THE SYSTEM OF TARGET SELECTION APPLIED BY THE

GERMAN AIR FORCE IN WORLD WAR II

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THE SYSTEM OF TARGET SELECTION APPLIED BY THE
GERMAN AIR FORCE IN WORLD WAR II

CHAPTER ONE

GERMAN AIR FORCE PRINCIPLES GOVERNING
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GERMAN AIR FORCE PRINCIPLES GOVERNING
THE SELECTION OF TARGETS

I. THE MISSIONS AS THE RULING FACTOR

Since the selection of targets was governed by the mis-
sions of the German Air Force, the first question presenting
itself to the mind is: What were those missions?

1

According to General Carl von Clausewitz

War is thus an act of force to compel the opponent
to do as we will.

From this it follows that this force

a. Must be applied by someone, and

b. Must be applied against someone or something.

The application of force was the mission of the military
forces as the exponents of force.

In a civilized country the sole mission of the military
forces is to apply force in the event of war. However, the
application of force was not a purpose in itself, but had to
serve some definite purpose, the achievement of some goal.

2

On this subject German Air Field Manual # 16 in Paragraph

1. General Carl von Clausewitz: "Von Kriege," published after
his death. 13th Supplemented Edition by Karl Linnebach;
Kellverlag, Berlin SW 68, 1937: Chapter 1, Paragraph 2.
2. Luftwaffendienstvorschrift 16, Luftkriegsfuehrung; Revised
Edition March 1940, Berlin 1940, Printed by Ernst Siegfried
Mittler und Sohn. The Manual will be referred to in this
study as Air Field Manual L. Dw. 16.
9 states as follows:

The mission of the military forces in war is to break the enemy will.....

As a branch of the military forces, the German Air Force thus had the mission of participation in action to ".....break the enemy will....." and to apply force to gain this end.

Paragraph 9 of Air Manual L. Dv. 16 also states against whom and for what purpose such force was to be applied, namely

The will of the Nation is most forcibly incorporated in its military forces.

Defeat of the enemy military forces is therefore the primary objective in war.

Concerning the specific mission of air power within this overall military mission, Paragraph 10 of the manual states:

The mission of the Air Force is to serve this purpose through the conduct of air warfare within the pattern of the overall conduct of the war.

Through combat action against the hostile air forces it will weaken the military power of the enemy and at the same time protect its own military forces, its own Nation and Country by participation in operations on land and at sea and will render direct support
to the Army and the Navy.

Through combat action against the enemy sources of power of the hostile military forces, and through action to prevent the flow of power from those sources to the enemy front, the Air Force will endeavor to bring about the collapse of the enemy military forces.

The methods by which combat operations were to be conducted against the enemy sources of power were established in Paragraph 143 of the manual, as follows:

Combat action against the sources of enemy power will be directed against all installations and measures of the enemy serving to strengthen and increase the enemy military forces in the field. Such installations include primarily

- Manufacturing industries
- Food supplies and food supply sources
- Import activities, facilities, and installations
- Electricity supplies
- Rail and road routes
- Military replacement centers
- Centers of government and administration.

Air Field Manual L. Dw.16 rejected the idea of attacks against the civilian population (terrorization or intimidation action) "...to break the enemy will..." insofar as the civilians concerned were not actively participating in the enemy war effort (as in the case of labor employed in arms
and ammunition factories). The manual provided for such attacks exclusively as retaliatory action in the event of an enemy resorting to military action of this type. On this subject the manual states in Paragraph 186:

The idea of attacks against towns and cities for the purpose of terrorizing the population is to be rejected on principle.

However, if terrorization attacks are nonetheless carried out by an enemy against undefended and unprotected open cities, retaliatory attacks might be the only means by which to cause an enemy to desist from this brutal type of air warfare....

II. LIMITING FACTORS IN THE SELECTION OF TARGETS.

1. Necessity to Adapt to the Overall War Effort of the Military Forces as a Whole. This natural requirement that air warfare must be an integral part of the overall conduct of a war, and this requirement was expressed in the stipulation that the combat operations of the Air Force must have an influence on the operations of the whole of the military forces.

In point of numerical strength and equipment the German Air Force was not geared for independent air warfare of a type which could force a decision in war.

This fact found expression in the applicable German
regulations and also in the measures applied during the development of the Air Force.

Air Field Manual L, Dev. 16 in Paragraph 8 states on this subject:

Over and beyond this the Air Force, even if it should lack direct contact with the Army and the Navy, must at all times consider itself an integral part of the entire military forces and must realize the unity of combat action by all branches of the military forces.

This principle is expressed in even stronger terms in Paragraph 30 of the Manual:

A decision in war can only be brought about by the combined efforts of all three military branches. By coordinating the operations of the Army, the Navy, and the Air Force, and by shifting emphasis within the whole military establishment in consonance with the current situation, the supreme command directing the whole war effort will endeavor to achieve maximum results.

In Paragraph 143 the manual states:

Combat action against the sources of enemy power will be directed against all installations and measures of the enemy serving to strengthen and increase the enemy military forces in the field.

Consequently, those responsible for the selection of
targets for air attack from the outset had to disregard those targets which were such that action against them would not have an impact immediately or within a reasonable time on the combat operations of the overall military forces.

Only in the case of exceptional circumstances did Air Field Manual L. Dv. 16 provide that a decision in war could be brought about by air power alone. Paragraph 31 of the manual states on this subject:

Over and beyond this, air power might if fronts have frozen on the ground be the only means to prevent complete attrition of friendly forces on the ground and to force a decision.

The essential condition for success in such a case would be a complete shift of emphasis to air warfare at the expense of all other means of waging warfare.

Such a complete change in the conduct of warfare requires time. Precautionary preparations must be made.

Because of the restricting factors dealt with above, numerous objects had to be disregarded as targets for air attack, since action against them would only in a very indirect way and at a great loss of time have produced results influencing the overall military effort.

2. Limiting Factors of International Law. The only international agreement which was binding on Germany at the outbreak
of the war was the Hague Convention known as the Hague Rules of Land Warfare, from which the following passages are quoted out of Article 25, as the only article which has any bearing on the selection of targets. Under the heading C. Rules of Particular Importance for Air Warfare, Article 25 reads as follows:

It is forbidden to attack or fire upon, with any means whatever, undefended towns, villages, dwellings, or buildings.

The footnote on page 1 of the appendix qualifies this as follows:

1. The words "with any means whatever" are designed to make this legal paragraph also binding for the dropping of bombs from aircraft.

The requirement of Article 25 is only in the Rules for Land Warfare. It does not apply to naval warfare and accordingly also not to operational air warfare [the term used here in the German text is "seltene Krieg," literally translated "independent air warfare."]. According to the agreement regarding shelling by naval forces in times of war, the shelling of undefended settlements or buildings is prohibited in naval warfare, but the shelling of military targets within undefended settlements is permitted. This applies in the same sense to operational
These conditions of the Hague Rules of Land Warfare are worse than scanty, and this applies equally to the agreement concerning the shelling by naval forces during times of war.

In addition to the above, the rules of the second agreement concerning air traffic are valid in foreign countries.

The principle rules involved here are as follows:

**Article 22:**

Air bombing designed for the purpose of terrorizing the civilian population, destroying or damaging private property which is not of a military nature, or injuring noncombatants, is prohibited.

**Article 27:**

Air bombing for the purpose of enforcing the requisitioning of goods or the payment of monetary contributions is prohibited.

**Article 28:**

(1) Air bombing is permissible only when it is directed against a military target, meaning a target which is such that its total or partial destruction would represent an indisputable military advantage for the belligerent.

(2) Air bombing of this type is permissible only if it is directed exclusively against the following:

targets:

military forces, military works, military installations or depots; factories which are well-known and important centers and serve the purpose of manufacturing weapons, ammunition, and typical articles of military requirement; communication and transportation lines and routes which are used for military purposes.

(3) The bombardment of cities and towns, villages, dwellings, and buildings which are not located in the immediate vicinity of areas in which the ground forces are operating is prohibited. If the targets enumerated in Section 2, above, are so located that they cannot be bombed without involving an indiscriminate bombing of the civilian population, aircraft shall desist from bombing them.

(4) In the immediate vicinity of cities and towns, villages, dwellings, and buildings is permissible, provided reasonable causes exist to assume that the concentration of military forces at such points is large enough to justify the bombing in spite of the consideration of the hazards to which the civilian population thereby will be exposed.

(5) The belligerent power shall pay indemnity in money for any damage done to persons or property through acts by its representatives or by any of its military forces and
constituting an infringement of these rules.

It must be pointed out here, however, that Germany had not joined this agreement, so that it was not legally binding on the German Air Force.

It is an established fact that the German Government and the German Supreme Command had not devoted appropriate attention and consideration to the problem of "Air Warfare and International Law" prior to World War II. Characteristic of this circumstance is the evidence given in the Nuremburg Trials by the former Commander in Chief of the German Air Force, Reich Marshal Goering, part of which will be found in Appendix 2, Appendix Volume to this study. In the second last paragraph there Reich Marshal Goering states his opinion summarily as follows:

In my personal opinion the convention known as the Hague Rules of Land Warfare is not an instrument which can be applied to modern warfare, because it gives no consideration whatever to the essential features of such warfare, namely, armed conflict in the air, economic warfare, and psychological (propaganda) warfare.

In order to at least close the existing gaps in the field of International Law, the German Air Force High Command, in collaboration with various State authorities and societies,
had provisional legal principles worked out to govern the conduct of air warfare. These principles were drawn up prior to the Polish campaign and were furnished to the various command headquarters and troops together with the "Directives for the Strategic Concentration and the Conduct of Operations" known as "Operational Study 1939" (Aufmarsch- und Kampfanweisung--Planstudie 1939--) on 20 July 1939.

For the German air Force these principles thus represented the authoritative basis for action at the beginning of the war and later.

The principles are strongly inclined towards the Paris Air Traffic Agreement, and also preclude numerous objects as targets for attack.

3. **The Actual Target—Strategic and Tactical Targets.** By the nature of the missions of air power in war, as enumerated in Chapter One above, the following targets evolved for air attack.

A target, and thus an object against which force could be applied, naturally had to consist of live or still material. However, such an object only became a target for attack if its nature was such that action against it could contribute towards accomplishment of the assigned missions of air power.

It is thus clearly obvious that a relationship of unconditional interdependence existed between the mission of an
air force on the one hand and its targets on the other hand.

For the accomplishment of the missions which could develop for the German Air Force, the following targets evolved:

Mission 1: Counterair Action.

Target Categories and Targets.

a. Airborne Targets
   Enemy aircraft of all types
   Enemy barrage balloons.

b. Targets on the Ground.
   Enemy airfields with the following sub-targets:
   Aircraft
   Hangars
   Repair shops
   Supply depots of all types.
   Air supply depots and dumps of all types.
   Aircraft and aircraft engine factories and subsidiary works.
   Air defense installations, such as antiaircraft artillery and antiaircraft rocket firing positions.
   Signal communication installations.

Mission 2: Direct Support for Army Forces.

Target Categories and Targets.

a. P Bowling Targets.
a. Moving Targets.
   Infantry advancing in dispersed order
   Vehicles of all types
   Convoy and truck columns
   Tanks.

b. Stationary Targets.
   Entrenched troops and weapons (infantry, machinegun, howitzer, mortar, and artillery positions)
   Fortification works of all types (bunkers, fortresses)
   Signal communication installations (telephone, teletype, and radio centers)
   Supply and ammunition depots and dumps for the troops on line
   Command posts.

Mission Three: Action supporting the Navy.

Target Categories and Targets.

a. Moving Targets.
   Naval ships of all types
   Merchant ships, tankers.

b. Stationary Targets.
   Naval bases and their installations (docks, ship-building yards, depots)
   Loading and unloading ports.
Mission Four: Traffic Interdiction to Prevent the Movement of Troops, Equipment, and Supplies to the Front, and the Movement of Supplies to Installations and Areas of Military Importance.

Target Categories and Targets.

a. Railroads.

Rolling stock
Rail routes, including rail depots and man-made structures
Railway repair shops
Power stations and transformer stations servicing electric railroads
Water supply installations.

b. Waterways.

Ships of all types
Canals, including manmade structures
Ports, including shipbuilding and repair installations and storage areas

b. Road Routes.

Roads of all types, with particular emphasis on manmade structures and traffic bottlenecks.

Mission Five: Combat Action against Enemy Resources.

(1) Installations and factories engaged in the initial production and processing of basic products, such as coal, iron, oil, non-ferrous metals, to include mines and mining installations, blast furnaces, steel and rolling mills, non-ferrous smelting works, oil wells and oil refineries.

(2) Weapons and ammunition factories of all types.

(3) Chemical factories producing for the armament industry.

(4) Machinery and tool factories.

(5) Subsidiary parts factories producing such items as crank shafts or ball bearings.

b. Initial Mission: Combat Action against Electric and Other Power Supply Sources, to include

(1) Electric power stations and their hydraulic dams, transformer stations, electric cable networks.

(2) Gas supply installations, to include gas producing works, gasometers, long-distance gas pipelines.

(3) Water supply installations, to include pumping stations, reservoirs, dams.
Mission Six: Action to Prevent Enemy Import Traffic.

Targets.

Shipping
Silos and warehouses.

Mission Seven: Disruption of Enemy Food Supplies.

Targets.

Large grain mills
Sugar factories
Cold storage and other warehouses
Canning and other food preserving factories.

Mission Eight: Action against Centers of Government and Administration.

Targets.

Government buildings
Post and telegraph offices
Radio broadcasting stations.


Targets.

Barracks and cantonments
Military headquarters of all types
Buildings used in the military training and education program (schools)
Research and proving centers.
CLASSIFICATION AS STRATEGIC OR TACTICAL TARGETS

In the German Air Force no steps were taken to classify targets as strategic or tactical. This may have been due to the following reasons:

It was not always possible to clearly define the difference between strategic and tactical missions. Thus traffic interdiction operations, including the interdiction of traffic routes, could at one and the same time serve strategic and tactical purposes.

Another factor was that the air forces were not organized separately in strategic and tactical units so far as command control was concerned. One and the same command controlled both single-engine bombers with only a small striking range and long-range multi-engine bombers. Each such command committed its forces against strategic targets or against tactical targets as the current situation required. Therefore, no necessity existed in the German Air Force to classify its units in strategic and tactical branches.
CHAPTER TWO

THE GERMAN SYSTEM FOR RECORDING PERMANENT TYPE TARGETS

The Processing of Target Data

As early as in 1935 a Target Processing Section was established in the Operations Division of the Air Command Office (later Luftwaffe General Staff). In contrast, all data on targets for counterair action were processed in the Foreign Air Intelligence Division (Abteilung Fremde Luftverkehr), a branch of the Luftwaffe Operations Staff and also controlled by the Air Command Office.

On 1 January 1938 the Target Processing Section was consolidated with the Foreign Air Intelligence Division, so that one agency was now responsible for the procurement and for the processing of target data.

The procurement of data (Organization, Intelligence Media), is covered in detail in Study #171 "Intelligence Procurement in the German Air Force" (NachrichtenWirtschaft in der deutschen Luftwaffe).

The basic line of thought was as follows:

All objects which might become targets for German air attack in the eventuality of war could be classified in two categories according to the time at which they would be in evidence, namely,
1. Targets which would only appear after the Outbreak of a War. Primarily, such targets were bound up with the activities of the enemy field forces, including their supply and replacement systems. Targets of this type could only be detected during war, and were in many cases only temporarily in evidence. The provisions made for their detection comprised the assignment of clearly defined intelligence procurement missions to all appropriate agencies directing intelligence media.

2. Permanent Targets, which Existed During Times of Peace.

Targets in this category were usually of greater importance than those of Category 1.

Since the air forces immediately at the beginning of a war would have the mission of attacking stationary targets in enemy territories, much had to be done during peace to procure the necessary data on such targets, insofar as they were of a permanent nature.

Air Field Manual L Dw. 16 states on this subject

In Paragraph 66:

Wartime intelligence operations will be based on the information procured during peace.

As a rule, the peacetime intelligence activities will provide the data serving as the basis for the initial operations of the air forces.
As the war proceeds this data will often do away
with the necessity for the time-consuming operations of
initial reconnaissance, and in many cases will make it
possible to restrict activities to the procurement of
supplementary information or to a reexamination of the
data already available.

Peacetime intelligence activities will procure data
which during war can only be obtained with extreme diffi-
culties or not at all.

On the subject of the peacetime procurement of target
data for combat action against the sources of enemy military
power and against the flow of such power to the front, the
manual states in Paragraph 144

Combat action against the sources of enemy military
power and against the flow of such power to the front
is primarily combat action against permanent installations.
To a large extent these exist already during peace and
are restricted to specific localities. The expansion of
existing and the creation of new installations creates
important missions for wartime intelligence operations.
However, combat action against the sources of enemy mili-
tary power initially will be directed on the basis of
intelligence data procured during peace.
I. THE INDIVIDUAL TARGETS.

Rules were established as early as in 1935 for the procurement and processing of data on each individual target. The 1935 edition of Air Field Manual L, Dv. 16 deals with this subject in Paragraph 146 as follows:

On the basis of peacetime intelligence activities the necessary instructions will be established already during peace for combat and reconnaissance action against each individual target. These instructions will contain information on the importance of the target to the enemy, the key points of a target complex, the appropriate time method for combat action against it; the most practicable for of attack, the requirements in forces, ammunition, and time; the attack results required, and the probable active passive and defense which will be encountered. The instructions will define the missions for reconnaissance to improve the data already available.

TARGET DATA PROCESSING IN PRACTICE

A target folder was maintained for each individual target detected, and a special form, known as the Basic Target Sheet (Zielblatt) was used to record all important items of information.

As a rule, the following maps were included in each

1. Appendix 4.
target folder:

A map of the target area, Scale 1:250 000, for the
target run, showing the position of the target and the
most appropriate route of approach and departure. Further
detail, entered on the map if available, included infor-
mation on the enemy defenses, such as fighter and anti-
aircraft artillery, and enemy airfields, which could con-
stitute a hazard during the approach or departure; navi-
gational aids, such as salient terrain features (easily
identifiable wooded sections, large rail or road inter-
sections, and so forth), all of which were marked by hea-
vier print; and magnetic deflections due to the presence
of ore deposits or other causes.

A map in the scale of 1:5 000 or up to 1:25 000 of
the target itself and its most immediate vicinity, show-
ing the configuration of the target and its surroundings,
with special emphasis on the most sensitive points of
the target and all available information concerning de-
fenses at the target itself, such as battery and search-
light positions. If at all possible a planview or
sketches of the target were included naming the indi-
vidual installations it comprised.

The details required in Air Field Manual L, Dw. 16, Para-
graph 146 (quoted above) were entered on the basic target
Under the item "Importance of the Target for the Enemy" details were entered on the output of a factory, the carrying capacity of rail routes, and so forth.

The information under the item "Key Points of the Target" included such details as the most important parts of a factory, such as its electricity plant, its gas supply installations, and its water supply system, the destruction of which could result in a total cessation of manufacturing operations.

To establish the "Most Appropriate Time for Attack" it was important to know the working hours and the time at which shifts changed in the factory, in order to strike the workers in the attack.

In order to determine the most appropriate types of bombs and the best form of attack it was important to know whether parts of a factory or a whole factory were particularly vulnerable to the hazards of explosions or of fire.

In addition to information on the active defense which might be encountered, it was also important to give details on passive defense installations, such as air raid shelters and smoke screening facilities.
II. TARGET CATEGORIES AND CLASSIFICATION IN SEQUENCE OF IMPORTANCE.

The immense number of targets involved necessitated their registration and evaluation. This, in turn, made it necessary to group them, by country, in target categories. These target categories also provided the basis for the overall evaluation of individual segments of the economy, and so forth, a subject which will be dealt with in the next section of this chapter.

1 From available documents it has been possible to partially reconstruct the following target categories and their numbers:

<table>
<thead>
<tr>
<th>Target Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>Airfields, ground service installations</td>
</tr>
<tr>
<td>12</td>
<td>Naval ports</td>
</tr>
<tr>
<td>13</td>
<td>Barracks, schools, headquarters</td>
</tr>
<tr>
<td>13 500</td>
<td>Command posts</td>
</tr>
<tr>
<td>20</td>
<td>Air ordnance offices and air parks</td>
</tr>
<tr>
<td>21</td>
<td>Motor fuel depots</td>
</tr>
<tr>
<td>22</td>
<td>Ammunition depots and dumps, power magazines</td>
</tr>
<tr>
<td>23</td>
<td>Ordnance offices of the Army and Naval AAA parks</td>
</tr>
<tr>
<td>24</td>
<td>Arsenals, construction and repair shops</td>
</tr>
<tr>
<td>25</td>
<td>Materiel supply dumps of unknown types,</td>
</tr>
</tbody>
</table>
1. (Archive records L/Franzoesisch Afrika/F.A) LW. Fuehr. Stab
1c Va-Stand 1 September 1943.
balloon (barrage) depots with supplies for special type troops

40 Rail depots, loading ramps, rail workshops, locomotive sheds

41 Railroad bridges

42 Rail interdiction targets on open way

43 Road bridges

44 Interdiction points on open roads

45 Commercial ports

47 Telephones and teletype centers

49 Radio stations and radio broadcasting stations

50 Electric power stations, and their hydraulic power dams

51 Transformer stations in the electricity system

52 Gas works

53 Waterworks, pumping stations, reservoirs, dams

56 Silos, warehouses, large grain mills, sugar factories, canning and other food conserving factories, distilleries

63 Explosives factories

64 Chemical industries, factories processing wood pulp, paper, artificial silk, artificial textiles, parachutes

65 Mineral oil refineries and fuel depots

66 Smelting works for calcium carbide and ferro-alloys, factories producing acetylene,
66--continued

balloon material, rubber tires

70 Iron and iron ore works, blast furnaces, steel
and refined steel works, steel roller mills

71 Non-ferrous metal industries, mines, smelting
works, roller mills

73 Factories producing aircraft engines

74 Factories producing aircraft fuselages, pro-
pellers, steering equipment, and undercarriages

76 Explosives and ammunition factories

82 Machinery and tool factories.

III. DETERMINING THE WEAK POINTS OF AN ENEMY COUNTRY.

1. Basic Considerations. The large numbers of targets
in existence far exceeded the attack capabilities of the Ger-
man Air Force with any prospects of success in the event of
war, unless it was possible to determine the most important
targets, destruction of which would have a decisive impact
on the enemy.

It was found, for example, that a country like France
had approximately 40,000 medium- and large-size factories,
all of which could be used to a greater or lesser extent
in manufacturing the items required in the conduct of war,
and it must be borne in mind that this number included targets
of only one single category, that of production. To serve
as a basis for comparison the following information is offered:

From the records of the sixth meeting of the Working Committee of the Reich Defense Council (Arbeitsausführung des Reichsverteidigungsrates) on 7 February 1934 it can be seen that in Germany copies of the mobilization orders and mobilization schedules had to be furnished to 240,000 industrial and other concerns considered as vitally important for military and other reasons.

Records of the tenth meeting of the committee on 26 March 1935 reveal that in addition to the above number, 60,000 factories and other concerns had to be registered for armament production purposes in Germany as serving exclusively in the production of armament requirements.

Correspondingly high figures therefore had to be assumed in the case of each technologically highly developed country with which Germany might become involved in conflict.

Within the Operations Branch of the German Air Force High Command there existed a section which maintained a Register of Air Defense Targets. The mission of this section was, in collaboration with the responsible military and civilian authorities, to determine all objects within Germany which might become targets for enemy air attacks, to register them, and to establish priorities for the defense.

The food supply and distribution systems
Traffic and communication routes, lines, and facilities.

Here it was necessary to develop special methods in order
to discover whether prospects existed for successful attacks,
and which targets were to be selected.

The information thus gathered and compiled provided the
basis for decisions to be taken by the command.

THE NECESSITY FOR CONTINUOUS RE-ASSESSMENTS OF
THE RESULTS OBTAINED THROUGH ANALYSIS

Changes in policies and in the military and/or economical
situation could bring about important modifications in the
results previously arrived at.

The conclusion of political or military pacts could re-
move shortages known to have existed previously in a country.

New inventions or new measures, such as the production
of artificial rubber, the conversion of coal to oil, or the
movement of important branches of industries to underground
shelters, could render the results of previous intelligence
analyses valueless.

The course of military operations, and primarily such
events as the occupation of large parts of a country, also
could cause important changes.

2. The System of Analysis.
concerned for the articles produced in the branch of industry during times of war.

(2) The possibilities open to that country to insure the availability of the required quantities.

The size of peacetime and wartime production.

The extent to which, and the time within which, the enemy would be able to convert other factories to this branch of industry.

Stockpiles held.

Possibilities for imports and their extent.

Possible bottlenecks in individual factories or in the industry as a whole due to dependence on subsidiary industries, on electricity or other supply sources, or on transportation facilities.

The percentage of the overall output coming from the individual localities listed as targets.

to

(3) Possibilities/Bring About a Practically Important Reduction in the Output of the Branch of Industry Concerned through Air Attacks against Some or All of the Factories.

Here, consideration had to be given to strength and time requirements. The principles established in the 1935 Edition of Air Field Manual L. Div. 16, Paragraph 148, had to be taken into consideration:

"As a rule the size of the forces required for action
against the sources of enemy military power will increase in proportion to the distance of those sources from own bases and in proportion to the size of the sources. Increasing distances decrease the bomb load which can be carried, the larger the size of the sources, the larger will be the amounts of ammunition required.

"To secure an economic use of forces it is therefore wise to desist from action against the whole complex of military power sources and to operate only against the currently most important elements.

"These elements are to be so selected that their destruction will bring about the collapse of the entire power source area."

(4) To what extent could the country concerned replace lost industrial output:

(a) Through the release of stockpiled supplies.

(b) Through conversion of other factories to produce the required items.

(c) Through imports from abroad by rail, by canal shipping, by sea, or by air transportation.

What possibilities existed to prevent such imports by air attacks against ports, ships, and rail routes, or by other means. Such other means could include the precautionary purchase of the supplies involved in foreign
markets to prevent their purchase by the enemy country, or diplomatic and/or military pressure against the prospective supply country.

(5) **Summary:**

When and under what circumstances did action against the type of target under examination offer prospects of success? When could results be expected? When and in what form would such results influence combat operations by the armed forces?

In practice, however, a detailed examination such as that described above could remain restricted to those branches of industry which even a superficial examination showed to be critical.

b. **Possibilities for Combat Action against Vitaly Important Imports.** Here it was important to find answers to the following questions:

(1) What would be the import requirements of the country involved in the event of war?

What categories of goods would imports of vital importance to the military effort include? (Raw materials, semi-finished products—particularly for armament purposes, mineral oils, food supplies).

Had the country involved stockpiled supplies?

For how long would these stockpiled supplies
suffice to meet current needs?

(2) Did the possibility exist to reduce the supplies of the country involved in a decisive measure? The entire supply system or specific fields, such as oil supplies?

(a) By means of combat action against merchant shipping and the enemy navy protecting such shipping, such action to be taken possibly in cooperation with naval forces (submarines); by means of attacks against ship-building yards and docks?

(b) By means of combat action against the main transit ports in the form of operations to mine and close approach routes and to destroy vitally important installations and locks.

Mining operations.

(c) Destruction of unloaded supplies.

Destruction of supply depots.

Oil depots.

Refrigeration storage houses.

Grain silos.

d. Vulnerability of a Country's Traffic Routes to Air Attack.

(1) The basis for investigations here was provided by rail route maps, from which it was possible to determine the carrying capacities of individual routes per day (the
maximum number of trains of a given length which could travel the route daily. It was only possible to determine very roughly whether the carrying capacities of such rail routes would be adequate to meet the requirements of wartime traffic. The density of the rail network in relation to the size of the territory involved provided some indications.

The importance of rail routes usually only became apparent during war in relation to operations of the military forces (troop concentrations etc.).

An exception to this rule was the case of the movement of raw materials and semi-finished products to important industrial regions. In such cases it was possible in some circumstances to estimate the importance of a rail route already during peace.

Lists of important points for interdiction, such as bridges, narrows, water supply installations (in areas with scarce water supplies) served to complete the target data.

(2) Canals. Here again maps showing the course of a canal together with details on its navigability and the peacetime volume of traffic carried (which showed its capacity) provided the basis for target analysis.

The important point here was to determine which canals should be attacked and destroyed in order to disturb important processes within a country.
It was also important to examine the shipping tonnage available to a country in order to determine whether destruction of that shipping or of elements thereof, such as tugs or tankers, could produce telling results.

Lists of important points for interdiction, (such as locks or dams the destruction of which would empty the canal, or ship lifting installations) showed the vulnerability of a canal to air attack.

(3) Roads. As a rule a road network was only considered in conjunction with military operations on the ground. Lists were compiled in peace showing manmade structures and other suitable interdiction targets.

The appropriate information was available in the Military Geographic Information volumes for the various countries concerned.

- Combat Action Against Electricity and Power Supply Installations. Power supply installations often represent a bottleneck because of the degree to which modern industry is dependent on power. The destruction of large electric power stations in countries which were not very highly developed frequently paralyzed entire industrial regions.

For this reason the identification of electric power stations, together with information on their capacities and the areas they supplied was an important measure in preparing
for air warfare.

LONG-DISTANCE HIGH-VOLTAGE CABLE LINES AS TARGETS

Electric power stations are frequently so located and their size is relatively so small that they are often difficult to attack successfully with bombs. Usually they are also well defended by antiaircraft batteries. For this reason Professor Dr. Steinmann, employed in the Reich Air Ministry as Director of Water, Gas, and Electricity Supplies for Air Force Installations suggested that attacks should not be directed at enemy electric power stations but at the highly vulnerable overland high-voltage cable systems instead. For this purpose he had developed what he called a cable bomb. When dropped this bomb placed a wire cable over the high-voltage cables causing them to burn through. The weight of the electric cables on either side of the parted cable then caused the collapse of a large number of poles in both directions, the replacement of which took a considerable time. On 1 March 1943 a special staff of 37 assistants under Professor Steinmann was established with the mission of examining all data on all Russian territories within the striking range of German aircraft with a view to determining points at which this type of attack could be carried out. All available maps and air photos of Russian territories were carefully examined to detect overland electric cable lines, and reconnaissance
aircraft turned in innumerable new air photos for the purpose. The outcome of all this work was the production of special maps showing the entire Russian high-voltage transmission network, the way it was interconnected, and the capabilities of the individual lines, together with the results which could be achieved through air attacks. This information was to serve as a basis for plans of attack.

GAS SUPPLIES

Since large segments of the armament industries depend of the supply of gas in their operations, weak points can often be found in this field.

f. FROM TACTICS OF RUSSIAN AIR ATTACKS DIRECTED AT COMPLETE INDUSTRIAL REGIONS INSTEAD OF AT SEPARATE TARGETS.

The fact that the individual targets falling under one category heading were often widely distributed throughout the enemy territories, or perhaps were located far inside the enemy interior, in many cases could result in failure to achieve the desired results in planned attacks, even though these attacks caused serious damage to the enemy. On this subject Air Field Manual L. Div. 16 states in Paragraph 148:

As a rule the size of the forces required for action against the sources of enemy military power will increase in proportion to the distance of those sources from own bases and in proportion to the area involved.
Increasing distances decrease the bombload which can be carried, and the larger the size of the source areas, the larger will be the amounts of ammunition required.

To secure an economic use of available forces it is therefore wise to desist from action against the whole complex of military power sources and to operate only against the currently most important elements.

These elements are to be so selected that their destruction will result in the collapse of the entire military power source area.

Very frequently, however, action against only elements of a target category, as provided for in the above passages, will not produce successful results. Here, however, other opportunities present themselves for action which will seriously damage the enemy.

In examining the most important targets within Germany, the fact evolved that, similarly to conditions in other countries, large industries developed to form concentrated industrial regions at places where raw materials were to be found or where labor was plentiful, as was the case in major cities.

Examination of the problem of what results large-scale attacks against such regions would produce showed that these regions represented neuralgic nerve centers of the first magnitude.
Even if no single one of the industrial installations located in such regions could be considered as a key industry, and even if only elements of the various branches of vital wartime industries were located in the regions, it was found that large-scale air attacks against a region of this type could have a harmful impact on the entire armament output of a country. This was true whether the impact was due to the direct results accruing from the destruction of industrial works or to indirect results accruing from the destruction of railroads, electric power plants and their overland electricity supply distribution lines, and overland power gas pipelines. Above all, the results could be that factories in other regions were deprived for a considerable part of their supplies in subsidiary items.

The German Command therefore decided on the compilation of special staff studies on industrial regions in order to determine the vulnerability of a country. As an example, a map of London, as an industrial region of this type, with details on the most important branches of industry located in and around the city is included as an appendix to this study. This map was prepared as a visual aid in training and therefore shows only some of the important installations involved.

1. Appendix 5.
IV. THE RESULTS ARRIVED AT BY TARGET DATA ANALYSIS IN THE
GERMAN AIR FORCE HIGH COMMAND

1. Poland. The following is an extract from Operational Study 1939 (Fliegerstudie 1939), as revised on 1 March 1939,
Volume II, pp. 2-6.

1. MILITARY FORCES


a. Combat Forces. The Polish air and antiaircraft artillery forces are considerably inferior to those of
the German Air Force in numbers, quality, organization and command.

b. Ground Service Organization. The Polish ground service organization has approximately twelve well developed air bases, which during peacetime contain disproportionately large units (up to a complete air regiment of
240 aircraft).

The other (75) airfields in most cases only meet the requirements of German provisional air fields. They are located in an almost regular pattern throughout the country.

Of these only the following are provisionally equipped for operations by bomber units:

Kattowitz
Lodz
Lublin (2 airfields)
1. Appendix 6. The present tense is being used in quoting from the original source.

2. It should be noted here that the German Air Force (the Luftwaffe) controlled all German antiaircraft artillery forces, so that the term "Air Force" here includes those forces in addition to all air units.

3. Footnote in the original text: It is to be assumed that the Poznan, Thorn, Bromberg, and Graudenz airfields will be completely evacuated already during times of crisis.
Bomb and aviation fuel depots are located almost exclusively at the air bases. Repair hangars are available only at regimental air bases. Even during peace all major repairs have to be carried out in the factories (usually at the R. W. D. factory in Warsaw).

In view of the difficult traffic conditions the supply installations are inadequate for the maintenance of sizable air forces.

The most important point for personnel and material replacements is the Deblin central depot.

Operations by large Russian air forces from bases in Polish territories, which the closely meshed network of airfields would permit, is therefore presently not possible, also because of personnel (language difficulties) and technical (different aircraft types and equipment) difficulties. Such operations would require long preparations, which experience shows would hardly be likely to be carried out except after the outbreak of a conflict.

c. Probable Behavior of Polish Aggressive Air Forces.

Polish air power in the bulk will be committed in cooperation with the Navy, and for this purpose will be...
assigned in squadron and group size units under army commands.

It is to be assumed that a few attacks by small forces will be directed against the strategic assembly of the German Army and possibly, on a limited scale, against towns and installations of military importance in near front areas, particularly in Eastern Prussia and Silesia. It is not to be expected that these will have any important impact on the course of military operations.

The Polish air forces will endeavor to protect themselves against a German attack by displacing from their overcrowded bases to field type airfields.

d. Polish Air Defense.

Fighters and antiaircraft fire must be expected over the front areas held by army ground forces.

It is furthermore to be assumed with certainty that Warsaw, Gdingen, and the industrial region of Upper Silesia will be protected, although not completely, by fighters and antiaircraft artillery.

For the targets distributed throughout the country, including those in the central industrial region and in the oil region, it is certain that adequate protection can not be provided. It is to be expected that weak defenses will be encountered in the Deblin-Racow-Lublin area.
Poland has made good progress in the field of passive air defense.

2. Army:


   By the sixth day of mobilization the Polish Army can probably be brought up to a wartime strength of 45 divisions, 15 cavalry brigades, etc., with a total maximum man power strength of 800,000.

   Weapons are modern, but there is a lack in heavy artillery and usable armored vehicles.

   The average Polish soldier is well disciplined, trained to attack, easily very enthusiastic, but at the same subject to depression. On the whole officers in all ranks cannot be compared with German officer personnel.

2. Fortress and Other Fortifications. The following fortresses or fortifications have been developed against Germany:

   1. In Upper Silesia in the form of modern bunker lines.

   2. At the Naraw River in the form of the obsolete fortified lines taken over from the Russians.

   3. The former German fortresses of Thorn, Posen, Graudenz, and Kulm.

   The other defense installations are still under de-
development. Their value is insignificant.

c. Polish Plans for Operations. The Poles seem to have relinquished their offensive intentions and appear to expect heavy German attacks, particularly from Eastern Prussia.

It is to be expected that the Poles will fight delaying actions in a withdrawal to the line extending along the Narew to Ostrolenka and through Soldau, Thorn, Bromberg, and Kalish to the fortifications of Upper Silesia and from there to Teichen, evacuating the Polish Corridor and establishing a bridgehead around Gisingen.

Present plans of operations are at present under revision.

II. ECONOMY.

The Polish peacetime economy stands or falls with the possession of the industrial region of Upper Silesia.

The central industrial region around Sandomierz is still under development.

The old Polish industrial triangle of Kielce-Ostrówiec-Skoczysko-Kamienna is presently the most important center for armament production, so far as the finishing processes are concerned. This excludes heavy guns which still cannot be produced in Poland.
Power supplies represent a bottleneck. The electric power stations for the most part are only linked up to form local electricity supply networks. These networks are not interconnected.

Destruction of a few electric power stations can paralyze the industrial regions of Warsaw, the industrial areas around Kielce, and the central industrial region.

High capacity rail routes connect Poland only with Germany and the Soviet Union. The difference between rail gauges (Poland and Germany have the same gauge, Russian rail roads are wider) create difficulties for large transportation movements of long duration. The transit stations at the border with the USSR are highly vulnerable to air attack.

Within Poland the rail network is particularly widespread in the eastern territories and within Congress Poland is oriented exclusively towards Warsaw. Under attack systematic/it is hardly likely to meet wartime requirements.

The findings arrived at in the analysis of the communication networks of a country were stated in the publication "Air Geographical Descriptions" (Luftwarte-geographische Beschreibungen). The following is an extract from Volume II, 1 July 1939, (which deals with Poland) of that publication:
Only in those areas which were German territory up to 1918 (Posen, parts of Silesia, of western Prussia, and of Eastern Prussia) does the road network in Poland to some extent remind one of road conditions in the rest of Germany and in western Europe. The Pripyt swamp area and the areas northwest of a line from Warsaw through Grodno to the border of Eastern Prussia/extremely difficult to traverse (verhauptmässig). The Pripyt marshes are completely unsuitable for sizable operations and divide eastern Poland into two separate parts.

Sand roads were frequently encountered. Only 4 percent of all roads are hard-surfaced. In the autumn months road conditions are unfavorable in practically all parts. In September, however, the German motorized units will encounter no insurmountable difficulties.

In many parts densely wooded sectors make air observation and air action against marching columns impossible; in many parts, however, such columns are exposed without any protection to the bombs and the machinegun fire of bomber and ground-attack aircraft.

On rail and road routes the bridges, the large-scale destruction of which must be expected, represent critical bottlenecks. This will be the case particularly all along the Vistula River, farther south at the Dunajec and
San Rivers, in the center at the Warths and Filica Rivers, and in the north at the Brahe and Drewenz Rivers (west, east, and south of Thorn).

The supply systems of the Army and the Air Force will be subjected to severe strains by reason of all these hindrances.

Compared with German conditions the rail network, with an overall length of 12 000 miles of rails, is also poorly developed. It will not be of much significance for German supply and replacement movements, and particularly not for the strategic movements of the Polish Army parallel with the anticipated front line or from east to west.

For these purposes the rail routes in Poland can be considered in the following systems:

System Area One: Bromberg-Posen-Kalisz-Warsaw-Kutno-
Mlawa-Thorn.

System Area Two: Warsaw-Lodz-Kalisz-Katowitz-Krakau-
Przemysl-Sandomierz-Lublin-Deblin-Warsaw.

System Area Three: Warsaw-Deblin-Lublin-Lvov-Ryno-
Sarny-Lumiens-Baranovichi-Lida-Vilna.

System Area Four: The "escape" routes leading from the Lvo-B Vilna route to Russia, Latvia, and Lithuania; and the Route from Lvo to Rumania.

The Posen-Warsaw trunk line is important for the retrograde movements of the Posen Army and the Polish
Towards the end of November or the beginning of December 1938 the Commander in Chief of the Luftwaffe ordered that work was to start at a comprehensive study of Britain's air power and military economic capabilities. The study was conducted under the title "Studie Blau" by the 5th Branch of the General Staff in the months of January to June 1939.

Among others Goering appointed Miloh, Udet, and Jeschonnek as permanent members of the study group.

The study was conducted under the chairmanship of the Chief, Intelligence Division, in the form of lectures, discussions, and interrogations held once to twice weekly and often lasting as long as between four and five hours.

Participants included all members of the England Section, Intelligence Division, all section chiefs of the division, technological personnel from the Military Economy Branch of the Chief of Special Supplies and Procurement, and specialized experts on the various specific fields involved.

The study included all areas of political and economic endeavor, military forces, structure of the British Empire, the Nation as such and the form of Government, Administration, the economic system, industry,
trade imports and exports and supplies in peace and war, electricity supplies, sensitivity to air attack, shadow factories, mineral deposits, rail systems, canal systems, naval and civilian ports, stockpiles held against the eventuality of war, seaborne communications, etc., all of which subjects were submitted to a very careful scrutiny. Ample information was available for the purpose, including publications and the records of debates in the House of Parliament in World War I. The study produced new ideas and a basis for the formulation of missions of intelligence procurement. In July 1939 the completed study was presented to the Commander in Chief of the Luftwaffe in the presence of the Chief of Staff, an Under Secretary of State, the Commanding General of the Second Air Fleet and his Chief of Staff. The study was presented with an oral address by the Chief of the Intelligence Division.

The finding were summarized as follows:

Great Britain has an extraordinarily firmly anchored form of Government, and is biologically and economically strong. Her military power is anchored primarily in the Navy which is far superior in strength to the German Navy. Mobilization of the Navy has already commenced. The second strongest branch of the military forces is the Air Force,
which presently is engaged in a program of modernization and rearmament and might reach a status equal to that of the German Air Force in 1940. The air defense of the British Isles is well prepared and is being improved continuously. Modernization of the small British Army is making good progress, but for the time being the Army can only play a role in cooperation with France.

Stockpiling of supplies for the economy has begun in all fields. The weakest points in the overall British economy are its dependence on imports from abroad and on sea routes. This gives special importance to the sensitivity of Britain as a whole, because of her geographical position, and of British naval and mercantile ports to air attack. The inescapable condition for air warfare against Britain is the neutralization of her Air Force and Navy. The only mission which would then remain would be to neutralize all of her naval and mercantile ports and destroy her shipping.

It is not possible to estimate how long it would take to achieve the objective aimed at.

Information was also available on the subject of the economical situation of Britain. An analysis of the data available in this field presented the following picture:

1. Appendix 1: Extract from the Navy Memorandum on Intensified Naval Warfare against Britain, 15 October 1939 (Denkschrift der Kriegsmarine über den verschärften Seekrieg gegen England.)
1. BRITISH PRECISE IMPORT REQUIREMENTS IN PERCENTAGE OF OVERALL CONSUMPTION

<table>
<thead>
<tr>
<th></th>
<th>Agricultural Products</th>
<th>Industrial Commodities</th>
<th>Mineral Oils</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage of overall consumption imported</td>
<td>75</td>
<td>73*</td>
<td>96</td>
</tr>
<tr>
<td>Volumes imported in 1937</td>
<td>23,000,000 tons</td>
<td>25,000,000 tons</td>
<td>11,000,000 tons</td>
</tr>
<tr>
<td>Characteristic features</td>
<td>Large quantities of bulky animal feeds besides mineral feeds; mainly concentrated mineral products and foodstuffs</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Calculated on the basis of monetary values.

Degree of British Dependence on Foreign Imports in Detail:

Food.

- Fats, tea, coffee, cocoa, tropical and sub-tropical fruits, etc.: 90-100%
- Bread grains: 80-90%
- Sugar: 70-80%
- Cheese, fruits: 60-70%
- Meat: 50-60%

Mineral Oils.

- Rubber, cotton, silk, jute, potash, bauxite, nickel, antimony, mercury, etc.: 100%
- Copper, manganese, chromium: 90-100%
- Iron oxide, wolfram: 98-99%
- Flux, zinc: 96-97%
- Timber, mineral oils: 96%
- Tin, lead: 92-93%
- Wool, hides, skins: 71%
- Iron ores (in iron content): 42%
The only commodities in which Britain is completely self-supporting are coal and nitrogen.

II. BRITISH WARTIME IMPORT REQUIREMENTS.

The curtailment of civilian consumption, a changeover from the import of bulky to that of concentrated commodities, increased home production, and various organizational measures plus the use of stockpiled supplies could sharply reduce imports in dry commodities to a level far below that of the peacetime import requirements. In contrast, the import of mineral oils would increase sharply. Computations by the Institute for Business Research (Institut fuer Konjunkturforschung) under instructions by the Navy High Command reveal the following picture:

<table>
<thead>
<tr>
<th></th>
<th>1937</th>
<th>1st Year of War</th>
<th>2nd Year of War</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agricultural products</td>
<td>23.9</td>
<td>19</td>
<td>16.2</td>
</tr>
<tr>
<td>Industrial commodities</td>
<td>35.2</td>
<td>24.6</td>
<td>18.9</td>
</tr>
<tr>
<td>Mineral oils</td>
<td>11.2</td>
<td>21.5</td>
<td>57.2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>70.3</strong></td>
<td><strong>65.6</strong></td>
<td><strong>59.3</strong></td>
</tr>
</tbody>
</table>

By throttling her re-export and normal export activities, a measure Britain could introduce in an emergency as done in the World War II, it is to be assumed that imports could be even further reduced to an extent depending on the degree of export curtailment.

Total Import Requirements
Total Import Requirements
(in million tons)

1st Year of War  2nd Year of War

If industrial exports
are halved   60.0  53.7

If exports cease totally  56.5  50.2

It must therefore be assumed that Britain if necessary
could effect considerable savings in her import tonnage,
which could in certain circumstances reduce the peacetime
volume by up to 30 percent.

III. SHIPPING REQUIREMENTS

1. Dry Commodity. Excluding tankers, the tonnage of
British ocean going ships totalled 12,800,000 gross register
tons and was sufficient to carry all peacetime import require-
ments.

In wartime a number of factors must be taken into account
which will reduce the carrying capabilities of shipping, such
as

a. Delays due to overcrowded ports

b. Longer sea routes

c. Longer time spent on voyages

d. Increased accidents at sea due to convoy traffic and
other causes.

On the other hand, certain factors will serve to bring
the tonnage needed to meet peacetime requirements. Wartime
mineral oil consumption will show a sharp increase requiring
tanker space estimated at

2.6 million Gross Register tons in the first year of war
2.9 " " " " second " "
so that no appreciable reserve in British-owned tanker tonnage
is available (however compare IV, 1, below).

IV. SHIP SPACE RESERVES.

1. Actual Tonnage Reserve. Out of neutral mercantile
fleets Britain can count particularly on the tanker fleet of
the USA with a tonnage of 2,000,000 plus the merchant fleets
of the Scandinavian countries and Greece totalling 12,000,000
Gross Register tons, including Norwegian tankers with a tonnage
of 2,100,000. It is hard to estimate what share of this re-
serve Britain will be able to secure in an emergency.

Shipping owned by British dominions and colonies will
probably only be available to a small extent to support the
Home Country, since this shipping, which totals 3,100,000
tons, will mostly be required for local and inter-Empire traf-
fic.

2. Potential Reserve. It can be assumed that shipbuilding
yards in Britain and the USA can construct ships with a total
of 6 million Gross Register tons annually. However, this
figure could probably not be achieved before the third year of war. It is probable that Britain alone can construct new ships totalling 1,500,000 tons in the first year of war and 2,000,000 annually from then on, with the limitation that such results could be influenced by air warfare.

V. DEPENDENCE ON NORTH SEA AND BALTIC SEA.

In 1937 the following percentages of British imports came from countries bordering the North and Baltic Seas:

Agricultural Products:

- Bacon 70 percent
- Butter 42 "
- Eggs 70 "

Timber and Wood Products, Including Imports from Russia:

- Timber 65 percent
- Wood pulp 90 "
- Paper and hardboard 55 "
- Iron ore 22 "

VI. THE CONTINENT OF NORTH AMERICA AS A SOURCE OF SUPPLIES.

If the USA makes its material resources fully available, restricting its home consumption in cases where this is necessary, the continent of North America is in a position to supply more than 90 percent of Britain’s wartime import requirements.
1. **Agricultural Products.** Except in the case of crop failures North America can supply all needs, since market conditions already reflect a marked tendency towards over-production and in the case of animal feeds, reserve supplies already would permit a rapid increase in the animal population.

2. **Timber and Wood Products.** Requirements in this field can be met by Canada.

3. **Iron and Steel.** Since the American iron and steel industries were working at only approximately 60 percent of full capacity in August 1939, the United States would be able to supply all of Britain's needs in iron and steel if production capabilities are exploited to the full and if supplies to other countries are deferred whenever this might become necessary.

4. **Non-Metallic Metals.** Britain's wartime requirements could be met in full in the case of copper, nickel, zinc, lead, and titanium.

5. **Textiles.** If a stop is put to the production of the finer types of cloth and threads, for which purpose Egyptian cotton would be required, Britain's cotton requirements
in cotton can be supplied by the United States alone, particularly in view of the fact that supplies totalling 12 million bales or roughly enough to supply world consumption for six months are presently held in storage.

6. **U.S.A.** In view of the immense reserve resources and the possibilities to step up production rapidly, all of Britain's requirements could be supplied without any need to curtail consumption within the United States.

The Continent of North America cannot supply the following commodities:

- Wool, flax, hemp, jute: approximately 800,000 tons
- Manganese ore: 300,000 tons
- Rubber: 200,000 tons
- Potash: 200,000 tons
- Zinc: 100,000 tons
- Bauxite: 300,000 tons

Approximate total: 1,900,000 tons

Furthermore, North America has too small supplies of no supplies at all in mercury, chromium ores, antimony, and wolfram. So far as ship space is concerned, however, the quantities required in these metals are so small that they are unimportant. The same applies in the case of a few materials in the fields of stones and earths, hides
and leather, and chemistry, some of which items also can be supplied only in part from the United States.

The fact that North America can supply such a large percentage of Britain's needs will make it possible to concentrate shipping on routes in the North Atlantic, which will considerably facilitate Britain's mission of protecting her merchant shipping. Simultaneously, Britain's ship space requirements would be considerably reduced.

3. Russia. Air power in Russia is considered primarily as auxiliary to the Army and the Navy. A lack of uniform control is noticeable in the highest levels of command. Initiative, in the form of willingness to make personal decisions, is hampered by cooperation with Military Councils and because of controls by the Party.

Russian air strength presently totals approximately 6,000 military types of aircraft, including seaplanes. The 5,000 front line aircraft included in this number are distributed as follows:

Europe:

1,270 bomber and strategic reconnaissance planes, 800 of them Class I

Europe

Europe--Continued

300 ground-attack aircraft, meeting minimum requirements for Class I

270 Army tactical reconnaissance planes, Class II

1400 fighter aircraft, 1200 of them Class I.

Far East

250 bomber and strategic reconnaissance aircraft, 100 of them Class I

100 ground-attack aircraft, as above

250 Army tactical reconnaissance planes, Class II

400 fighter aircraft, 200 of them Class I.

The Naval air arm comprised 700 seaplanes, Class II, stationed primarily in the Baltic areas.

The ground service organization maintains a large number of airfields, particularly in the western territories. However, these airfields are poorly constructed and are therefore only conditionally suitable for operations by bomber forces. The disadvantages of the Russian ground service are that the airfields are in areas where the subsoil is poor, dust conditions, and the fact that they are only conditionally usable during the thaw seasons and during snowfalls in winter. Hangar space is inadequate. Fuel supplies held and fuel storage space are inadequate.
Signal communications are poor. The whole organization cannot compare with the German ground service organization.

"The numerous airfields in European Russia therefore can only be considered as of conditional value for the operations of air forces in warfare."

Even during peacetime the supply and traffic conditions are completely inadequate. It is to be expected that the striking capabilities of the Soviet-Russian air forces will soon sink considerably under war conditions.

The standards achieved in training are far below those of the German Air Force.

Paratrooper and air-carried infantry forces are available in large numbers. "This circumstance is due to the relatively sparse population of the eastern territories."

These forces are trained for integrated action with the Army. "One obstacle to the commitment of air-carried infantry in Central Europe is the dense population there."

The capabilities of the anti-aircraft artillery are considered small.

Military Economy: Conditions are favorable and under normal circumstances the military economy can meet requirements.

The weak point here is transportation routes.

"In view of the large use which will be made of transportation facilities for purely military
Any plans for use of Poland and the border States as bases for air operations would require lengthy preparations, since the ground organization presently in existence in these territories is inadequate.

"In summarizing it must be emphasized that the present striking power of the Soviet-Union is small because of innerpolitical reasons plus traffic, manufacturing, and supply operation conditions. This does not mean that this condition of weakness will not be remedied with time. In any case the rate at which the striking power might increase will be "Asiatic," meaning that it will be organizationally imperfect."

The consolidated findings of individual studies on air situation interpretations was intended to provide a basis for decisions to be taken by the Command and for the training of the higher level headquarters staffs.

To what extent the higher levels of command and the Supreme Command made use of the results thus obtained in order to translate them into action depended on numerous other factors. These factors were often unforeseeable and were outside the field of influence of the agencies responsible for the procurement, processing, evaluation, and final consolidation of intelligence data. For example, the knowledge that a country was particularly sensitive in the field of
aircraft engine manufacturing did not necessarily lead to attacks against the factories involved if the highest level of German command could assume that, in the event of war, it could conquer the country concerned and make use of the factories itself.

The results obtained through the research processes described above could only serve to provide patterns of action to be adopted from case to case in accordance with current situations.

1. The installations of the ground service organisation, air depots, airframe parks, aircraft parks, fuel fuel storage depots, and ammunition installations.

2. For the next phase, the phase of air operations in support of the army, bases were established in which enemy air routes were to be intercepted.

3. The appropriate installations in the field of control of the Air Force constituted a part of the "Assembly and Combat Instructions." Designed from 1936 as "Operational Forces" for reasons of security.

4. The compilation of small target data for each operation and for the enemy; training to enable operations to recognize specific types of target and their respective parts.

In the case of attacks against permanent-type targets, the rail interchanges were included in the target map of Poland in appendix 4.
the intention existed to furnish each participating aircraft crew the target data prepared in accordance with the requirements stated in Chapter 2, Section 1, above, for each target, so that a great amount of preliminary work was involved.

The target data sheets were printed during peace and in such large numbers that adequate supplies were available of the appropriate sheets at each tactical air port on the front involved, so that, as a precaution against the eventuality of war, an immediate attack against any one of these targets could be launched immediately. Any air unit landing at one of these bases would find the necessary data on the spot.

TRAINING TO ENABLE AIRCRAFT CREWS TO RECOGNIZE SPECIFIC TARGET TYPES AND THEIR SENSITIVE PARTS

Peacetime training aimed at enabling the crew members of bomber and reconnaissance units to recognize factories and other permanent installations by the constructional features characteristic of the type of product manufactured in them.

In the case of important factory complexes, crew members were instructed on how to identify points which were particularly sensitive to air attack.

One of the aids used in such instruction was a descriptive illustration of the manufacturing processes involved and the resultant characteristic structural features of a factory.
The illustrations used at the time are not available at the time of writing, for which reason similar illustrations of a more modern type are offered in the Appendix Volume.

1. Appendixes 7-9.
CHAPTER THREE

THE ACTUAL SELECTION OF TARGETS

The purpose in this chapter is to illustrate how targets for German air attack were actually selected in World War II.

As can be seen from what has been said in the preceding chapters of this study, the missions assigned to the German Air Force had to be established prior to any target selection.

The mission, or in other words the objective or result aimed at, and the selection of targets were inseparably interdependent. Consequently, it has been necessary to deal with both of these factors in the following narrative.

The examples offered later in this study, in Part Two, Chapters 1-3, represent only a selection from the innumerable events of the type concerned which occurred in five years of warfare on several fronts.

1. THE SUPREME MILITARY COMMAND AS THE DIRECTING CENTER.

Concerning the assignment of missions Air Field Manual 16 states in Paragraph 30 as follows:

The decision of a war can only be brought about by the coordinated action of all three branches of the military forces. By coordinating the operations of the Army, the Navy, and the Air Force, and by appropriate shifts
of emphasis within the whole military establishment in accordance with the current military situation, the Supreme Command directing the entire war endeavors to achieve the maximum overall result.

Paragraph 11:

In Chapter III

How the maximum results can be achieved towards bringing about a decision in war and, accordingly, which mission must be brought into prominence at any given time, can only be decided within the pattern of the overall military situation. The currently most important target must be determined with careful consideration of all military, political, and economic aspects involved.

In making the decision due regard must be given to the enemy, weather conditions, the season of the year, the structure of the country involved and the character of its population, and own combat capabilities, and the capabilities and limitations of the air forces available must be taken into consideration.

In Paragraph 13:

The whole pattern must be kept constantly in view.

From all of the above it becomes obvious that the missions, meaning the objectives to be achieved through operations of the

1. Note by author: Obviously the "objective aimed at" (Zielsetzung) is meant here. Instead, the term used in the original text is "ziel" or target.
Air Force in practice could only be established by the Supreme Command of all military branches. This was particularly the case after the war had developed into a multi-front war.

COOPERATION WITH THE POLITICAL AUTHORITIES

Air Field Manual L. Dv. 16 states categorically in Paragraph 11 that consideration must be given to political aspects. This flat statement is amplified in Paragraph 12 of the manual as follows:

Operations by the Air Force strike the enemy nation and its country in their most sensitive points. Unintended concurrent results cannot be avoided in the attacks. The results of the combat action can be of exceptionally serious import in the political field and in the field of international law. Attacks carried out at the wrong time can produce results diametrically opposed to those intended.

For these reasons the Supreme Command directing the whole war must retain the possibility to exercise a strong influence on the conduct of air warfare.

From the above it is obvious that not even the military command itself can make the decision concerning what the objective of air warfare is to be but must request a decision from the highest responsible political authority.
However, this principle did not apply in the case of Germany, because Hitler was at one and the same time Head of the State and Supreme Commander of the military forces.

The weak point here was that Hitler was admittedly advised by his military assistants, but not by his political advisers, so that the political decisions taken were based on the deliberations of him alone.

It would exceed the scope of this study to examine how this resulted in wrong assessments of the political repercussions of military action.

II. THE PRINCIPLES GOVERNING THE ESTABLISHMENT OF THE OBJECTIVE AND THE SELECTION OF TARGETS.

In defining the objective of air warfare it was essential, according to Air Field Manual L. Dw. 16, Paragraphs 13-15, to give consideration to the following points:

Paragraph 13:

The objective in air warfare must conform to the principle of power concentration. Within the scope of the applicability of air power innumerable missions will develop for the Air Force, for the accomplishment of which its available strengths usually will not be adequate.

For this reason care must be exercised to avoid any dispersion of effort through the simultaneous assignment of too many separate missions, or through an all too
change of missions, which would inhibit the proper culmination of any action taken. Attention must always remain directed towards the overall objective. Tactical reverses must be accepted if they do not endanger achievement of the operational intentions. The possibility to achieve tactical successes must be disregarded if the necessary action to secure them would tie down forces without any profitable repercussion on the overall situation.

Paragraph 12:

In spite of the necessity for firm adherence to the overall objective, it would be a mistake to overemphasize the power concentration principle. This could result easily in failure to exploit important successes in other areas, or might enable the enemy to secure decisively important advantages in other areas.

Developments of this kind must be detected at an early stage and prevented by means of precautionary measures.

Paragraph 15:

In the course of a war it will therefore frequently not be possible to separate, in timing, the missions of counter-air action, action in support of the Army and/or Navy, and action against the various resources of the enemy.
In the selection of targets, Paragraphs 45-47 of the manual had to be borne in mind, as follows:

**Paragraph 45:**

The presence of large numbers of targets for attack must not be allowed to lead to any dispersion of effort.

It is therefore wise to limit the number of targets selected.

**Paragraph 46:**

In spite of the principle of power concentration, it can at times be a wise practice to execute a number of missions concurrently.

If emphasis is shifted to a new target or target complex it might prove necessary to continue attacks against the former targets in order not to forfeit the advantage of success already achieved.

In some cases success achieved in the assigned area of attack can be expanded to strategic scope by extended combat action to include outside targets.

**Paragraph 47:**

The results desired will determine the nature of the action taken and the type or types of ammunition used.

In order to achieve annihilating results, forces must be held together. In many cases it will be necessary to repeat the attack.
Harassment and neutralizing effects can be achieved with smaller forces more widely spaced, by repeat attacks, and by use of the appropriate ammunition, namely, time-fuze bombs.
PART TWO

EXAMPLES OF MISSIONS ASSIGNED TO THE GERMAN AIR FORCE IN WORLD WAR II AND THE RESULTANT SELECTION OF TARGETS
CHAPTER ONE

THE BATTLE FOR AIR SUPERIORITY

1. The Mission as the Basis for the Selection of Targets.

2. Basic Rules to be Observed when Defining a Mission.

Air Field Manual L. Dv. 16 contains the following passages on this subject:

In Paragraph 16:

The own military forces and country are constantly threatened by enemy air power. This threat can at no time be adequately countered alone by defense activities within the homeland.

This latent air threat to the homeland makes it imperative from the very beginning of a war to commit bomber forces in offensive combat action against the enemy air forces within enemy territories.

In Paragraph 17:

Combat action over enemy territory is directed not only at the mobile enemy forces and their bases. It is directed in equal measure against the supply and manufacturing industries and facilities supporting the enemy air forces and thus becomes warfare against the enemy resources.

In Paragraph 18:
In Paragraph 18:

Combat action against the enemy air forces within enemy territory will not cease even if the goal is achieved during a war of temporarily reducing the air threat to a minimum. Even if temporary air superiority is achieved the possibility must be taken into account that the enemy might be able to regain freedom of action through the replacement of losses suffered or through the introduction of new technological devices, and that the more quiet and time they are allowed in the pursuit of such endeavors the more likely they are to succeed.

In Paragraph 19:

Even if the bomber forces are diverted to the execution of other missions, continued combat action against the enemy fighter forces in their bases might be necessary to protect the units engaged in the new missions.

In Paragraph 21:

Throughout a war the battle against the enemy air forces thus never ceases. The effort expended on such battle and the means employed for the purpose will vary in accordance with the urgency of other missions, the strength of the forces available, the threat to the home-land, and the extent of enemy air defenses.
In Paragraph 107:

Even if the forces available are not adequate for preplanned counter-air action of this type, in missions with limited objectives, action must nevertheless be taken to weaken the enemy bomber forces through the exploitation of favorable circumstances for occasional air attacks.

b. The Command authority Responsible for the Assignment of Missions. At the beginning of a war, a campaign, or a new phase in a campaign, the Supreme Commander of the Military Forces as a rule issued to the Air Force High Command the necessary directive defining the scope within which the Air Force was to wage the battle for air superiority, or, in other words stating whether the Air Force initially was to commit its entire power in this mission, or was to be required to execute concurrent missions, such as the mission of providing air support for the Army, with parts of its forces.

The Commander in Chief of the Air Force thereupon took the necessary measures to carry out his mission. He allocated the forces available among the air fleets and gave the air fleet headquarters the appropriate directives for the execution of the assigned mission or missions.

As a rule each higher level Air Force field commander as the war proceeded had the authority to institute counter-air action in the form of a concentrated attack by all forces
available under his command, or in the form of smaller attacks by only elements of the forces available to him, in order to prevent any increase in the enemy air strength. However, it the forces under his command were fully engaged in the execution of the mission or missions assigned to him by higher headquarters, he was required to obtain approval from the higher headquarters for such counter-air action.

c. Examples Showing the Assignment of Missions in World War II.

(1) Assignment of Missions by the Supreme Military Command.

Example One: Extract from Hitler Directive No. 6 for Conduct of the War in the Western Theater, Paragraph 2, 9 October 1939.

"The Air Force will prevent Anglo-French air operations against the German Army.

"It will be of importance here to prevent the Anglo-French air forces establishing themselves in Belgium and Holland."

Example Two: Extract from Supreme Military Headquarters Directive Dated II January 1940.

"Air Force attack against the enemy air forces. Assuming suitable weather conditions, the Air Force on 14
January 1940 will commit all available units in attacks against the majority of enemy airfields in operation in northeastern and eastern France, with the primary objective of destroying the fighter and reconnaissance aircraft present at those airfields...."
the islands of Hūmaa (Dagoe) and Saaremaa (Oesel) by means of a joint operation with army, naval, and air elements participating.

"The most urgent requirement here is to destroy the enemy airfields, from which it appears that the attacks against Berlin are being staged.

"The Army will be responsible for uniform preparations for the operation."

Example Seven: From Supreme Military Headquarters Order In Implementation of Hitler Directive 7 FZ. Preparations for the Drive Into the Balkans. 13 December 1940.


c. To eliminate the Greek-British air forces....


The missions assigned were:

"Through combat action to achieve air and naval supremacy in the area between southern Italy and northern Africa, in order to establish secure lines of communications to Libya and the Cyrenaica; for this purpose the neutralization of Malta is particularly important."

Example Nine: Hitler Directive # 39, 8 December 1941 (Russian Campaign).

II. Excerpt From Air Force Annex. "Concurrently with
counter-air action...

Example Ten: Hitler Directive # 41, 5 April 1942 (For Planned Offensive Directed at Stalingrad and the Caucasus).

"Concentrated air forces will initiate the offensive by attacking and destroying the enemy air forces and their ground service organization in the attack area."

Example Eleven: Hitler Directive # 42, 29 May 1942. (Instructions for Operations against Occupied France and/or the Italian Peninsula).

"The mission of the Air Force is, concurrently with action in direct support of army forces, to neutralize, in operations coordinated with the Italians, those elements of the French air forces which are in France.

(2) Directives from the Commander in Chief of the Air Force.

Example One: From Operational Study 1939 (Planstudie 1939) (Reorganization and Operational Orders for the Air Force. Instructions for Operations against the East--Poland), 1 May 1939.

Missions of the Air Force.

a. To exclude the possibility of effective interference by the Polish air forces in the operations, and to prevent air attacks against German territories.

b. This paragraph contains instructions for action

1. Ibid 6 o.
2. Ibid 6 o.
3. Ibid (Quoted here in an abridged form).
by forces held ready for the purpose, in direct and direct support of the Army.

Furthermore, orders required attacks against Russian mobilization centers and lasting interdiction of the rail routes to the front areas.

Paragraph 8: Direction of the Attack.

a. ....

b. The large bulk of all available forces will participate in the first attack, directed against the Polish air forces.

Example Two: From Operational Study 1939, Volume III, GNC Air Force (Case 3054), for the Conduct of Operations in the Western Theater.

Conduct of Combat Operations.

a. While fighting delaying actions on the assumption that the bulk of German air power is committed in the east against Poland

aa. Exploiting to the utmost the capabilities of the units, night conditions, and periods of bad weather to take all reported enemy airfields under continuous attack, including attacks by small units.

bb. ....

cc. ....

I. Ibid (quoted here in an abridged form).
The primary mission remains that of combat action against the enemy air forces, including their supply and other vitally important installations.

The paramount requirements for the bomber forces is to attack and destroy enemy air units they detect on the ground, this without regard for other current missions unless they have specific orders to the contrary.

Example Four: From Directive 71 from CINC, Air Forces, to Second and Third Air Fleets, 11 August 1939. (Operations in the west). This Directive was issued prior to the declaration of war by France and Britain.

"1. Hostilities against Poland will be initiated at 0445 on 1 September 1939 by the First and Second Air Fleets.

"2. What is most important in the west is to leave responsibility for the commencement of hostilities clearly to Britain and France...."

"3. If Britain and France commence hostile action against Germany....."

"4. Missions of Second and Third Air Fleets.

The initially most important mission of the Second Air Fleet is to protect the Ruhr Region; the ability of this region to continue work must be preserved with all means available...."

"The Third Air Fleet after the opening of hostilities

1. Ibid. (Quoted here in abridged form)."
by the enemy will as its first mission take action to prevent operations by French and British air forces within its command zone.

"Otherwise, the orders issued pursuant to the Operational Study (Plumadium) apply to the Second and Third Air Fleets."

Example #1: From Directive #2 to Second and Third Air Fleets, 3 September 1939. (In War Weak).

"1. The British Admiralty has issued orders, at 1100 on 3 September, to commence hostilities. France has declared herself in a state of war against Germany since 1000 on 3 September.

"2. The objective of the Supreme German Command for the time being remains the speedy and victorious conclusion of the operations against Poland.

"3. The principles for the conduct of the war stated in Directive #1 of 31 August 1939 remain in force.

"4. ....

"Air Force."

"The initiation of attack action remains contingent upon the commencement of hostilities in the air by France. I reserve to myself the authority to order the initiation of hostile action.

"German measures must be avoided which might cause 1. Ibid. (Quoted here in abridged form)."
the initiation of air warfare by the enemy...


"A 1. Since the operations in the east are drawing to a close....

"B 2. Now as before it is important to leave responsibility for the commencement of offensive air operations clearly to Britain and France.....

"3. Air attacks against French territory, the British homeland..... still remain prohibited.

"Whatever happens, the Fuehrer and Supreme Commander has reserved to himself the authority to approve such action."

Example Six: Instructions for the Conduct of Combat Operations, Supplementary to Directive # 5 by the CINC, Air Force, for Air Warfare in the West.

"Combat Action against Enemy Air Forces.

"Action against the enemy air forces for the time being will be restricted exclusively to attacks against the units detected in the Belgian area and at the airbases of the French and British specially marked in the Appendix, the neutralization of which would prevent combat action by enemy short-range units against the German advance."

1. Ibid.
2. Ibid.
"In this connection the near-front air bases reportedly containing large forces will also be attacked, if units are detected on them by reconnaissance planes or by our bomber forces committed against the enemy advance."

Example Seven: From Directive No 5, CINC, Air Force, 7 December 1939, for the Planned Offensive in the West.

"X Air Corps (Major General--Generalleutnant@Geissler responsible directly to me, will attack under my orders....

"With the opening of operations in the west and while these operations continue X Air Corps will attack with increasing intensity: (Seaborne targets and port installations).

"The ground installations of the British Air Force within Britain insofar as units are operating from them against the Continent...."

Example Eight: Directive No 5, CINC, Air Force, Concerning Preparations for the Campaign in the West.

"Second Air Fleet....will take action to prevent interference with the north flank of Army Group B by Franco-British and Belgian and, so far as the situation requires, Dutch air forces, and to prevent the establishment of Franco-British air forces in the Belgian-Dutch areas.

1. Ibid.
2. Ibid.
"(Main emphasis on Army support)"

"Initially only elements will be committed against the enemy air forces in Belgium and later also against those in the Lille area....

"Combat action against the Dutch antiaircraft artillery and the Dutch air forces with their ground installations will be taken only within a scope absolutely essential for our own conduct of operations, on an increased scale only if they participate in the combat operations. If Franco-British or Belgian units are unmistakably identified on Dutch territory, however, they will be taken under attack immediately, whether they are based together with Dutch units or not.

"IV air Corps, (support for 7th Air Division Airborne Operation).

"If necessary, attack is also authorized for this purpose against Dutch antiaircraft and fighter forces in the approach route zone of the 7th Air Division between the Waal River and the Belgian border.....

"Third Air Fleet, (Army Support).....and will attack the Franco-British air forces insofar as these could be employed effectively against our attack armies.

"V Air Corps, under Brigadier General (Generalmajor) von Greim, will attack the Franco-British air forces
insofar as these can be committed against our attack forces, primarily in the Cambrai-Amiens-Chateau Thierry-Chalon a. M.-Toul-Metz area.

2. The Selection of Targets.

   a. Principles to be Observed in the Selection of Targets.

   On this subject Air Field Manual M. Dr. 16, in Section IV: "Operations--Counter-Air Combat Action," states as follows:

   In Paragraph 1D3.

   ".....

   "...Combat action will be directed primarily at the enemy bomber forces. Destruction of the mobile forces must be the primary objective. A surprise attack by own bomber forces might succeed in striking the enemy bomber forces while they are still in their peacetime bases. Even if the units have left their peacetime bases too soon, attacks against these bases can be expected to cause considerable damage which will hamper their operations.

   In Paragraph 1D4.

   "....Destruction of elements of the ground service organization and of signal communication centers will hamper the enemy bomber forces in their freedom of action, will decrease their striking range, and will complicate
direction of their operations.

"Only an aggressive conduct of operations will strike
the roots of the enemy power if the attacks are directed
during the war against enemy supplies, personnel and mater-

tial replacements, and the supporting industries."

In Paragraph 118.

"Combat action will be taken against enemy air forces
in sea areas in accordance with the same principles as
those applicable for action against land-based forces.

Mobile units and their floating bases (aircraft car-
riers), however, are generally considered targets for the
units allocated to the Navy, whereas bomber units of the
Air Force can take action against shore air bases and signal
communication centers if these are within their striking
range.

As a rule combat action against their supplies, re-
placements, and supporting industries will not require any
special measures. Such action is inseparable from the

corresponding phase of overall combat."

b. What Headquarters Selects the Targets? For the
first attack at the beginning of a war or of a campaign it was
a general rule for the Commander in Chief of the Air Force to
select the targets and establish their sequence of priority.
or to call for recommendations from the air fleets on the subject. In other cases the air fleet headquarters or the air
command, air division headquarters, or air corps headquarters responsible for the conduct of operations decided the selection
and priority sequence of targets within its zone of operations.

Air Field Manual L, Dw. 16 states on this subject as follows in Paragraph 107:

Even if the bomber forces are employed in other missions they will be allowed a great measure of freedom of
action to take advantage of promising situations if they detect enemy bomber units on the ground or encounter them
while airborne.

This meant that even the tactical commander of a unit in flight had the authority to change his assigned mission over
enemy territory in order to attack enemy air units detected on the ground if favorable opportunities presented themselves.

o. Examples of Target Selection in World War II.

Recommendation by Third Air Fleet to Commander in Chief,
Air Force, Concerning First Targets of Attack Complement with
Directive #5 at the Beginning of the French Campaign.

"26 October 1939

"Command Personnel Only--Top Secret--Officer Handler.

"Solution B

"(Implying delimitation of zones and special concentrations of power within a close attack area immediately on first
attack).
Boundary Between II and IV Air Corps:
Speyer (V Corps)—Biteach (V Corps)—Pogny (V Corps)—Corbeil (V Corps)—Chartres (V Corps)—Laval (V Corps)—Vannes (V Corps).

Targets for first attack:

II Air Corps:
3d Bomber Wing, Amiens base; this leaves two groups still available
2d " " Thionville Base, leaving only one group still available
53d " " Reims base and Mormalon, leaving only one group available

V Air Corps
76th Bomber Wing, Metz—Frescaty—Nancy—Essy base
55th " " St. Dizier—Robinson base, leaving one group available
27th " " Râmilly and Bezanne—La Ferthe base, leaving one group available
51st " " Dijon—Longvic base, leaving one group available.

This would leave uncommitted in the first attack:

II Air Corps 4 bomber groups?
V " " 3 " " (?)

To be committed either immediately on the basis of reconnaissance of the previous day or later in the forenoon following renewed reconnaissance, primarily against enemy aircraft on the ground.
According to present intelligence the following would be suitable targets:

Tactical air ports at Leon, Provan-le Patron, Challeange, Chatel Chehey, Vitry le Francois, Auzainville.

Given favorable weather conditions, all units committed in the forenoon could be dispatched in a second attack on the same day.

For Air Fleet Adler Headquarters
Chief of Staff
a/ von Pohl
Adler, Operations Division, Air Section, # 193/39,
Top Secret, Commander Personnel only.

Exemplifying a large-scale German attack on 1 January 1945 against Allied airfields in southern Holland and Belgium.
(Source: Schnellbildsendungen des I.O.-Dienstes West # 26/45, 27.1.45. Nur fuer den Dienstgebrauch.)

"Strong German air forces on 1 January 1945 attacked Allied airfields in southern Holland and Belgium.

"....

"i. Results Achieved. Own air photos prove success.

Altogether 402 aircraft destroyed, namely:

279 (239 single-, 21 twin-, 19 four-engine) on the ground at airfields as evidenced by air photos
123 (113 single-, 7 twin, 2 four-engine), also on
7 other airfields, according to visual observations.

"Susuy aircraft shot down in air combat:
65 confirmed
12 in all probability.

"This makes a total enemy loss of
479 aircraft destroyed
114 " damaged."

(For typical target effect photos the reader is referred to
Appendix 10-17 in Appendix Volume).

COMBAT ACTION AGAINST AIRBORNE TARGETS

a. Principles to be Observed in Forming the Mission.

From Paragraph 10, Air Field Manual L.Dv. 16:

"To the mission of combat action over enemy territory
comes that of fighter action against enemy aircraft over
friendly territory....."

From Paragraph II.3:

"The less forcible the action taken currently in of-
fensive combat against the enemy, the greater will be the
importance attaching to defense action."

b. Target Selection. In a study "German Fighter
Aircraft in 1939-45" (Die Deutschen Jagdflugzeug 1939-45)

General Galland writes:

"The following decisively important mistake was made,
primarily in tactics. From 1941 on the Command demanded
1. Karlsruhe Document Collection, F IV 1 b.
action resulting in the downing of enemy bombers, disregard that consistent action to deplete the enemy bomber forces was only possible after successful contest with their escort fighters. In the real sense this meant the necessity to secure air superiority. Then the downing of bombers is a small matter."

3. Critical Review.

a. Mission Redivision and Assignment. With very harmful results the German Command time and again failed to adhere to the principles stated in regulations on the conduct of operations to establish air superiority. During the Russian campaign, for example, nothing was done to continue systematic combat action against the Russian air forces during later operations.

Apart from the circumstance that the German Air Force at the beginning of the campaign did not succeed in destroying the Russian aircraft factories, which was due to the inadequate striking range of its bomber forces, this failure to take continued counter-air action resulted in a quick recovery of Russian air power.

When in 1944 the airfields in England were crowded with Allied aircraft for preparatory action preceding the coming invasion, the German Air Force according to Air Field Manual 1, Ch. 16 should have attacked these airfields, particularly Appendix 16.
those on which bomber aircraft were stationed. However, Hitler prohibited such action, his opinion being that for retaliatory reasons the German Nation would prefer to have houses destroyed in London rather than destroy aircraft.

b. Target Selection. During the war it became evident that, contrary to the principles stated in Air Field Manual L. Dw. 16 and requiring that enemy bombers should be the primary target of attack, the enemy fighter forces frequently had to be the primary target, in order to create conditions for daytime bomber operations. The reason for this may have been the serious sensitivity of German bomber aircraft to weapons fire and their own weak defensive fire power. Examples from practical experience in this matter were the German air operations against Britain in the first phase of the Air Battle for Britain, and operations to neutralize Malta in April-May 1942.

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CHAPTER TWO

DIRECT AND INDIRECT SUPPORT FOR THE ARMY AND NAVY

I. AIR SUPPORT FOR THE ARMY.

1. The Mission as the Basis for the Selection of Targets.

a. Principles to Be Observed in the Defining and Assembling of Missions. In air operations supporting the Army it is necessary to differentiate between

   (1) Close support for the Army ground forces on the actual field of battle, and thus direct support, and

   (2) Indirect air support.

On the subject of direct air support Air Field Manual L. Dv. 16 states in Paragraph 20:

The commitment of air power in missions of direct support for the Army or Navy is advisable when operations of decisive importance for the overall conduct of the war are involved.

Even then counter-air action against the enemy airforces will not cease.

Besides action to interfere with the plans of the enemy army and naval forces, it is important to prevent similar action by the enemy air forces.

On the subject of indirect support for the Army, the manual states in Paragraph 21 as follows:
In missions of close tactical support for the Army and/or Navy, the Air Force, and primarily its bomber units, will not find targets wherein such that their striking power can be brought fully to bear and through the destruction of which they could most effectively support the Army or the Navy.

It is wiser to commit them in action against more distant targets, the destruction or temporary neutralization of which would have a decisively important impact on the combat operations of the Army and/or the Navy.

Even while employed primarily in support of the Army and the Navy, it might therefore be wise to also conduct warfare against the enemy resources.

The condition here is that the targets must be so selected that the action taken by air forces will affect the operations of the Army and Navy at the proper time.

b. Which Command Headquarters Stated the Mission? On this subject Air Field Manual L. Dv. 16 stated in Paragraph 125 as follows:

Beyond this, strong elements of the Air Force can also be committed to participate in battles of decisive Supreme Military importance on the ground. In such case the Commander will coordinate the requests of the Army with the other missions of air power and will

1. OKH (equivalent of Navy High Command) is obviously an error in the German text.
scope of the air support
determine accordingly the to be
given to operations on the ground.

The commander directing operations on the ground
will determine the purpose to be achieved by the air action
taken, whereas the Commander in Chief of the Air Forces
or one of his subordinate commands will direct the exe-
cution of the air mission.

The close cooperation essential in such action can
be established through liaison detachments or teams.

A departure is noticeable here from the usual procedure
in defining a mission, as follows:

The Supreme Command will only instruct the Air Force
that certain elements of the Army are to be given support
and, with due regard for any other air missions, will state
the size of the forces to be committed in such support ac-
tion.

The army headquarters receiving such air support will
inform the Air Force what purpose is to be achieved by the
air action requested.

The execution of the mission (frequency of strikes,
and the size of the units in successive strikes) will then
be the exclusive responsibility of the air command.

The intention here was to insure that the air units

1. Appendix 19.
would remain under control by an Air Force command staff, which alone, by reason of experience, could direct the air action with the best chances of success and with due regard to all contributing factors, such as the condition of the units involved, the capabilities of the aircraft and weapons, weather conditions, and the current air situation.

c. Examples of Mission Statement in World War II.

(1) Missions Assigned by the Supreme Military Command.

Example One.
From Hitler Directive # 6 for the Conduct of the War in the Western Theater, 9 October 1939.

"The Air Force will prevent action by the Franco-British air forces against our army forces, and will support the advance of our army forces to the extent necessary. Here, it will be particularly important to .... and to prevent the landing of British troops in Belgium and Holland."

Example Two.

From Hitler Directive # 18, 17 July 1940, for the planned Invasion of Britain in 1940-41.

".....

c. The air mission will be: (to prevent participation by enemy air forces), to neutralize coastal

1. Appendix 21. Also Appendix 21, which offers a good example of Army-Air Force cooperation taken from "The Feldzug im Osten, 1941-42" by General Flesher; Karlsruhe Doc. Collection. 2. Karlsruhe Document Collection, Ga.3. Ibid.
fortifications which could take the landing areas under fire, to break the initial resistance by the ground forces, and to break up enemy reserves on the approach.

In the execution of these missions extremely close cooperation is essential between the participating air units and the amphibious groups of the Army...

Example Three.

From Order by Supreme Military Command Headquarters Supplementary to Hitler Directive 7 20 for Advance into the Balkans, 1941.

"Preparations for the Advance into the Balkans Paragraph 5 Instructions for the Fourth Air Fleet.

"b. The concentration of the VIII Air Corps in Rumania must be so arranged that air corps forces can support the Twelfth Army from 1 February 1941 on (advance into Bulgaria, occupation of Greece)."

Example Four.

From Order by Supreme Military Command Headquarters, February 1941, Concerning Operations in Mediterranean Theater in 1941.

"1. In order to support the Italian defense operations in Libya pending the arrival of German Army ground forces, the Air Force under more detailed instructions

1. Ibid, G b.  
2. Ibid G b."
from the Commander in Chief, Air Force, and besides action to neutralize the British air forces stationed on Malta, will employ its units in Southern Italy to

"a. . . . ."

"b. to attack the enemy forces advancing westwards in the Cyrenaika.

c. to break up concentrations of the enemy armored and motorized forces advancing in and beyond the western areas of the Cyrenaika, consolidating all available air units for the purpose and using the heaviest types of bombs."

Example Five.

From Hitler Directive # 21, 18 December 1940, Paragraph 8 of the Plan for Strategic Concentration for Operation Barbarossa. (Invasion of Russia, Air force Cooperation...)

"The mission of the Air Force is to prevent as far as possible participation by the Russian air forces, and to support the combat operations of our army forces in areas of main effort, namely, in the zone of Army Group Center, and in the main effort area on the flank of Army Group South. During major operations, the Air Force will concentrate all units to support the Army. Attacks

1. Ibid.
2. Inserted by translator, since the German version (will concentrate all forces of the Army) is obviously an error.
against the enemy industry will be executed only after the operational objectives of the Army have been reached.

Cooperation will be as follows:

Army Group South to be supported by Fourth Air Fleet
Army Group Center " " " Second " 
Army Group North " " " First " 

Example Six.

FROM HITLER-Directive 7 of 1941 for Continuation of the War in the East, 19 July 1941.

"Paragraph 3. It is of particular importance for the Air Force when units can be released in the center to support the attack in the southeast through the commitment of air and antiaircraft artillery forces in concentration, if necessary by moving in reinforcements or by means of appropriate regroupings."

Example Seven.

FROM HITLER-Directive 11 of 1941.

"II. AIRFORES.

1. The Air Force will shift the emphasis in air attack operations to the northeastern frontage by transferring the bulk of VIII Air Corps units to the First Air Fleet. The reinforcements will be moved in early

1. Karlsruhe Document Collection @ b.
2. Ibida.
enough to permit their commitment at the opening of
the attack by the forces of Army Group North (early on
6 August).

"a. Germany. The mission of the Air Force elements
remaining in the zone of Army Group Center will be to
provide fighter defense in front of the Second and Ninth
Armies and, possibly, to support local attacks.....

"The attacks against Moscow will continue.

"3. Southwest Frontage. Missions remain unchanged.
No reduction of the Air Force elements committed in the
zone of Army Group South is planned.

"4. Finland. The primary mission of the Fifth Air
Fleet is to support the mountain corps. Concurrently,
the attack by the III Finnish Corps will be given support
in promising areas.

"Preparations will be made against the possible
necessity to commit forces in support of the Karelian
armies."

Example Eight.

From Order by Supreme Military Command Headquarters,Sup-
plementary to Directive # 34 of 12 August 1941.

"1. After describing the missions of the Army in the
southeastern area, namely,
under "a" annihilation of large enemy elements
still west of the Dnepr River and establishment of a bridgehead across the river,
under "b" Occupation of the Crimean Peninsula,
under "a" Occupation of the Donets region and the industrial region of Karkhov, the order continues:

"From these Army missions a large number of missions develop for the Air Force, all of which cannot be executed simultaneously, but each of which must be accomplished at the appropriate time through a tight concentration of power. The areas of main effort thus developed must be given greater concentration of action through the additional commitment of dive-bomber groups, primarily during the battles between Kanesv and Bogualav, and then in operations to establish a bridgehead across the Dnepr River."

2. Central Area of the Eastern Front. [Last item].

"Prior to the commencement of this drive in the direction of Moscow the operations against Leningrad must be brought to a close, and the units transferred from the Second to the First Air Fleet must be returned to the Second Air Fleet."

"Northeastern Front. The attack presently in progress is designed to isolate Leningrad and establish contact with the Finnish forces."
"In the matter of air support it is important that such support whenever possible be brought to bear in the strongest possible concentration at one point at a time so far as the location of our airfields permit."

"As soon as the tactical situation permits, the air and naval bases of the enemy on the islands of Hâmaa (Dagoe) and Saaremaa (Desel) must be removed by means of a joint operations with elements of the Army, the Navy, and the Air Force participating."

"The most urgent requirements here is destruction of the enemy airfields, from where the attacks against Berlin are obviously launched."

"The Army will be responsible for uniform preparations for this joint operation."

Example Nine.

From Hitler Directive # 75, 5 September 1941 (Eastern Theater), Last Paragraph, Item 2.

"The Air Force will support the attack [in the center of the eastern front by two forces, one operating from the Roslawl area in a northeast drive, the other from the Ninth Army zone in a drive against Ijesloí, with the forces of the Second Air Fleet, to be reinforced in time primarily by transfers from northeast, placing main emphasis on the flank areas and committing the bulk of..."

of available dive-bomber units VIII Air Corps to support the mobile units on both flanks of the attack."

"3. On the northeastern frontage, and in connection with the operations of the Finnish Corps attacking on the Karelian Isthmus, the enemy forces resisting in the Leningrad area (after our seizure of Shlisselburg) must be so enveloped that large elements of the mobile forces and of the First Air Fleet, in particular the VIII Air Corps, can be released by 15 September at the latest for transfer to the zone of Army Group Center. Before this, however, attempts must be made to achieve a close investment of Leningrad at least in the east and, weather conditions permitting, to launch a large-scale air attack against Leningrad. The most important objective is to destroy the water works."

Example Ten.

From Hitler Directive # 38, 22 September 1941 (Norway).¹


"It is of decisive importance that the Fifth Air Fleet must remain in the northern area of Norway with strong forces and forces capable of winter operations.

These forces must be large enough to be able to...

¹ Karlsruhe Document Collection.
provide strong air support in the intended continuation of the drive on Kandalaksha and operations to seize the western part of the Fisher Island, until the beginning of the season of bad weather. In the meanwhile it is necessary to take continuous combat action against enemy seaborne supply movements and supply dumps and depots.

"During the season of bad weather conditions this action will continue whenever possible and will be extended primarily to attacks against enemy forward movements of replacements and supplies and against enemy efforts to further develop their base."

Example Eleven.

From Hitler Directive 77, 30 October 1941 (Concerns Norway Exclusively).

6. So far as weather conditions permit, the mission of the Air Force will be, in the Finnish theater of operations:

a. To patrol the outpost coastal areas of northern Norway and Finland for the purpose of protecting own shipping and attacking enemy shipping.

b. To provide air defense, particularly for the nickel producing region of Petsamo, unloading points, and naval bases.

"c. To conduct reconnaissance over the future areas of operations and to take strong combat action against the enemy supply base at Murmansk and against movements to there by sea and rail.

"d. To make preparations for the commitment of larger forces to support future operations."

Example Twelve.

From Hitler Directive # 32, 2 December 1941, to CINC, Southern (Mediterranean) Theater of Operations, Concerning the Employment of Air Power.

"... cooperations with the German and other Axis forces committed in Northern Africa."

Example Thirteen.

From Hitler Directive # 32, 8 December 1941 (Pamplona in the East).

"II. Air Force.

"1. The mission of the Air Force is....

"Particular importance attaches to continuous interdiction of the enemy communications, which sustain the enemy forces and the enemy use of which constitutes a threat to our own front segments. Concurrently with counter-air combat action, every possible support will be given to army defense against attacks on the ground and in the air.

I. Karlsruhe Document Collection G b. 2, Ibid G. C.