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 Vol. I

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

by

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CONTENTS

	Page
Chapter One: German Air Force Principles Governing the Selection of Targets	
I. The Mission as the Ruling Factor	1
II. Limiting Factors in the Selection of Targets	4
1. Necessity to adhere to the Overall War Effort of the Military Forces as a whole	4
2. Limiting Factors of International Law	6
3. The Actual Targets--Strategic and Tactical Targets	11
Classification of Strategic and Tactical Targets	17
Chapter Two: THE GERMAN SYSTEM FOR RECORDING PERMANENT TYPE TARGETS	18
1. Targets Which would only Appear after the Outbreak of a War	19
2. Permanent Targets, which Existed During Times of Peace	19
II. TARGET CATEGORIES AND CLASSIFICATION IN SEQUENCE OF IMPORTANCE	24
III. DETERMINING THE WEAK POINTS OF AN ENEMY COUNTRY	26
1. Basic Considerations	26

The Necessity for Continuous Re- Assessments of the Results Obtained through Analysis	29
2. The System of Analysis	29
a. Individual Targets which could decide the Outcome of a war	30
b. Weak Points in Important Branches of Industry	30
c. Possibilities for Combat Action against Vitally Important Imports	33
d. Vulnerability of a Country's Traffic Routes to Air Attack	34
e. Combat Action against Electricity and Power Supply Installations	36
Gas Supplies	38
f. Prospects of Success in Attacks Directed at Complete Industrial Regions instead of at Separate Targets	38
IV. THE RESULTS ARRIVED AT BY TARGET DATA ANALYSIS IN THE GERMAN AIR FORCE HIGH COMMAND	41
1. Poland	41
2. Britain	49
British Peacetime Import Require- ments in Percentage of Overall Consumption	53
Britain's Wartime Import Require- ments	54

Dependence on North Sea and Baltic Sea	58
The Continent of North America as a Source of Supplies	58
V. THE PREPARATION OF PLANS OF ATTACK	67
VI. THE COMPILATION OF DETAIL TARGET DATA FOR UNIT COMMANDERS AND FOR THE TROOPS; TRAINING TO ENABLE CREW MEMBERS TO RE- COGNIZE SPECIFIC TARGET TYPES AND THEIR SENSITIVE PARTS	67
Chapter Three: THE ACTUAL SELECTION OF TARGETS	70
Cooperation with the Political Authorities	72
II. The Principles Governing the Estab- lishment of the Objective and the selection of targets	72a
PART TWO	
EXAMPLES OF MISSIONS ASSIGNED TO THE GERMAN AIR FORCE IN WORLD WAR II AND THE RESULTANT SELECTION OF TARGETS	76
Chapter One: The Battle for Air Superiority	79
1. The Mission as the Basis for the Se- lection of Targets	79
a. Basic Rules to be Observed when Defining a TERRITORY Mission	79
b. The Command Authority Responsible for the Assignment of Missions	81
c. Examples of Mission Assignment in World War II	82
2. The Selection of Targets	92

a. Principles to be Observed in the Selection of Targets	92
b. What Headquarters Selected the Targets	93
c. Examples of Target Selection in World War II	94
Combat Action against Airborne Targets	97
a. Principles to be Observed in Assigning the Mission	97
b. Target Selection	97
3. Critical Review	98
a. Mission Definition and Assignment	98
b. Target Selection	99
 Chapter Two: DIRECT AND INDIRECT SUPPORT FOR THE ARMY AND NAVY	
I. AIR SUPPORT FOR THE ARMY	100
1. The Mission as the Basis for the Selection of Targets	100
a. Principles to be Observed in the Definition and Assigning of Missions	100
b. Which Command Headquarters Stated the Mission?	101
c. Examples of Mission Statement in World War II	103

vi

2. The Selection of Targets	137
a. Ruling Principles in the Selection of Targets	137
b. Who Selected the Targets	141
c. Examples of Target Selection in World War II	142
3. Critical Review	143
II. AIR SUPPORT FOR THE NAVY	145
1. The Mission as a Basis in the Selection of Targets	145
a. Principles to be Observed in Stating the Mission	145
b. Which Headquarters Stated the Mission	146
c. Examples of Mission Assignment in World War II	147
2. The Selection of Targets	154
a. Principles to be Observed	154
b. Which Headquarters Selected the Targets?	156
c. Examples of Target Selection in World War II	156
Individual Examples from 1945	163
3. Critical Review	167
a. The Assigning of Missions	167

vii

b. The Selection of Targets	168
CHAPTER THREE: OPERATIONAL OR STRATEGIC WARFARE	170
I. OPERATIONS TO INTERDICT COMMUNICATIONS AND TRAFFIC ROUTES--Basic Considerations	170
A. RAILROADS	172
1. The Assigned Mission as the Basis for the Selection of Targets	172
a. Principles to be Observed in Stating the Mission	172
b. Which Headquarters Assigned the Mission	175
c. Examples of Mission Assignment in World War II	176
2. The Selection of Targets	182
a. Principles to be Observed	182
b. Which Headquarters Selected the Targets?	184
c. Examples of Target Selection in World War II	185
3. Critical Review	187
a. Statement of Mission	187
b. Target Selection	188
B. CANALS AND OTHER WATERWAYS	190
1. The Mission as the Basis in Target Selection	190

viii	
a. Principles to be Observed in Stating the Mission	190
b. Which Command Headquarters Stated the Mission?	191
c. Examples of Mission Assignment in World War II	191
2. The Selection of Targets	195
a. Principles to be Observed	195
b. Which Headquarters Selected the Target?	195
c. Examples of Target Selection in World War II	195
3. Critical Review	195a
a. The Statement and Assigning of Missions	195a
b. Target Selection	196
C. ROAD ROUTES	196
1. The Mission as the Basis in the Selection of Targets	196
a. Principles to be Observed in the Statement of Mission	196
b. Which Headquarters Stated and Assigned the Mission	197
c. Examples of Mission Assignment in World War II	198
2. The Selection of Targets	199
a. Principles to be Observed	199

ix	
b. Which Headquarters Selected the Targets?	199
c. Examples of Target Selection in World War II	199
3. Critical Review	202
a. The Statement and Assigning of Missions	202
b. Target Selection	202
II. WARFARE AGAINST THE ENEMY SOURCES OF MILITARY POWER	203
1. Attacks against the Enemy Economy	207
a. General	207
b. The Army	207
c. The Navy	208
d. The Air Force	208
IIA. WARFARE AGAINST ARMAMENT INDUSTRIES	216
1. The Mission as the Basis for the Selection of Targets	216
a. Principles to be Observed in the Statement and Assigning of Missions	216
b. Which Headquarters Stated and Assigned the Mission?	217
c. Examples of Mission Assignment in World War II	218
2. The Selection of Targets	222
a. Principles to be Observed	222

x

b. Which Headquarters Selected the Targets	223
c. Examples of Target Selection in World War II	223
3. Critical Review of German Target Selection	223
B. IMPORTS AND FOOD	225
1. The Mission as the Basis in the Selection of Targets	225
a. Principles to be Observed in the Statement and Assigning of Missions	225
b. Which Headquarters Stated the Mission	226
c. Examples of Mission Assignment in World War II	227
XXXXXXXXXXXX	
b. Which Headquarters Stated and Assigned the Mission	250
c. Examples of Mission Assignment in World War II	231
2. The Selection of Targets	233
a. Principles to be Observed	233
b. Which Headquarters Selected the Targets	235
c. Examples of Target Selection in World War II	235
3. Critical Review	236

C. ELECTRICITY SUPPLY SYSTEMS

- L. The Mission as the Basis for Target Selection 246
 - a. Principles to be Observed in the Statement and Assigning of Missions 246
 - b. Which Headquarters Stated the Mission? 247
 - c. Examples of Mission Assignment in World War II 247
 - Critical Review 251

D. ATTACKS AGAINST CITIES OR MILITARY

TARGETS WITHIN CITIES 252

RETALIATORY ATTACK AGAINST TOWNS;
ATTACKS AGAINST TOWNS WITHIN THE
ZONE OF COMBAT ON THE GROUND 252

Examples 253

Attacks Against Centers of Govern-
ment, Administration, Mobilization,
and Replacement Activities 256

- 1. The Mission as the Basis for the Selection of Targets 256
 - a. Principles to be Observed in Stating and Assigning the Mission 256
 - b. Which Headquarters Stated and Assigned the Mission? 257
 - c. Examples of Mission Assignment in World War II 257

x111

6. Map of Poland	340
7. Photo--Layout of a Blast Furnace Installation	342
8. Photo-- " " " Cement Factory	343
9. Layout--Mineral Oil Processing in the Lingen Refinery	344
10. Photo--French Airfield after an Attack	346
11. Photo--Russia, A Complete Air Unit Destroyed on the Ground	347
12. Photo--1940, Result of a Bombing Attack to Put out of Operation Take-Off and Landing Area of a French Airfield	348
13. Photo--No Caption. No Text.	349
14. Photo--Destroyed Air Force Supply Depot at Nanterre	350
15. Photo--The Citroen Factory, Paris	351
16. Air Photo--No Caption. No Text	352
17. IV Air Corps Attack against US Four-Engine Bombers at Russian Feltava Air Field	353
17a Air Photo--No Caption. No Text.	354
18. Outline Map--British Air Force Disposition in Southern UK	355
19. Air Support over Field of Battle; German Chains of Command and Command Channels--1939-1942	355a
20. As above--1941-1942	355b
21. Example of Air Support for Army Operations	356

22. Annex to 1st Panzer Division Order, 13 May 1940, for Attack across Meuse River	359
23. Photo: Near Montmort Bois du Bris, France-- Results of a Strike by German Ground-Attack Air Units	361
24. Photo: A March Route under Bombing Attack	362
25. Photo: Vyazma-Bryansk Pocket	363
26. Photo: Direct Hit on Ammunition Depot	363
27. Photo: Kiev--Results of an Air Attack on a Motor Park	364
28. Photo: Russian Tanks Destroyed on Field of Battle by German Air Attacks	364
Photo: 29. Stalingrad--Russian Tanks under Air Attack	365
30. Photo: Russia--Results of an Air Attack on a Road to the Front	365
31. Photo: Air Attacks Strike Field and Battery Positions in Northern Don River Bend Area	366
32. Photo: Bunker Damaged by Near Hit	366
33. Photo: Hit by a 550-Pound Bomb	367
34. Air Support of Army Operations in the 1940 Campaign in France	368
35. Study: Warfare against Russian Armament Industries	369
36. Air Photo: No Caption. No Text	373
37. Air Photo: No Caption. No Text	373
38. Air Force-Navy Cooperation in Western Theater from September 1939 on--Chain of Command and Command Channels	374

39. Outline Map: North Sea and Helligoland Bight	375
40. Photo: Outside Kronahtadt--Battleship Marat under Dive-Bomber Attack	376
41. Photo: Kronshtadt, September 1941--Armored Cruiser October Revolution under Attack in Port by German Ju-87 Dive-Bombers	376
42. Photo: Near Odessa--Ship Sunk by Dive-Bombers	377
43. Photo: Gulf of Finland--Sinking of a Troop Transporter	377
44. Photo: Sevastopol--Naval Ships and Troop Transport Sunk	378
45. Photo: The Port of Tuapse under Attack by Ju-88 Dive-Bombers	378
46. Photo: Sunken Polish Destroyer in Drained Basin of Port of Dunkirk. Showing Damage done by Attacking Bombers	379
47. Photo: Bomb Hits on an American Ammunition Ship at Sicily	379
48. Example of Attacks against a Rail Depot	380
49. Profitable Targets for Attacks against Trans- portation Movements in France, with Map	381
50. Photo: Bomb Hit on an Armored Railway Train	383
51. Photo: Ronconay, France*-Railroad Installations Destroyed in Attack by 77th Dive-Bomber Wing	384
Ammunition Destroyed at the Pavlovgrad Rail Depot, Russia	384

52. Photo: Bomb Hits on a Rail Depot in the East, 1942	385
53. Map: Railroad Interdiction during Operations to Seal off the Battlefield of Kiev, 1-25 September 1941	386
54. Photos: Typical Target-Effect Photos taken after Attacks against Large Rail Depots	387
55. Photo: Panama Canal	388
56. Photo: Bomb-Stricken Volga River Ships	389
57. Photo: Bridge across Bzura River, Poland, Destroyed in Bomb-Diving Attacks	389
58. Photo: Bridge at Noggorod, Russia, under Dive-Bomber Attack	390
59. Photo: Vyazma Bridgehead Pocket after Attack by Dive-Bombers, 1941	390
60. Photo: A Bridge under Attack by Bombers	391
61. Profitable Targets for Interdiction of Troop Movements in France, with Map	392
62. Large-Scale Attacks against Ports and Industrial Installations in England, September 1940, Outline Map	395
63. Outline Map: Large-Scale Attacks against Ports and Industrial Installations in England, October 1940	396
64. Outline Map: Large-Scale Attacks against Ports and Industrial Installations in England, November 1940	397

65. Photo: Astrakhan, Russia--Oil Bulk Storage Tanks Set on Fire by Bombing Attack	398
66. Target-Effect Photo: Motor Vehicle Factory in Russia	399
67. Photo: Oil Farm on Fire in Lower Thames River Following German Bomber Attack on 9 September	400
68. Photo: A Convoy at Sea	401
69. Map: The Far North Theater of Operations in 1942	402
70. Map Showing Value of Cargoes Arriving in Eng- land by various Shipping Routes	
71. Map Showing Routes, Numbers of Ships, and Tonnage of Cargoes Arriving in Britain from Overseas, plus Coastal Routes, Ships, and Tonnages	403
72. Target Map of Warsaw	404
72a. Overlay to Map of SE England and Dartford (Order I Air Corps, 6 September 1940)	405
73. Modlin and Warsaw, 25-26 September 1939	406
74. Photo: 1939--Warsaw on Fire	406a
75. German Air Attacks against Warsaw in the Light of the Laws of Warfare	407
76. German Air Attack against Paris, June 1940, in the Light of the Laws of Warfare	411
77. Attack against Rotterdam, 13 May 1940, Excerpt from A. Kesselring: <u>Soldat bis zum letzten Tag</u>	413
77a. Bombing Attacks against Dutch Forces Defending Rotterdam	419

77b. German Air Attack against Rotterdam in 1940
in the Light of the Laws of Warfare 420

77c. Photo: Result of the German Air Attack
Against Rotterdam in 1940 425

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

CHAPTER ONE

GERMAN AIR FORCE PRINCIPLES GOVERNING
THE SELECTION OF TARGETS

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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 missions 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 some one, 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: "Vom Kriege," published after his death. 15th Supplemented Edition by Karl Linnebach; Keilverlag, 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. Dv. 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. Dv.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

4

3 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 Adhere 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

4 regulations and also in the measures applied during the development of the Air Force.

Air Field Manual L. Dv. 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

5 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
6 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

6 of the war was the Hague Convention known as the Hague¹ 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 "selbstaendigen Luftkrieg" 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 1. Appendix Volume, Appendix 1.

6

1

air warfare.

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 traffic¹ are valid in foreign countries.

7

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 noncombattants, is prohibited.

Article 23:

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

Article 24:

(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
 1. Ibid: Paris Air Law Agreement, 13 Oct 19.

7

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.

of operations by the ground forces, the bombing
 (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

7

8 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 Nuremberg 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,

8 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 Kampfweisung--Planstudie 1939--¹) 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.

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

3. The Actual Targets--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

9 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. Moving Targets.

10

a. Moving Targets.

Infantry advancing in dispersed order

Vehicles of all types

Convoys 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 storehouses

c. Road Routes.

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

Mission Five: Combat Action against Enemy Resources.

a. Partial Mission: Combat Action against Manufacturing Industries Supporting the Enemy War Effort.

12

(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. Partial 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.

12

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.

Mission Nine: Action against Military Recruiting,
Training, and Replacement Centers.

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.

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 Luftmächte), 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" (Nachrichtenbeschaffung 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,

14

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. Dv. 16 states on this subject

In Paragraph 80:

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.

15

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 difficulties 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 military power initially will be directed on the basis of intelligence data procured during peace.

16 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 for combat action against it; the most practicable^{method} for~~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 (Zielstammblatt) was used to record all important items of information.¹

As a rule, the following maps were included in each Appendix 4.

16 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 information on the enemy defenses, such as fighter and anti-aircraft artillery, and enemy airfields, which could constitute a hazard during the approach or departure; navigational aids, such as salient terrain features (easily identifiable wooded sections, large rail or road intersections, and so forth), all of which were marked by heavier print; and magnetic defelections 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, showing the configuration of the target and its surroundings, with special emphasis on the most sensitive points of the target and all available information concerning defenses at the target itself, such as battery and searchlight positions. If at all possible a planview or sketches of the target were included naming the individual installations it comprised.

The details required in Air Field Manual L. Dv. 16, Paragraph 146 (quoted above) were entered on the basic target

17 sheet.

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 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.

18 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.

18 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.

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

Target Category

	10	Airfields, ground service installations
	12	Naval ports
	13	Barracks, schools, headquarters
	13 500	Command posts
	20	Air ordnance offices and air parks
19	21	Motor fuel depots
	22	Ammunition depots and dumps, power magazines
	23	Ordnance offices of the Army and Naval AAA parks
	24	Arsenals, construction and repair shops
	25	Materiel supply dumps of unknown types,

24a

1. (Archive records L/Franzoesisch Afrika/F.A) Lw. Fuehr. Stab
Ic 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
- 20 66 Smelting works for calcium carbide and ferro-alloys, factories producing acetylene,

20

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 German 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

21 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 (Arbeitsausschuss des Reichsverteidigungsrates)¹ 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 armement requirements.¹

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 Roster 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.

1. Karlsruhe Document Collection.

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 remove 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.

24 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.

(3) Possibilities^{to}/Bring About a Decisively 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. Dv. 16, Paragraph 148, had to be taken into consideration:

"As a rule the size of the forces required for action

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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

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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 Vitrally 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

26 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

27 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 reaction 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.

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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.

e. 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

29 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. Prospects of Success in 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. Dv. 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.

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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 work 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^{time}/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.¹ 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 (Planstudie 1939), as revised on 1 March 1939,
Volume II, pp. 2-6.¹

I. MILITARY FORCES

1. Air Forces and Antiaircraft Artillery.

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.²

b. Ground Service Organization. The Polish ground
service organization has approximately twelve well devel-
oped air bases, which during peacetime contain dispropor-
tionately large units (up to a complete air regiment of
20 aircraft).³

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 equip-
ped for operations by bomber units:

Kattowitz

Lodz

Lublin (2 airfields)

41a

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.

32

Rahmel

Terespol-Malaszewica.

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.

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The most important point for personnel and materiel replacements is the Dablin central depot.

Operations by large Russian air forces from bases in Polish territories, which the closely meshed network of airfields would permit, ~~are~~ 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 Balk will be committed in cooperation with the Army, 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 Defenses.

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-Radom-Lublin area.

Poland has made good progress in the field of passive air defense.

2. Army:

a. Strength, Weapons, Appraisal of Capabilities.

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.

b. 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 Narew 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-

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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 Teschen, evacuating the Polish Corridor and establishing a bridgehead around Gdingen.

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.

36

The old Polish industrial triangle of Kielce-Ostrowiec-Skarzysko-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 railroutes connect Poland only with Germany and the Soviet Union. The difference between rail gages (Poland and Germany have the same gage, 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 wide-meshed 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" (Luftgeographische Beschreibungen). The following is an extract from Volume II, 1 July 1939, (which deals with Poland) of that publication:

37

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 Pripet swamp area and the areas northwest of a line from Warsaw through Grodno to the border of Eastern Prussia ^{are} extremely difficult to traverse (Verkehrseindlich). The Pripet 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

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San Rivers, in the center at the Warthe and Pilica 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-Kalish-Warsaw-Kutno-Mlava-Thorn.

System Area Two: Warsaw-Lodz-Kalish-Kattowitz-Krakau-Przemysl-Sandomierz-Lublin-Deblin-Warsaw.

System Area Three: Warsaw-Deblin-Lublin-Lvov-Rovno-Sarny-Lunienz-Baranovichi-Lida-Vilna.

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

The Posen-Warsaw trunk line is important for the retrograde movements of the Posen Army and the Polish

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post war study:

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 Hlau" by the 5th Branch of the General Staff in the months of January to June 1939.

Among others Goering appointed Milch, 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,

1. Karlsruhe Document Collection.

40

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 findings 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,

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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 ¹ economical situation of Britain. An analysis of the data available in this field presented the following pictures:

1. Appendix 1: Extract from the Navy Memorandum on intensified Naval Warfare against Britain, 15 October 1939 (Denkschrift der Kriegsmarine ueber den verscheerften Seekrieg gegen England.

41 I. BRITISH PEACETIME IMPORT REQUIREMENTS IN PERCENTAGE OF OVERALL CONSUMPTION

	Agricultural Products	Industrial Commodities	Mineral Oils
Percentage of overall consumption imported	75	73*	96
Volumes imported in 1937	23 000 000 tons	35 200000 tons	11 200 000 tons
Characteristic features	Large quantities of bulky animal feeds besides highly concentrated foodstuffs	Large quantities of bulky raw materials; few finished products	Mainly refined mineral oils

*Calculated on the basis of monetary values.

Degree of British Dependence on Foreign Imports in Detail:

<u>Food.</u>	Percent
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
<u>Raw Materials.</u>	
Rubber, cotton, silk, jute, potash, bauxite, nickel, antimony, mercury, etc.	100
Copper, manganese, chromium	99-100
Iron oxides, wolfram	98-99
Flax, zinc	96-97
Timber, mineral oils	96
Tin, lead	92-93
Wool, hides, skins	71
Iron ores (in iron content)	42

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:

43

	1937 Imports (in million tons)	Britain's Wartime Import Re- quirements (in million tons)	
		1st Year of War	2d Year of War
Agricultural products	23.9	19	16.2
Industrial commodities	35.2	24.8	18.9
Mineral oils	11.2	21.8	24.2
	70.3	65.6	59.3

By throttling her re-export and normal export activities, a measure Britain could introduce in an emergency as done in the World War [World War I] 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

43

	Total Import Requirements (in million tons)	
	1st Year of War	2d Year of War
If industrial exports are halved	60	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 tannage, which could in certain circumstances reduce the peacetime volume by up to 30 percent.

44

III. SHIPPING REQUIREMENTS

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

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 2 800 000 plus the merchant fleets of the Scandinavian countries and Greece totalling 12 300 000 Gross Register tons, including Norwegian tankers with a tonnage of 2 100 000. It is hard to estimate what share of this reserve 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 traffic.

2. Potential Reserves. 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

46

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 "
<u>Iron Ore.</u>	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-Ferrous 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

48

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. Oils. 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 "
Rubber	"	200 000 "
Potash	"	200 000 "
Zinc	"	100 000 "
Bauxite	"	<u>300 000 "</u>
approximate total		<u>1 900 000 tons</u>

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.

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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:

1270 bomber and strategic reconnaissance planes, 800 of them Class I

1. The Karlsruhe Document Center holds the following report on this subject: "Die russische Luftwaffe:" Excerpts from "Gedanken zur Luftlage in Europa, Stand:Fruehjahr 1939." Quelle: D.R.d.L. und Ob.d.L., Chef des Generalstabes, # 700/39 g.K. (5. Abt. I), 2 May 1939. Only an abridgment is on file, the original is not available.

Europe

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Europe--Continued

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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.

50

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 antiaircraft artillery are considered small.

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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

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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.

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"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

V. THE PREPARATION OF PLANS OF ATTACK.

52

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.

air weapons parks, aircraft parks, bulk fuel storage dumps and depots, and ammunition installations.

For the next phase, the phases of air operations in support of the Army, areas were established in which early rail routes were to be interdicted.

The appropriate directives to the field commands of the Air Force constituted a part of the "Assembly and Combat Instructions," designated from 1938 as "Operational ^{Directives} Manuals" for reasons of security.

VI. THE COMPILED OF SPECIAL REPORT DATA FOR GIFT OPERATIONS AND FOR THE IMPROVING TRAINING TO ENABLE CREW MEMBERS TO RECOGNIZE SPECIFIC TARGET TYPES AND THEIR SENSITIVE PARTS.

In the case of attacks against permanent-type targets

1. Compare the rail interdictions shown in the target map of Poland in appendix 4.

54 the intention existed to furnish each participating aircraft crew the target data prepared in accordance with the requirements stated in Chapter 2, Section I, 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.

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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

1. Appendixes 7-9.

CHAPTER THREE

THE ACTUAL SELECTION OF TARGETS

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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.

I. 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.

56 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 22 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.

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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. Dv. 16, Paragraphs 13-15, to give consideration to the following points:

Paragraph 13:

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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

58

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 14:

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.

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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

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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 extending 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.

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Harassing 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.

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76

PART TWO

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

Pages 77, 78 not used

CHAPTER ONE

THE BATTLE FOR AIR SUPERIORITY

L. The Mission as the Basis for the Selection of Targets.A. 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:

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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 119:

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 homeland, 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

62

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, if 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 # 6 for Conduct of the War in the Western Theater, Paragraph 4, 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 Orders Dated 11 January 1940.²

"Air Force attack against the enemy air forces. Assuming suitable weather conditions, the Air Force on 14

1. Karlsruhe Document Collection, G) a.

2. Ibid

.....

63 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...."

Example Three: From Hitler Directive # 16, 16 Junly 1940.¹
(Against the eventuality of a German landing in England).

"The mission of the Air Force will be to prevent interference by the enemy air forces...."

Example Four: From Hitler Directive # 17, 1 August 1940,
for the Conduct of Air and Naval Operations against Bri-²
tain.

"Paragraph 1: Using all available forces, the German Air Force will neutralize British air power as speedily as possible. The attacks will be directed primarily against the enemy flying forces, their ground service organization, and the supply installations; furthermore,
64 against the air armament industry, including factories manufacturing antiaircraft artillery weapons and equipment."

Example Six: Extract from Supreme Military Headquarters³
Supplement to Directive # 34, 12 August 1941. (Russian
Campaign: Saaremaa (Oesel) Island).

"Paragraph 3. As soon as the situation permits, action must be taken to remove the enemy air and naval bases on

- | | | |
|----|-------|-------|
| 1. | Ibid, | G) a. |
| 2. | " | G) a. |
| 3. | " | G) b. |

64

the islands of Hulumaa (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 # 20. Preparations for the Drive into the Balkans. 13 December 1940.¹

"Paragraph 5. Directives for Fourth Air Fleet.

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

Example Eight: Hitler Directive # 38, 2 December 1941, to CINC, Southern Theater Command, Mediterranean.²

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).³

II. Excerpt from Air Force Annex. "Concurrently with

1. Ibid G b.
3. Ibid G b.

2. Ibid G.b

counter-air action...."

1

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."

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Example Eleven: Hitler Directive # 42, 29 May 1942. (Instructions for Operations against Unoccupied France and/or the Iberian 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) (Mobilization and Operational Orders for the Air Force. Instructions for Operations against the East--Poland), 1 May 1939.³

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 G c.

2. Ibid G c.

3. Ibid (Quoted here in an abridged form).

65 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, GINC, Air Force (Case Polish), 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.

1. Ibid (Quoted here in an abridged form).

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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 and 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 # 1 from CINC, Air Force, to Second and Third Air Fleets, 31 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).

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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 (Planstudie) apply to the Second and Third Air Fleets."

Example 4a: From Directive # 2 to Second and Third Air Fleets, 3 September 1939. (In the west).

"1. The British Admiralty has issued orders, at 1117 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).

67

the initiation of air warfare by the enemy...."

Example 5: From Directive # 4, CINC, Air Force, to Second and Third Air Fleets, 23 September 1939.¹

"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.²

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. 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 # 5, CINC, Air Force, 7 December 1939, for the Planned Offensive in the West.¹

"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 # 5, CINC, Air Force, Concerning Preparations for the Campaign in the West.²

"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.

69

"(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

69 insofar as these can be committed against our attack forces, primarily in the Cambrai-Amiens-Chateau Thierry-Chalon s. 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 No. Dv. 16, in Section IV: "Operations--Counter-Air Combat Action," states as follows:

In Paragraph IO3.

".....

"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 IO4.

".....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

70

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 material replacements, and the supporting industries."

In Paragraph IIB.

"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 carriers), 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, replacements, and supporting industries will not require any special measures. Such action is inseparable from the corresponding phase of overall combat."

b. What Headquarters Selected 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.

71 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. Dv. 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 ^{bomber} 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.

c. Examples of Target Selection in World War II.

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

"26 October 1939

Command Personnel Only--Top Secret--Officer Courier.

"Solution B

" (Implying delimitation of zones and special concentrations of power within a close attack area immediately on first attack).

72

Boundary Between II and IV Air Corps:

Speyer (V Corps)-Bitsch (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 Mourmelon, leaving
only one group available

V Air Corps

76th Bomber Wing, Metz-Frescaty-Nancy-Essey base

55th " " St Dizier-Robinson base, leaving
one group available

27th " " Romilly and Sezanne-La Perthe 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 " " (?)

73

To be committed either immediately on the basis of
reconnaissance of the previous day or later in the fore-
noon following renewed reconnaissance, primarily against
enemy aircraft on the ground.

73

According to present intelligence the following would be suitable targets:

Tactical air ports at Laon, Prosnes-Le Patron, Chal-
lerange, Chatel Chehery, Vitry le Francois, Auzainvil-
liers.

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

For Air Fleet Adler Headquarters

Chief of Staff

s/ 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 Ic-Dienstes West # 26/45,
27.1.45. Nur fuer den Dienstgebrauch!)

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

".....

74

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

Altogether 402 aircraft destroyed, ~~XXXXXXXXXXXXXXXXXXXX~~

~~XX~~

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

74

7 other airfields, according to visual observations.

"Enemy 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 Appendixed 10-17 in Appendix Volume).

COMBAT ACTION AGAINST AIRBORNE TARGETS

a. Principles to Be Observed in Defining 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 113:

"The less forcible the action taken currently in offensive 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 Jagdflugzeuge 1939-45)¹

General Galland writes:

"The following decisively important mistake was made, primarily in tactics. From 1941 on the Command demanded
I. Karlsruhe Document Collection, F IV 1 b.

75

action resulting in the downing of enemy bombers, disregarding 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 Definition 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.

76

When in 1944 the airfields in England were crowded with Allied aircraft for preparatory action preceding the coming invasion,¹ the German Air Force according to Air Field Manual L. Dv. 16 should have attacked these airfields, particularly I. Appendix 18.

76 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 houses¹ destroyed in London rather than destroyed aircraft.

b. Target Selection. During the war it became evident that, contrary to the principles stated in Air Field Manual L. Dv. 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.

1. Karlsruhe Document Collection.

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 Assigning 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 air forces 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:

101

77

In missions of close tactical support for the Army and/or Navy, the Air Force, and primarily its bomber units, will not find targets which are 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 importance on the ground. In such case the ~~XXXXXXXXXX~~ Supreme Military
 1
 Commander
~~Chief of the Air Force~~ will coordinate the requests of the Army with the other missions of air power and will

1. OKM (equivalent of Navy High Command) is obviously an error in the German text.

scope of the air support
 determine accordingly the ~~size of the air support~~ 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 execution of the air mission.

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

A departure is noticable here from the usual procedure
 1
 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 action.

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.

79 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.¹

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 1939.²

"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 # 16, 17 July 1940, for the planned Invasion of Britain in 1940-41.³

80

".....

"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 "Der Feldzug im Osten, 1941-45" by General Flocker; Karlsruhe Doc. Collection
2. Karlsruhe Document Collection, Ga.3. Ibid.

79

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.....^v

Example Three.

From Order By Supreme Military Command Headquarters Supplementary to Hitler Directive # 20 for Advance into the Balkans, 1941.¹

"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 1941.²

"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~~² 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.

31 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 # 33 for Continuation of the War
1.
in the East, 19 July 1941. Drive at Kiev.

"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 # 34, 30 July 1941. 2.

"II. Air Forces.

"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. Ibid.

82

enough to permit their commitment at the opening of the attack by the forces of Army Group North (early on 6 August).

"a. Center. 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, Supplementary to Directive # 34 of 12 August 1941.¹

"1. After describing the missions of the Army in the southeastern area, namely,

under "a" annihilation of large enemy elements

1. Karlsruhe Document Collection G b.

83 still west of the Dnepr River and establishment of a bridgehead across the river,

under "b" Occupation of the Crimean Peninsula, under "c" 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 Kanev and Boguslav, 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 Frontage. 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 Hulumaa (Dagoe) and Saaremaa (Oesel) 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 # 35, 6 September 1941 (Eastern Theater); Last Paragraph, Item 2.

"The Air Force will support the attack $\bar{\wedge}$ in the center of the eastern front by two forces, one operating from the Roslavl area in a northeast drive, the other from the Ninth Army zone in a drive against Eylöy $\bar{\wedge}$, 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

l. Karlsruhe Document Collection.

85 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.

86 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 # 36, 22 September 1941 (Norway).¹

"3. Air Force.

"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.

111

86

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."

87

Example Eleven.

From Hitler Directive # 37, 10 October 1941 (Concerns Norway Exclusively).¹

"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 ports, and naval bases.

1. Karlsruhe Document Collection G b.

88

"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 # 38, 2 December 1941, to CINC, Southern (Mediterranean) Theater of Operations, Concerning the Employment of Air Force.¹

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

Example Thirteen.

From Hitler Directive # 39, 8 December 1941 (Campaign in the East).²

"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.

1. Karlsruhe Document Collection G b. 2. Ibid G c.