. On the battlefield, up to 30 kilometers beyond the frontline, the commitment of fighter-bomber aircraft at low and medium altitudes and the participation of these aircraft in ground combat by conducting bombing raids and by using aircraft cannons and machine guns will produce a considerable material and moral effect on the enemy.

During the attack of the ground forces, the enemy is forced to take cover and is distracted from his ground effort by continual air attack while the friendly forces are morally supported.

4.)In the tactical area, up to 100 kilometers beyond the frontline, the enemy can, prior to his proper commitment on the battlefield, be battered, weakened, or even beaten so effectiv ly that he is no longer able to conduct systematic field operation In such cases, the fighter-bomber operations are directed against the concentration of the enemy forces, enemy command posts, enemy reserves on the march to the front, and troop movements of all kinds on roads and by rail.

In addition to providing support for the ground troops, the fighter-bomber forces may be assigned the following missions to be accomplished in the framework of the Luftwaffe:

a.) Attacks on enemy combat airfields.

b.) Operations against the antiaircraft artillery defenses.

c.) Supporting airborne operations of friendly forces.

d.) Destruction of enemy airborne forces.

5.) The fighter-bomber attack on the battlefield is directed against enemy strongholds, positions, artillery, armored and antitank forces, and assemblies of all types of forces.

B . Action and Armament of the Fighter-Bomber Aircraft

1.) The fighter-bomber aircraft operates:

a.) with its cannons and machine guns against points and live targets. In such action, the moral effect is increased by

b.) a great number of extremely small ground-attack bombs (SD 2) with a considerable fragmentation effect and by tracer ammunition.

c.) with 10-kilogram bombs dropped in 50-kilogram packs (C-10 pack) and with SC and SD-50 bombs.

d.) With SC-250 and SC-500 bombs.

e.) With smoke and incendiary bombs.

2.) The effect produced by the armament and bombs is increased by the combat method - bomb release from medium and extremely low altitudes. The rigid aircraft armament can destroy point targets in accurately aimed attacks carried out at close distances.

III. The Commitment of the Fighter-Bomber Aircraft

A. General Points of View

1.) On principle, fighter-bomber aircraft are committed at the point of main effort of a ground operation. If possible, they should not be assigned missions which can be accomplished also by other arms (for instance artillery). A fighter-bomber commitment should be primarily aimed at insuring, by fully exploiting all existing possibilities, the unmolested advance of the friendly forces. For this purpose, the enemy resistance must be broken by reckless operations and enemy offensive intentions must be frustrated by defensive action.

2.) In view of the extremely rapid changes which nowadays take place in the ground situation, a fast and reliable communication of orders must be insured as a basis for an effective fighter-bomber commitment. For this reason, the ground-attack wing is usually assigned to an air corps (close-support corps). The corps headquarters issues the directives on when and where the fighter-bomber operations are to be conducted.

3.) The closer the combat airfields are located to the ground forces to be supported the more often the ground-attack wing can be committed. The reliability of all signal communications between the air corps and the units as well as within the unit is of decisive importance.

4.) In addition to the air situation the ground situation in the area of operations must be thoroughly known. The personnel concerned must be provided detailed information.

The mission, targets and time schedules for the attacks of the ground forces also must be known. If this requirement is met, it will be possible for a ground-attack unit to accomplish its mission satisfactorily according to the situation.

5.) Whenever the communication between the wing and the close-support corps is interrupted or unreliable owing to the long distance, the wing is directed to cooperate most closely with the ground forces. The wing cooperates with that command of the Army which conducts the ground operations at the point of main efforts. In addition to establishing personal contact the ground-attack unit will, upon orders of its superior command, detail a liaison officer to the Army command post concerned. This liaison officer will have the mission to inform his unit continually by wire or radio on the situation and the views taken by the Army.

6.) The nature of ground-attack air operations requires the employment of the following combat methods:

Concentrated attack at the point of main effort of the ground operations or "rolling attacks" i.e. consecutive attacks at the point of main efforts. The attacks by concentrated forces are to be conducted especially in the open field, at river crossing points, and in sectors of defense to support the offensive action of the Army in the respective area effectively by striking heavy blows.

"Rolling" attacks are to be carried out whenever a continual support of the Army is necessary.

7.) The possibility of commitment of ground-attack aircraft is, in general, dependent on the following factors:

Weather conditions, air situation, ground defenses, and terrain.

a.) Weather Conditions:

A medium-altitude cloud bank with breaks serving as cover for the approaching aircraft is especially favorable for offensive action. Clouds mean the same to the ground-attack airman as cover means to the ground forces. In case of strong fighter and ground defenses, the ground-attack aircraft approaches its targets by flying in the clouds from time to time.

b.) Air Situation:

The ground-attack aircraft, when taken by surprise, is inferior to the fighter aircraft if the latter attacks fiercely. In case of enemy air supremacy the ground-attack aircraft have to be escorted by fighter aircraft during their operations. In case of a limited enemy air activities and inferior enemy fighter forces the ground-attack aircraft can, after having accomplished their ground-attack mission, in general stay longer in the combat area to operate with aircraft armament against other targets and to engage in free fighter operations against enemy fighter forces attracted by the ground-attack action. (Fighter-bomber ! - the author).

c.) Ground Defenses:

The most effective opponents to the ground-attack aircraft are the small-caliber antiaircraft guns with a high rate of fire, antiaircraft machine guns, and rifles. The effect of the ground defenses can be reduced by exploitation of the element of surprise. This surprise can be achieved by hiding in the clouds and suddenly diving to raid the enemy as well as by dispersing the ground defenses. This can be done by attacking in a broad front from different directions or by changing the flight direction and flying altitude as early as during the approach flight. Moreover, this dispersion of the enemy ground defenses can be brought about by having elements of the unit direct a simultaneous attack against these ground defenses.

d.) Terrain:

The selection of the method of attack, for instance whether high-altitude or low-level attack should be preferred, and of the direction from which the attack should be conducted is greatly dependent on the terrain conditions. Enemy columns, for instance, can be effectively raided at river crossing points. For assembly purposes, areas with weak defenses (such as swamps, lakes, forests) are especially suited.

B. Commitment in Coordinated Action with the Army

1.) To support the Army the ground-attack aircraft can participate in the assault operations of the friendly ground forces thus backing the assault against an enemy sector, enemy positions, or an enemy defense line.

The time for the attack must be exactly determined. During the assault operations of the ground forces the ground-attack units will commit strong elements to batter the enemy and, afterwards, will commit small elements to hold down the enemy forces as soon as the friendly troops have penetrated into the enemy positions.

The targets assigned to the fighter-bomber aircraft during such operations will be field fortification systems, heavy infantry weapons, artillery, or enemy reserves on the march to or employed at the breach while the ground-attack aircraft will primarily operate with aircraft cannons and machine guns against the infantry weapons and continually hold down the enemy forces.

The ground-attack unit coordinates its attack with that of the ground forces at the beginning of the assault. The friendly frontline must not be crossed prematurely by the aircraft. Artillery positions should be spotted as early as during the approach flight, since enemy batteries generally do not fire when aircraft appear over their positions. To increase the momentum of the assault of the ground-attack aircraft, the period of time of the attack must not be overextended.

2.) Ground-attack aircraft can be employed to fight and destroy enemy artillery. During such action, ground-attack aircraft would operate with bombs against enemy artillery on the march and while changing positions. The aircraft would operate with cannons and machine guns primarily against artillery in positions. Prior thorough target reconnaissance by reconnaissance aircraft is necessary.

The ground-attack units must know the ranges of the artillery to be able to recognize the concentration of the artillery forces.

3.) Ground-attack aircraft can be successfully employed in pursuit operations to destroy completely an enemy beaten and withdrawing. An important mission is to prevent the withdrawing enemy from disengaging from friendly forces to establish himself for new resistance in another area. The success of the ground operations is to be insured by conducting "rolling" operations. During such action, a great effect can be produced by attacks against narrow passes, river crossing points, and loading points of troops and equipment.

4.) During defensive action, the ground-attack aircraft should raid enemy assembly areas. After the beginning of the enemy attack, the air attacks have to be directed primarily against the most advanced elements to reduce the momentum of their assault.

5.) The ground-attack aircraft can be assigned the special mission of providing protection for the ground forces pushing forward and of covering their flanks.

6.) In the case of free ground-attack operations, the ground-attack unit is assigned a combat area within which it engages in combat operations independently but in accordance with the mission and operational intention of the ground forces.

The following targets are to be raided in free ground-attack operations:

Traffic on roads, passages, and valleys; troops and columns on the march and assembling on roads, in the open field, and in villages. Assembly areas of motor vehicles, loading and unloading activities, trains, ammunition and fuel depots.

The mobile targets will be either spotted by reconnaissance aircraft assigned to the ground-attack unit or the ground-attack unit commits a number of single ground-attack aircraft to locate the targets while the unit is on its approach flight.

C. Commitment in the Tactical Area

The ground-attack aircraft as a weapon able to decide the outcome of a battle develops its utmost effectiveness when committed in the tactical area. The area in which the ground-attack aircraft can, provided the ground forces advance steadily, exert an effective influence on the course of the battle by its combat operations extends to about 100 kilometers into the rear area of the enemy.

In the tactical area, the offensive action of the ground-attack forces is directed against concentrations of troops and approaching enemy forces, large-scale transfers of enemy forces behind the front-line, concentrating motorized columns of all arms, the supply system, high-level command posts and headquarters.

D. Commitment within the Framework of the Luftwaffe

These operations are mostly conducted in coordinated action with other Luftwaffe units.

The following missions may be assigned to the ground-attack forces during such action:

a) Operations against enemy combat airfields.

b) Operations against antiaircraft artillery positions.

c) To provide support for airborne forces during an airborne operation by:

ca) operating against antiaircraft gun and machine gun positions under the approach route of the transport aircraft,

cb) neutralizing ground defenses of all types when the parachute forces are dropped and during the further landing operations of the airborne forces,

cc) operating against the enemy forces approaching for offensive action against the landing site,

cd) supporting the advance by extending the air landing bases,

ce) operating against and destroying enemy aircraft grounded at airfields located closely behind the frontline. Such action can contribute considerably to the weakening of the enemy air units employed to operate against the airborne operation.

This mission, however, ranks next to providing immediate relief for and support of the friendly forces engaged in ground combat.

d) Action against and the total disruption of enemy airborne operations are based, though in an opposite sense, on the same principles as the action in support of friendly airborne operations listed above under D.c. ca to ce.

E. Prerequisites for the Commitment

1.) Close cooperation with the Army is the basis for a commitment which promises success. For this purpose it is necessary to provide the ground-attack unit with exact information on the combat area and the targets. The frontline must, in addition, be well marked and the ground panels established for a better marking of the frontline as well as the derivatives of these panels to be used for marking the strongholds causing trouble should be frequently employed.

Precious time required for seeking the targets can be saved by thoroughly marking friendly troops by means of smoke signals, ground panels, flags etc. as well as by waving signals and by using indicator cartridges, adjustment shots for direction, and direction signs to indicate the targets.

Moreover, adequate wire communications to the air corps or, in the case of an independent commitment of a ground-attack unit, the delegation of a liaison party to the command staff of the Army are necessary to provide the flying unit as fast as possible with information on the enemy and the operational intentions of the ground forces. The liaison party delegated to the Army headquarters consists of an officer and a small radio section (Type C radio set).

The leader of the radio section should be able to replace the officer if the latter is put out of action until the replacement proper arrives.

2.) Accurate knowledge of the terrain of attack based on aerial photography, information, and orientation flights.

3.) Thorough evaluation of the terrain and the enemy forces prior to the attack (vulnerable spots of the enemy defenses, areas provided with inadequate defenses etc.)

4.) Concentration of ground-attack aircraft immediately behind the front whereby the approach routes are shortened and frequent commitment is made possible.

5.) Detailed information of the ground-attack wing and the individual ground-attack pilots on the air situation, location of the frontline, reports on the enemy, and the operational intention of the ground forces prior to every take-off. Each staff and each ground-attack squadron has its own situation maps with exact entries.

F. Methods of Attack

The conduct of a ground-attack operation is subdivided into:

approach and run-up,

attack,

leaving the combat area and return flight.

a) Approach

The approaching aircraft fly in a closed though slightly dispersed formation. Each pilot must endeavor not to lose the connection with the formation.

b) Run-Up

The run-up on the target is dependent on the ground situation, the terrain, and the weather conditions. The aircraft should over friendly territrory as long as possible and change their courses after crossing static fronts in order to deceive the enemy aircraft reporting system. Areas provided with strong defenses should be avoided as far as possible. In cases of bad visibility, the aircraft should initially head for an auxiliary target (areas with lakes, rivers, rialroad lines, cities, villages, forests) for the purpose of further detailed orientation to be able to locate from there more easily the target scheduled for attack.

According to the extension of the target areas the aircraft conduct their run-up flying in a combat array which is a checkerboard-type flight formation in which the aircraft follow their leading aircraft flying at irregular distances and intervals continually changing their position by curving. (

The aircraft carry out the run-up flying in a combat line if the target has a considerable lateral extension and an encounter with enemy fighter forces can be expected. The combat line is a flight formation in which the aircraft fly in a line to the right or to the left of the leading aircraft so that the airspace behind the unit can be easily observed.

When this flight formation is employed, it is advisable to provide overhead cover. In such case, the units approaches the target flying in a combat line while the force providing cover flies in an upward stepping of 300 to 400 meters keeping small distances and lateral intervals.

c.) Attack

The attack is conducted from an average altitude of 800 to 1500 meters in the form of a stepped glide-angle diving raid. The flight (consisting of 4 to 5 aircraft) proved to be a unit well suited for such attack. The flight is maneuverable and strong enough to carry out an effective raid against a certain target (such as field positions, artillery positions, small columns and concentrations of vehicles). The force carrying out the attack is subdivided into one flight which is to conduct the raid proper and another flight which is to provide cover.

By mutual support and cover (taking turns in the accomplishment of the missions during the offensive operation) the air and ground defenses are distracted and dispersed. The flight providing cover attacks as soon as the flight carrying out the raid proper has brought its bombs to bear. This attack has to be carried out early enough to prevent the ground defenses from directing their action against this second attack.

In the case of strong ground defenses it is advisable to leave the combat area immediately after a single surprise attack in order to assemble for a new raid over an area not provided with strong defens forces.

The flight formation of the combat array is employed for a certain protection against ground defense fire. The combat line, however, is less vulnerable to fighter attacks.

d.) Leaving the Combat Area

The aircraft may leave the combat area flying at a low altitude if this would make it possible to get out of the range of the ground defenses on the shortest possible way (for instance flying across lakes, forests, friendly territory) making full use of the last diving speed, climb at the steepest possible angle in a slight frontward curve up to the medium altitudes used for run-up and attack (800 to 1200 meters) thus extending the target course as far as possible by which the effects of the small-caliber antiaircraft weapons are reduced.

e.) Return Flight

The aircraft begin their return flight after assembling over a specific assembly area (area with negligible defenses) which is located remote from routes of advance to facilitate the recognition of the returning ground-attack unit by the friendly ground defenses and to avoid any unnecessary alerting of the ground forces.

G. Reconnaissance

1.) The following means of reconnaissance are available to the ground-attack forces:

a) Reconnaissance aircraft of the ground-attack unit.

b) Reports of returning friendly air units.

c) Reports of the short-range reconnaissance squadrons employed for reconnaissance purposes in the operational area of the ground-attack unit.

2.) The friendly reconnaissance aircraft are assigned the mission of providing target data, reconnoitering the weather conditions in the combat area of the ground-attack unit, and, in cases of concentrated offensive action, of observing the enemy territory during the time intervals in which no ground-attack unit can be over the enemy thus making it possible to adjust a new operation to changes in the ground situation. The reconnaissance aircraft can be committed to confirm the effects produced by the attack.

3.) Close contact must be maintained with the short-range reconnaissance squadrons stationed in the operational area of the ground-attack unit. The radio traffic of these reconnaissance forces should be largely intercepted by the ground radio station. Weather reports, in particular, should be intercepted.

H. Methods and Chain of Command

1.) In general, the ground-attack unit is placed under the command of an air corps (close-support corps) or of a close-support commander. These authorities keep in close contact with the Army by means of liaison parties and elaborate signal communication facilities.

Whenever the connection of the ground-attack unit with the close-support corps is interrupted, the commanding officer of the unit commits his forces independently on the basis of his own knowledge of the ground situation and within the scope of his overall mission.

2.) The commanding officer of the ground-attack unit commands his forces in the air by radio-telephony. This requires a good radio discipline on the part of the individual pilots. The operation has to be discussed so thoroughly and the corresponding orders have to be given in such a clear manner on the ground prior to take-off that only brief orders in form of commands have to be transmitted by radio telephony.

3.) The endeavor should be made to have the spearheads of the attacking forces (command tanks etc.) maintain direct voice-radio communication with the ground-attack unit. In operations of particular importance it is advisable to establish ground-attack control stations headed by an experienced ground-attack air officer with the attacking ground forces. For this purpose, command tanks, armored scout cars, or Type Fieseler-Storch aircraft can be employed.

I. Signal Communications

The radio telephone communication is conducted in the clear. Simple codewords, however, will be used. The codewords used should contain a great number of vowels and, though being short, should stand for groups of sentences.

In general, codenames are not changed, since interception by the enemy would not enable him to take countermeasures owing to the short period of time still available until the attack starts.

III. Commitment of other Types of Aircraft as Ground-Attack Aircraft

(Bomber, twin-engine fighter, fighter-bomber, and dive-bomber aircraft)

Whenever other types of aircraft are committed as ground-attack aircraft, the following points have to be in general taken into consideration:

1.) The commitment of such other types of aircraft (as listed above) should be restricted to exceptional cases if these units are to participate directly in the ground combat on the battle field (up to 30 kilometers beyond the frontline). Such commitment requires a specialized training and ample practical experience which only the ground attack airman possesses.

Therefore, other types of aircraft primarily operate against targets in the enemy territory located up to 100 kilometers beyond the frontline such as enemy airfields, unloading activities, railroad transports, columns of motor vehicles, road traffic etc. They are to start their raids deep in enemy territory and to operate in direction of the frontline.

2.) To make best use of the characteristic features, performance, and equipment of these other types of aircraft, it is necessary to fly such aircraft by fighter methods and employ the tactics developed by the fighter forces. This applies particularly to the twin-engine fighter and fighter-bomber units. Since the latter units mostly operate without fighter cover, it is necessary to have them fly in small elements in a dispersed formation. These elements have to be concentrated in respect to time and space for offensive or defensive action. For this purpose, such a force must, on principle, be subdivided into attack units and cover units. Such subdivision may be changed according to the enemy situation and the flight position.

It is the main purpose of the dispersed flight formation to have the space in the rear below which cannot be observed by the pilot nor by the radio operator be watched by the neighbor aircraft or by the whole neighbor unit and to bring fully to bear for defensive action the strong rigid aircraft armament by adequate curving.

3.) In general, these other types of aircraft are able to operate against strong enemy fighter forces near the friendly frontline and to withdraw inot friendly territory in cases of attack by superior enemy fighter forces.

Escort fighter cover provided by friendly fighter forces may be necessary only in the case of a penetration of more than 30 kilometers into enemy territory and of strong enemy fighter defenses. This applies especially to bomber and dive-bomber aircraft.

4.) Because of the large operational area in which these other types of aircraft can be committed, reconnaissance reports are of particular importance to the latter.

5.) It is advisable, especially for the bomber aircraft, to determine a bombing safety line, since the bomber pilots will not always be able to recognize accurately the frontline and, above all, forward observation posts.

6.) Otherwise, the commitment of these other types of aircraft as ground-attack aircraft is based on the principles for ground-attack operations laid down in the memorandum.

Appendix 12

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Memorandum No. 2 for the Commitment of Antitank Ground-Attack Aircraft

I. General Information

II. The Commitment of the Antitank Ground-Attack Aircraft

A. General points of view

B. Technical data

C. Prerequisites for the commitment

D. Methods of attack

The Commitment of Antitank Ground-Attack Aircraft

(During the period from 1939 to 1945)

I. General Information

1.) In addition to their ability to bring bombs to bear, ground-attack aircraft are capable of destroying armored combat vehicles owing to their additional equipment with aircraft armament and with armor-piercing ammunition.

2.) The effect of the armor-piercing aircraft armament is fully ~~fully~~ exploited only if utmost accuracy is exercised in aiming, the attack is carried out at closest distance, and the vulnerable spots of the armored combat vehicles are hit.

3.) The conduct of the antitank operation requires an extremely good flying performance on the part of the pilots. In cases of strong ground defenses consisting of infantry weapons, light and medium antiaircraft artillery, the ground-attack pilot must show reckless aggressiveness, intrepidity, and gallantry in the combat operations against enemy armored combat vehicles.

II. The Commitment of the Antitank Ground-Attack Aircraft

A. General Points of View

1.) The main effort of the antitank operations with aircraft armament is directed against tanks which have broken through the frontline. In such cases only, the pilot can raid his target at closest distances without being hindered by enemy ground defenses.

Such antitank operations with aircraft armament are conducted especially in cases when bad road conditions owing to mud and snow no ~~longer~~ longer permit the shifting of friendly antiaircraft guns, artillery, and antitank forces for the purpose of commitment against tanks broken through the frontline. The antitank and antiaircraft artillery on the ground is then replaced by the ~~airborne~~ flying antitank arm.

Each ground-attack pilot employed in antitank operations must always realize that enemy tank broken through the frontline can inflict considerable damage on the friendly ground forces and that the destruction of such tanks by the ground-attack forces may be of decisive importance for entire front sectors. Especially important is a rapid destruction before the enemy succeeds in pushing through the point of breach with strong infantry and corresponding antiaircraft artillery forces.

2.) The commitment of the ground-attack units intended for antitank action is to be restricted to antitank operations only.

A short or long pause between the operations of the squadrons has to be taken into account, since in the case of continual commitment for ground-attack purposes the ground-attack aircraft intended for antitank operations are not available at the decisive moment. A systematic disposition of the commitment on the basis of these considerations is necessary. Long pauses between operations should be used for training purposes.

3.) The aircraft armament can be brought to bear effectively against enemy armored combat vehicles when the enemy is forced to withdraw by advancing friendly forces and is thus no longer able to employ his ground defenses systematically.

4.) In addition to the strafing attack or in the case when armor-piercing weapons are not available, operations against enemy tanks attacking or broken through the frontline must be conducted by fast ground-attack aircraft equipped with bombs and flying at extremely low altitudes. These aircraft should employ the so-called "Steckruebenwurf" (bombing method) also used in operations against water-borne targets. Employing this method the aircraft conduct the run-up on the tank flying at an extremely low altitude and closely ahead of the tank climb to 20 to 30 meters to drop the bomb while gliding at a flat angle against the side of the armored combat vehicle. The bomb has to hit the tank or touch the ground within 1 to 2 meters of the latter, since otherwise it would bounce over the tank. The fuzes have to be set at delayed-action.

5.) In areas provided with strong ground defenses a mere strafing raid without any bombs would involve heavy losses on the part of the raiding forces. Prior to any operation in such situations, the responsible command staffs and the commanding officers of the air units concerned must thoroughly examine whether the expected success would justify the losses and whether the situation necessitates such action. The losses can often be reduced by committing aircraft equipped with cannons together with those carrying bombs.

Aircraft carrying bombs of small and smallest calibers (50-kilogram down to 1-kilogram bombs) and committed at medium altitudes (1200 meters to 1500 meters) disperse and hold down enemy ground defenses. Such commitment of bomb-carrying ground-attack aircraft thus creates the basis for the commitment and offensive action of the cannon-carrying aircraft attached to the unit.

6.) Assembly areas of armored forces are mostly protected by strong ground defenses. They constitute targets for bomber and dive-bomber units. Ground-attack aircraft equipped with 500-, 250-, and 50-kilogram bombs can attack such targets only from high altitudes. Owing to the strong ground defenses, strafing raids, especially those carried out by the high-quality antitank ground-attack aircraft would always involve heavy losses on the part of the attackers. Therefore, such raids should be avoided as far as possible.

B. Technical Data

The armor-piercing armament of the antitank ground-support aircraft at the present time consists of cannons with H-Pz. Gr. Ptr. *

1.) Hs-129 aircraft

1 Type 101 automatic cannon (30 mm)

H - Pz. Gr. Ptr. * with a muzzle velocity of 960 meters per second and a rate of fire of 240 rounds per minute with a drum magazine containin 30 rounds.

2 Type 151 automatic cannons (15 mm)

H - Pz. Gr. Ptr.*with a muzzle velocity of 1046 meters per second and a rate of fire of about 700 rounds per minute - belt with 250 rounds per weapon.

2.) Ju-87 aircraft

2 Kw. K. 38 (t)** (37 -mm automatic cannon)

H - Pz. Gr. Ptr.

with 6 rounds in each drum magazine.

2 MK 151 (15-mm automatic cannon). For technical data see Hs-129 aircraft.

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Notes: * H - Pz. Gr. Ptr. - armor-piercing grenade cartridge with hard-alloy point .

** Kw. K. - anti-armor vehicle gun

3.) Ju-88 aircraft

Hs-129 aircraft 1 Kw.K. * 40 (75-mm automatic cannon - anti-tank gun 40)

Pz. Gr. Ptr. with 6 rounds loaded in each drum magazine.

H - Pz. Gr. Ptr.** are extremely valuable and should be used for operations against armored combat vehicles only.

C. Prerequisites for the Commitment

1.) Intensive training in firing and bombing.

2.) Exact knowledge of the construction of a tank, of the strength of its walls, of the location of its ammunition containers, fuel tanks, the engine, and above all of its vulnerable spots. Detailed instruction (armor identification service) on the friendly and enemy types of armored combat vehicles is necessary.

3.) Knowledge of the functioning of armor-piercind ammunition.

4.) Close contact with the battlefield by the detachment of ground-attack control parties which direct the attacking units to the tanks to be raided by means of radio communication using reference points previously established. It should be avoided that armored combat vehicles already destroyed are attacked again from the air. Any waste of ammunition should be avoided.

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Notes : * Kw.K. : Motor vehicle gun

** Pz. Gr. Ptr. :armor-piercing grenade cartridge.

5.) The ground-attack control parties have to report the armored combat vehicles by providing exact information on the type of the tanks concerned, since the method of attack employed is always governed by the type of construction of the tank to be raided.

D. Methods of Attack

1.) The strafing attack is carried out according to the type of construction of the armored combat vehicle concerned. For the run-up an angle of 90 degrees should be used whenever possible. The figures for the angles to be used during run-up and attack are contained in the firing table for antitank operations.

Staging and direction of the attack are governed by the most vulnerable spots of the tank.

It should be attemted to obtain the most favorable angle of impact. This angle is arrived at by computing the angle of slope, the angle of run-up, and the angle of deflection. The angles of slope and run-up are always governed by the type of construction of the tank to be tattacked. Therefore, the most exact knowledge of the types of armored combat vehicles is again required. Extremely rapid recognition and instantaneous selection of the most favorable run-up angle decide on the success.

2.) The aircraft attck in pairs or in flights flying in the combat array. The aircraft keep the distance from each other necessary to prevent that the aircraft attacking first is endangered by the following and that the airdraft disturb one another during firing. The unit most suited for such raids is the pair. Each of its two aircraft selects its target for attack and destruction. The directions of attack of the two aircraft may well be the same.

The aircraft peel off and curve in opposite directions.

3.) Prior to each attack, the targets will be accurately assigned by means of FT*, so that each attacking aircraft attacks another group of tanks rather than that the whole squadron attacks a single group. It is absolutely necessary that the different flights are dispersed over the battlefield.

4.) In general, the fire is opened at a distance of 500 to 700 meters. This distance is conditioned by the comparatively slow rate of fire of the large-caliber automatic guns. This is especially true of the 75-mm Kw.K.**40.

5.) Bombing raids on armored combat vehicles which have broken through the frontline are conducted only from extremely low altitudes or by the "Steckruebenwurf"-method. In such operations the aircraft must attack singly to prevent that the following aircraft is endangered by the fragments of the bomb dropped by the preceding aircraft. Whenever this method of attack is employed, it must be established by accurate target designation in the unit which aircraft is to attack and which tanks are to be attacked by the individual aircraft.

6.) When operating within the range of the enemy ground defenses, the aircraft employ, according to the strength of the ground defenses, the "Steckrueben" bombing method or, if the ground defenses are too strong, attack and destroy armored combat vehicles by diving at a glide-angle from medium altitudes.

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Notes: * FT : radio telegraphy

** Kw.K. : anti-vehicle gun

In a glide-angle attack the distances within the flgihts and squadrons are to be kept as small as possible to deprive the ground defenses of the possibility of concentrating their fire on each individual aircraft. When the "Steckrueben" bombing method is employed, however, the aircraft must, even under such circumstances, carry out their attacks singly.