COPY No. 12

WAR DEPARTMENT

THE ARMY AIR FORCES

THE AIR STAFF

A. W. P. D. - 42

REQUIREMENTS FOR AIR ASCENDANCY

MAJOR GENERAL MUIR S. FAIRCHILD

DIRECTOR OF MILITARY REQUIREMENTS

M-28462-S

PART I

PRESIDENT'S DIRECTIVE

THE WHITE HOUSE

WASHINGTON

August 24, 1942

[redacted]

MEMORANDUM FOR GENERAL MARSHALL:

I wish you would ask General Arnold to submit to you his judgment of the number of combat aircraft by types which should be produced for the Army and our Allies in this country in 1943 in order to have complete air ascendency over the enemy.

This report should be prepared without consideration for existing schedules or production possibilities or any other competing military requirements. I am asking for this because I would like to know what the theoretical requirements are to get complete control and domination of the air.

I realize fully, however, that there are limiting factors to the creation of air power, such as the availability of pilots, high octane gas, transportation and the competition of other essential critical munitions of war. Hence, I would like you and Admiral King to submit a second schedule based on these realities and the proper relationship of air power to the Navy and our ground forces.

/s/ FRANKLIN D. ROOSEVELT

PART II

ANSWERING MEMO AND OUTLINE OF REPORT

September 9, 1942.

MEMORANDUM FOR THE CHIEF OF STAFF:

Subject: Combat Aircraft Which Should Be Produced in the United States in 1943.

1. Pursuant to the instructions from the President in his memorandum to you, dated August 24, 1942, an estimate has been made of the number of combat aircraft by types which should be produced, for the Army, the Navy, and our Allies, in this country in 1943 in order to secure complete air ascendancy over the enemy.

2. The requirements have been based upon the following air operations in 1943 and early 1944:

a. An air offensive against Europe to deplete the German Air Force, destroy the sources of German submarine construction and undermine the German war-making capacity.

b. Air support of a land offensive in Northwest Africa.

c. Air support of United Nations land operations to retain the Middle East.

d. Air support of surface operations in the Japanese Theater to regain base areas for a final offensive against Japan Proper, including:

(1) Land operations from India through China, reopening the Burma Road.
(2) Amphibious operations from the South and Southwest Pacific toward the Philippine Islands.

e. Hemisphere Defense, including anti-submarine patrol.

3. To implement these air operations, the following airplanes should be produced in the United States in 1943:

	U.S. Army	U.S. Navy	Others	Total
Tactical	63,068	24,800	19,540	107,408
Training	12,232	8,000	1,900	22,132
Liaison	116	250	1,000	1,366
Total Airplanes	75,416	33,050	22,440	130,906
Gliders	8,284			

4. These air operations require the development and deployment of the following Army Air Forces by January 1, 1944:

Aircraft Type	Heavy Bomb	Med Bomb	Light Bomb	Dive Bomb	Obs.	Photo Recon. Flr	Troop Carrier	Gliders	Total
Groups	76	43	14	12	20	12 70	34		281
Airplanes	3648	2752	896	1152	1680	624 7000	1768		19520
Gliders								8284	8284
Air Transport Command, long range transports									2217

5. Personnel requirements - Strength of the A.A.F. by January, 1944.

	Army Air Corps	Other Branches	Total
Officers	230,243	72,600	302,843
Enlisted Men	1,554,104	877,400	2,431,504
Total	1,784,347	950,000	2,734,347

6. Logistical requirements, Army Air Forces.

Bombs	1,140,363 tons
Gasoline	4,888,941,000 gallons
Shipping	17,421,507 ship tons, total during 1943.

7. Details concerning these requirements are contained in the body of the report and in the Annexes.

H. H. Arnold

H. H. ARNOLD,
Lieut. General, U.S.A.,
Commanding General, Army Air Forces.

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Charts of: Fighter factories.
Bomber factories.
Aircraft engine factories.
Submarine bases and building plants.
Oil.
Electric Power.
Transportation.
Rubber.
Aluminum and Magnesium.

b. Combined Offensive - Europe.

(2) Air Operations - North Africa.

(3) Air Operations - Middle East.

(4) Air Operations - Far East.

a. 1st Phase

Support of surface forces in regaining base areas.

b. 2nd Phase

Air offensive against Japan.

Charts of: Fighter factories.
Submarine bases and building plants.
Oil.
Rubber.
Steel.
Chemicals.
Shipbuilding and Naval bases.
Aluminum and Magnesium.

(5) Air Operations in Hemisphere Defense.

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[redacted]

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Bombs
Gasoline
Ammunition
Shipping

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[redacted]

PART III

SUMMARY

[redacted]

SUMMARY

The following aircraft should be produced in the United States in 1943 in order to secure complete air ascendancy over the enemy. The requirements have been computed on two conceptions of strategic employment; (1) Envisioning a Strategic Offensive in the German Theater and a Strategic Defensive in the Japanese Theater; (2) envisioning simultaneous Strategic Offensives in both theaters. The former is considered to come more nearly within our capabilities.

I
PROGRAM "A"

Strategic Offensive in German Theater, Strategic Defensive in Japanese Theater.

Air Offensive preliminary to Combined Offensive in German Theater, and air support of ground operations in North Africa and Middle East.

Air operations in support of land and amphibious forces in the Japanese Theater, to regain bases for a subsequent offensive against Japan.

The Air Offensive against Germany is a combined effort of the United States Army Air Forces and the British Royal Air Forces. The former will concentrate on daylight bombing of precision objectives. The latter will concentrate on night bombing of area objectives to break down morale.

Types for	U.S.A.A.F.	U.S.N.	U.K.	Dominions *	USSR	NEI	China	Brazil **	Mexico	Other ** So. Amer.	Total
Heavy Bombers, Land	11,039		248		300		15				11,602
Heavy Patrol Bombers, Boat		600									600
Medium Patrol Bombers, Boat		1,500									1,500
Medium Bombers, Land	8,608		860		900	100		64	18	15	10,565
Subtotal	19,647	2,100	1,108		1,200	100	15	64	18	15	24,267
Light Bombers, Land, 2 Eng.	4,987		1,800	690	2,100	48	300	32			9,957
Light Bombers, Land, 1 Eng.	3,830		1,800	720		100		132	118	115	6,815
Light Bombers, Land, 1 Eng. (Carrier)		10,000									10,000
Subtotal	8,817	10,000	3,600	1,410	2,100	148	300	164	118	115	26,772
Fighters, 2 Eng., Night	(	(200)									200
Fighters, 2 Eng., Day	(24,403										24,403
Fighters, 1 Eng.	(		2,800	1,380	2,800	244	1,000	300	125	130	8,779
Fighters, 1 Eng. (Carrier)		10,000									10,000
Subtotal	24,403	10,200	2,800	1,380	2,800	244	1,000	300	125	130	43,382
Transports, 4 Eng., Boat		250									250
Transports, 4 Eng., Land	(	50***									50
	(8,723										8,723
Transports, 2 Eng., Land	(	1,000***		60		18	150	30	10	18	1,286
Subtotal	8,723	1,300		60		18	150	30	10	18	10,309
Scouts - Observation - Photo	1,478	1,200									2,678
Subtotal - Tactical	63,068	24,800	7,508	2,850	6,100	510	1,465	558	271	278	107,408
Trainers	12,232	8,000	1,500			100		300			22,132
Command & Liaison	116	250						500	200	300	1,366
Total Airplanes	75,416	33,050	9,008	2,850	6,100	610	1,465	1,358	471	578	130,906
Gliders	8,284										8,284

* Estimates of Dominion requirements shown in CCS 91 have been trebled for this study.
** Hemisphere defense requirements are being met by Army Air Forces.
*** Army for Navy.

[redacted]

September 8, 1942

II

PROGRAM "B"

Strategic Offensive in German Theater and Strategic Offensive in Japanese Theater.
Air Offensive in German Theater.
Combined Offensive in German Theater.
Air support of land operations in North America and Middle East.
Air operations in support of land and amphibious forces in the Japanese Theater to regain bases for an air offensive against Japan.
Air Offensive against Japan.

Types for	U.S.A.A.F.	U.S.N.	U.K.	Dominions *	USSR	NEI	China	Brazil **	Mexico	Other ** So. Amer.	Total
Heavy Bombers, Land	12,859		248		300		15				13,422
Heavy Patrol Bombers, Boat		600									600
Medium Patrol Bombers, Boat		1,500									1,500
Medium Bombers, Land	8,506		860		900	100		64	18	15	10,463
Subtotal	21,365	2,100	1,108		1,200	100	15	64	18	15	25,985
Light Bombers, Land, 2 Eng.	6,594		1,800	690	2,100	48	300	32			11,564
Light Bombers, Land, 1 Eng.	5,410		1,800	720		100		132	118	115	8,395
Light Bombers, Land, 1 Eng. (Carrier)		10,000									10,000
Subtotal	12,004	10,000	3,600	1,410	2,100	148	300	164	118	115	29,959
Fighters, 2 Eng., Night	(	200									200
Fighters, 2 Eng., Day	(29,598										29,598
Fighters, 1 Eng.	(		2,800	1,380	2,800	244	1,000	300	125	130	8,729
Fighters, 1 Eng. (Carrier)		10,000									10,000
Subtotal	29,598	10,200	2,800	1,380	2,800	244	1,000	300	125	130	48,577
Transports, 4 Eng., Boat		250									250
Transports, 4 Eng., Land	(10,499	50***									50
Transports, 2 Eng., Land	(	1,000***		60		18	150	30	10	18	10,499 1,286
Subtotal	10,499	1,300		60		18	150	30	10	18	12,085
Scouts - Observation - Photo	1,478	1,200									2,678
Subtotal - Tactical	74,944	24,800	7,508	2,850	6,100	510	1,465	558	271	278	119,284
Trainers	22,716	8,000	1,500			100		300			32,616
Command & Liaison	878	250						500	200	300	2,128
Total Airplanes	98,538	33,050	9,008	2,850	6,100	610	1,465	1,358	471	578	154,028
Gliders	10,499										10,499

* Estimate of Dominion requirements shown in CCS 91 have been trebled for this study.
** Hemisphere defense requirements are being met by Army Air Forces.
*** Army for Navy.

PART IV

REPORT

~~SECRET~~

PART IV

REPORT

1. Directive.

Determine the number of combat aircraft by type which should be produced in this country in 1943 in order to have complete air ascendency over the enemy (extract from a letter from the President to General Marshall, August 24, 1942).

2. Definition.

Air ascendency: the conditions of air strength, both of ourselves and of the enemy, under which it will be possible for our several armed forces to complete the defeat of our enemies.

Under this definition it will be observed that: (1) the enemy air strength must be so depleted as to render him incapable of frustrating the operations of our air, land, and sea forces; and (2) our own air strength must be so developed as to permit us to carry out the roles of our air force, in conjunction with our land and sea forces and also independently thereof, which are necessary for the defeat of our enemies.

3. Strategic situation and concept.

European

By the time that the air forces contemplated in this study are ready for employment, it is likely that large Axis ground forces will be released from the Russian front for employment elsewhere. Under these circumstances the ground forces of the United Nations will be numerically inferior to the Axis ground forces in Europe. If our ground forces, while numerically inferior, are to defeat the seasoned troops of the Axis in Europe, then circumstances must be created which will make this possible. Our numerically superior air forces must deplete the air forces of the enemy and undermine the structure which supports his surface forces. Fortunately a base, England, is available to us which is capable of sustaining our increasingly superior air power, and is within striking distance of the sources of German air power and the vitals of the German war economy.

Far Eastern

Our armed forces in the Far Eastern theater are not within effective striking distance of the vital sources of Japanese military policy. Unless the Russian Maritime Provinces can be made available -- and retained -- as bases of operation, we will be unable initially to wage a sustained air offensive against Japan. This condition cannot be relied upon. Hence our land and sea forces, supported by our air forces, must recover lost areas which are suitable as offensive bases against Japan proper. When these bases have been recovered, then our air power can be brought to bear against the highly vulnerable structure of Japan. Hence from the standpoint of air requirements, the Far Eastern operations may be divided into two phases:

(1) Air operations in support of our land and sea forces to regain bases within striking distance of Japan. This involves support of amphibious forces driving northwest from Australia as a base area, and of land forces driving northeast from India as a base area.

(2) Air operations against Japan proper to destroy her war making capacity. This operation may be undertaken fairly promptly if it is possible to retain the Russian Maritime provinces as a base area.

Sequence of Operations in 1943 and early 1944.

Air Operations:

Since:

(1) The German air force must be depleted and the German war economy must be undermined before a successful invasion of the European continent can be undertaken; and

(2) Base areas for an air offensive must be secured before a decisive attack can be launched against Japan; and

(3) Each of these undertakings will involve large forces and will require considerable time for accomplishment;

it appears that the air operations which can be carried out simultaneously in 1943 and early 1944 may be listed as follows:

Program A

(1) An Air offensive against Germany to deplete the German Air Forces and submarine force and undermine German war economy. See Tab B. (1)

(2) Air support of operations in North Africa. See Tab B. (2)

(3) Air support of operations in Middle East. See Tab B. (3)

(4) Air operations in Far East.
Support of surface forces in regaining bases and operations against enemy lines of communication and installations from available bases. See Tab B (4) a.

(5) Air operations in Hemisphere Defense. See Tab B. (5)

When these operations have been successfully accomplished, we will be in a position to carry out the following air operations - later in 1944 - successively or simultaneously.

Program B

(6) Air operations in support of a Combined Offensive against Germany. See Tab B. (1) b.

(7) An air offensive against Japan. See Tab B. (4) b.

4. Description of air operations.

a. AIR OFFENSIVE AGAINST GERMANY.

The air offensive against Germany is a combined effort by the U. S. Army Air Force and the R.A.F. The U.S. Army Air Force will concentrate its efforts upon the systematic destruction of selected vital elements of the German military and industrial machine through precision bombing in daylight. The R.A.F. will concentrate upon mass air attacks of industrial areas at night, to break down morale. In view of the acute shortage of skilled labor in Germany this effort of the R.A.F. should have a pronounced effect upon production.

Systems of objectives to be destroyed and priorities are as follows:

First Priority: Destruction of the German Air Force.
Targets: 11 fighter factories; 15 bomber factories; 17 airplane engine plants.
Destruction: Complete - with repeated attacks at two month intervals.
Results: Almost complete destruction of the sources of German air power, with consequent depletion of the German air force through combat attrition caused by these - and other - bombing raids.
Bomber force: 22374 bomber sorties.
Bombs: 44,748 tons (100 times the tonnage dropped on Renault)

Second Priority: Submarine building yards.
Targets: 20 building yards.
Destruction: Complete - one attack each.
Results: Germany's submarine shipbuilding program completely disrupted. This offensive cure to the submarine menace, at its source, is the only conclusive solution. Other types of anti-submarine operations are defensive and inconclusive.
Bomber force: 10,332 bomber sorties.
Bombs: 20,664 tons.

Third Priority: Transportation.
Targets: 38 (locomotive building shops; locomotive repair shops; marshalling yards; inland waterways)
Destruction: Partial.
Results: Breakdown of a vital link in the German military and industrial structure - one which is at present taxed to its maximum capacity and has become very sensitive to disruption.
Bomber force: 9348 sorties.
Bombs: 18,696 tons.

Fourth Priority: Electric Power.
Targets: 37 major electric power plants.
Destruction: Of targets selected - complete.
Results: Virtual paralysis of the major manufacturing centers. Germany is now working her extensive power system to the limit. Loss of such a tremendous source of energy would have immediate and wide-spread effect. However, harassing raids must be repeated in order to keep these areas isolated from other sources of electric power.
Force Required: 13,447 bomber sorties.
Bombs: 26,894 tons.

Fifth Priority: Oil.
Targets: 23 plants.
Destruction: Complete.
Results: Reduction of 47% of Germany's refined oil products.
Force required: 8322 bomber sorties.
Bombs: 16,644 tons.

Sixth Priority: Alumina.
Targets: 14 plants.
Destruction: Complete.
Results: Loss of practically all aluminum production in Germany and occupied countries. This would be a severe blow, since aluminum is now extensively used as a replacement for copper, of which there is an acute shortage.
Force required: 1932 bomber sorties.
Bombs: 3864 tons.

Seventh Priority: Rubber.
Targets: 2 synthetic (Buna) plants.
Destruction: Complete.
Results: The loss of approximately 48% of rubber supply, to Germany. Immediate effect upon all forms of the armed services.
Force required: 288 bomber sorties.
Bombs: 576 tons.

Recapitulation:
Targets: 177
Force required: 66,045 bomber sorties.
Bombs: 132,090 tons of bombs.
Results: Decimation of the German Air Force.
Depletion of the German Submarine Force.
Disruption of German war economy.

b. AIR SUPPORT OF OPERATIONS IN NORTH AFRICA, with partial opening of the Mediterranean and a base for operations against Italy.

c. AIR SUPPORT OF OPERATIONS IN THE MIDDLE EAST, to hold the Middle East and drive the Axis forces out of Africa.

d. AIR OPERATIONS IN THE JAPANESE THEATER. Support of a land offensive to reopen the Burma road and gain operating bases in China.
Support of an amphibious offensive to regain the Philippines.
Support of land forces holding Siberia, if possible.

e. AIR OPERATIONS IN HEMISPHERE DEFENSE. Primarily the defense of the American Republics against carrier attacks, and the defense of shipping by air operations against submarines.

f. AIR OPERATIONS IN SUPPORT OF A COMBINED OFFENSIVE AGAINST GERMANY. This involves the provision of additional fighters, light and dive bombers, observation, and transports for the close support of a land invasion of Europe from the British Isles. This operation must be subsequent to a successful air offensive.

g. AN AIR OFFENSIVE AGAINST JAPAN. Considering the great distances involved, it is apparent that the majority of our bombing effort must be carried out by long-range bombers (B-29 type). These will not be available in quantity until late in 1944. The following table indicates the system of targets selected and the effect of destruction of each. The total force required for this offensive is 51480 bomber sorties.

Appendix	System of Targets	Number of Targets	Percentage of Total Production Represented by Targets
J I	Aircraft and Engines	14	78.1
J II	Submarine Yards	5	100
J III	Naval and Commercial Bases	20	99.2 (Naval) 92.7 (Commercial)
J IV	Alumina and aluminum	20	100 (Alumina) 77.1 (Aluminum)
J V	Iron and Steel	21	100 (Iron) 94.3 (Steel)
J VI	Oil	15	87
J VII	Chemicals	14	--
J VIII	Rubber	14	100
	Total Number of Targets	123	

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5. Factors Involved in conducting these air operations.

a. Destructive effect of bombing (Tab E).
Direct hits by bombs will destroy all of the targets selected. In some cases repeat-raids must be conducted to prevent re-building. Forces have been provided to meet this requirement.

b. Feasibility of conducting accurate bombing (Tab C).
Experience has shown that it is perfectly feasible to conduct accurate, high level, daylight bombing under combat conditions, in the face of enemy antiaircraft and fighter opposition.

c. Feasibility of penetrating fighter and AA defense without excessive losses (Tab D).
With our present types of well armed and armored bombers, and through skillful employment of great masses, it is possible to penetrate the known and projected defenses of Europe and the Far East without reaching a loss-rate which would prevent our waging a sustained offensive.

d. Rate of operations, and weather (Tab F).
Studies of the European and Japanese Theaters indicate that the following rates of operation of bomber units may be anticipated:
Europe - 5 to 6 operations per month.
Far East - 10 operations per month.

6. Air Forces Required to carry out the operations listed above in 1943 and early 1944 (Tab G).

281 Groups, to carry out operations 1 to 5 incl., Program A.
The size force required to fully complete this task cannot be provided in the theaters shown until January 1944. However, during the period of build-up - in 1942 - the available forces can be partially completing the selected operations. It is anticipated that they can complete about one-third of the tasks required for the air offensive in 1943. Hence, it is expected that the air offensive against Germany, requiring six months of operations of the complete force, at the rates of operations expected, can be one-third accomplished in 1943, thus requiring four months of operations in 1944. This operation should be complete by May 1944, and the Combined Offensive should follow immediately thereafter.
336 Groups, to carry out operations 1 to 7 incl,, Program B.

7. Recapitulation of Combat Aircraft Required (Tab H).

To carry out operations 1 to 5 incl., (Program "A"), the U. S. Army Air Forces will require 63068 tactical aircraft in 1943.
To carry out operations 1 to 7 incl., (Program "B"), the U. S. Army Air Forces will require 74944 tactical type aircraft in 1943.

8. Air Bases (Tab J).

There will be ample air bases in the United Kingdom to accommodate the air forces set up for the European Theater.
In the Japanese Theater there are at present insufficient air bases to accommodate the land based air forces which are deployed in this study. It will be necessary to construct:
24 new bases in the Central Pacific.
20 new bases in the South Pacific.
It is believed that the deployment shown in this study represents virtual saturation of the Japanese Theater, and that larger air forces cannot be accommodated without an extensive air-base building program.

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9. Total Aircraft Required, including trainers and replacements, for the U. S. Army Air Forces in 1943 (Tab H).

Program A		Program B	
63,068	Tactical airplanes.	74,944	Tactical airplanes.
12,232	Training airplanes.	22,716	Training airplanes.
8,284	Gliders.	10,499	Gliders.
116	Liaison planes.	878	Liaison planes.
83,700	Total	109,037	Total

In accordance with the established policy in such matters, it is anticipated that the requirements of the U. S. Army Air Forces for Army Type aircraft will be given first priority in allocation of U. S. production, within the capacity of the U. S. Army Air Forces to man and employ such aircraft.

Spare parts for the maintenance of these aircraft are not included in the totals listed above, and adequate provision must be added to these requirements.

10. Total Personnel Requirements (Tab I) to meet this program in 1943.

Summary of Personnel Requirements to meet Programs A and B by January 1, 1944. (Including present on hand, and estimated attrition)

	Program A			Program B		
	Air Force	Arms and Services	Total	Air Force	Arms and Services	Total
Officers	230,243	72,600	302,843	253,000	86,260	339,260
E. M.	1,554,104	877,400	2,431,504	1,963,000	1,048,740	3,011,740
Total	1,784,347	950,000	2,734,347	2,216,000	1,135,000	3,351,000

Given the necessary priorities, these requirements can be met and trained. Of the 150,000 annual rate of aviation cadets estimated available, the A.A.F. will require 120,000 leaving 30,000 for the Navy.

11. Logistic Requirements. (Tab L).

	Program A	Program B
Bombs	1,140,363 tons	1,238,566 tons
Gasoline	4,888,941,000 gallons	5,372,179,000 gallons
Shipping required	17,421,507 ship tons	19,804,041 ship tons.

Maximum number of 11,000 ton vessels required to be in use in any one month (average turn-around 2.81 months)

Program A	Program B
429	477

The Air Force requirements for shipping imposed by either program can be met, if the Navy requirements increase on a straight line basis applied against 1942 requirements, and if no other increase is made in Army strengths overseas beyond that attained by January 1, 1943.

The total gasoline requirement is close to the maximum output that can be attained in the United States, using all productive facilities and without regard to any United States Navy or British requirements, if all the gasoline is 100 octane. The fact that a great deal of this gasoline can be 91 octane, for trainers, alleviates this situation to some extent.

12. Air Transport Command Requirements. (Tab K)

2,217 Transports are required, of which two-thirds should be long range, four engine.

13. Rates of Attrition.

It is likely that initial operations in the air offensives will be attended by an abnormally high rate of attrition. This may be expected as a result of losses in shipping caused by submarine operations before the air attack on submarine bases has taken effect, losses at bases before the attack of enemy bomber factories has taken effect, and losses from combat before the attack of fighter factories and attrition from air combat has reduced the enemy fighter forces. However, these loss rates should drop rapidly as our operations progress. It is believed that the rate of attrition of 20% per month from all causes in active combat zones will be a fair average. This is based upon British long-term experience.

14. Rates of Commitment.

In order to reach the increased goal of combat units by January 1944, it will probably be necessary to reduce the expected rate of commitment of units to combat theaters in early 1943, to increase the training establishments.

15. Conclusions.

a. Both Germany and Japan are vulnerable to air attack.

b. A successful air offensive against Germany can be carried [illegible] and is a necessary preliminary to ultimate victory over Germany.

c. Base areas are now available in the United Kingdom, capable of sustaining the necessary air forces to accomplish this purpose.

d. It is possible to conduct precision daylight bombing in the face of known and projected defenses of Western Europe.

e. It is possible to conduct such an air offensive against Germany without prohibitive losses.

f. Air support is essential to the conduct of all our other campaigns in 1943.

g. It is possible to meet the logistic and personnel requirements for the air force necessary to gain victory over our enemy.

h. It is believed possible to provide and deploy the necessary air forces in 1943 provided this requirement is given priority over all others including the allocation of necessary shipping, for an air offensive against Germany and support of land and sea forces in all other theaters.

i. It is not believed possible to provide and deploy the necessary air forces in 1943 for simultaneous air offensives against Germany and Japan and air support of other essential operations.

PART V

ANNEXES

Tab A

Strategic Air Concept

STRATEGIC SITUATION AND CONCEPT

1. Strategic Situation.

It is assumed that, by the end of 1943, German operations against Russia will have been sufficiently successful to permit the release of half the German forces now engaged on the Russian front, for employment elsewhere.

It is further assumed that:

Our operations in North Africa have given us control of French Morocco and Algiers, and that our forces control the south shore of the Mediterranean, at least as far as, and including Tunisia.

United Nations forces are engaged with Axis forces somewhere in the Middle East, and that India is still controlled by the United Nations.

Our forces have made some progress toward regaining the lost base areas in the Japanese Theater, but that Japan still holds the majority of her conquests.

Siberia probably is not available as a base area. However, forces will be provided for operations from Siberia in case it should be available.

Under these circumstances it may be anticipated that the relative strength of the opposing land and air forces is approximately as follows, by the end of 1943:

Locality	Divisions		Airplanes	
	United Nations	Axis	United Nations	Axis
Western Europe) North Africa) Middle East)	87	245	15700	7500
Far East	56	44	9400	2000

Under these conditions, it is apparent that the United Nations will be unable to launch a land offensive in Europe, unless the war-making capacity of the Axis powers is undermined.

On the other hand, the United Nations enjoy an increasing superiority in air power and possess a base (England) which is within striking distance of the vital elements of Germany and is capable of sustaining powerful air forces.

In the Japanese Theater, we would be unable to attack the real sources of Japanese strength, in Japan Proper, except by very long range bombers (B-29 type). It is doubtful whether these bombers could be made available in sufficient quantity by the end of 1943 to have a decisive influence on Japan.

2. Grand Strategy.

The Combined Chiefs of Staff recently expressed the following strategic concept (C.C.S. 91):

Consideration of the foregoing leads to reaffirmation of the previous strategic concept for the United Nations:

To conduct the strategic offensive with maximum forces in the Atlantic-Western European Theater at the earliest practicable date, and to maintain the strategic defensive in other theaters, with appropriate forces.

To implement the strategic concept our land, sea and air forces should be disposed to effectuate the following main courses of action:-

Strategic Offensive.

(a) Initiate a major combined offensive against Germany in the European theater. Plans to be flexible so as to meet the situations if Russia should collapse.

(b) Wear down and undermine German resistance by increasing bomber offensive, blockade, raids, subversive activities and propaganda.

(Note: These courses of action in the Strategic Offensive must be reversed, from a chronological point of view, since a successful air offensive is a necessary preliminary to success in a Combined Operation involving land, sea, and air forces.)

Strategic Defensive.

(c) Secure essential land, sea and air communications of the United Nations, particular emphasis being placed on an increasing anti-U-boat offensive.

(d) Secure the Middle East.

(e) Secure Ceylon and stop the Japanese penetration towards India and the Indian Ocean.

(f) Secure Australia, New Zealand, Hawaii and Alaska.

(g) While the above strategic defensive roles are being carried out, employ amphibious forces in the Pacific theater on limited offensive operations. At the same time inflict attrition and exert economic pressure on Japan.

(h) Without prejudice to (a) above, prepare to reoccupy Burma in order to reopen land communications with China.

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Tab B

Operating Plans and Forces Required

Tab B–1–*a*

Air Offensive—Europe

EUROPEAN THEATRE — SUMMARY OF SYSTEMS

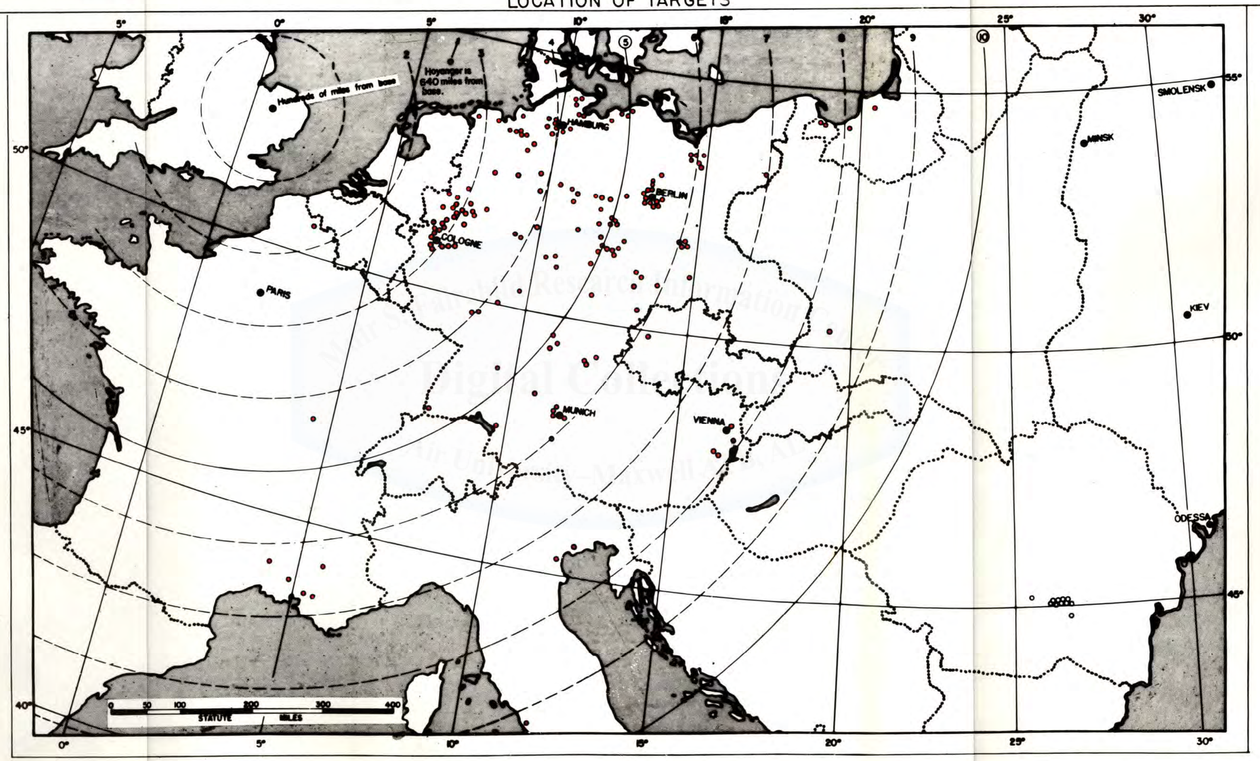
TARGET SYSTEMS

Appendix	System of Targets	Number of Targets	Percentage of Total Production Represented by Targets
G I	Pursuit Airplane Ass.Plant	11	100
G II	Bomber Airplane Ass.Plant	15	100
G III	Aero-engine Plants	17	100
G IV	Submarine Yards	20	100
G V	Transportation	38	41.9 Loc.Bldg. 31.5 Loc.Repr.
G VI	Power	37	---
G VII	Oil	23	47.0
G VIII	Alumina	14	100
G IX	Rubber	2	47.5
	Total Number of Targets	177	

NOTES:

1. The systems are arranged in the order in which it is suggested they be attacked.
2. The first three systems relate to the German Air Force. In all cases the targets selected include 100% of the total output. If these targets were destroyed, Germany's airplane building program would be brought to a standstill and her offensive and defensive air operations would rapidly decline as and when her operational airplanes were destroyed after using up any reserve. In the case of pursuit airplanes, Germany is known to have very few reserves.
3. The fourth system relates to U-boats and the targets include 100% of present production. If these targets were destroyed, Germany's U-boat shipbuilding program would be brought to a standstill and the U-boat campaign would be gradually reduced as and when her operational subs were rendered inoperative. This would be accelerated by virtue of the fact that by destroying the yards all major servicing and repair facilities to operational U-boats would similarly cease.
4. The fifth system relates to transportation and covers locomotive building plants, locomotive repair shops, marshalling yards, and inland waterways. It is well known that Germany is extremely short of locomotives at present and the destruction of the repair facilities and concentrations of locomotives which might be found in those works would disrupt her general transportation system. This system is complementary to other systems in that it would prevent the diversion of raw materials to new centers of production when the original centers were destroyed.
5. The destruction of objectives in the sixth class - power - cannot be expressed quantitatively but if each of the thirty-seven (37) targets included were destroyed, industry would be very largely brought to a standstill and the effect on morale would be very great.
6. The remaining systems - oil, alumina, and rubber - represent three of the major commodities required by Germany in the prosecution of her war effort.
7. There is no doubt that if the targets included in these systems were successfully destroyed, the effect would be decisive and Germany would be unable to continue her war effort.

LOCATION OF TARGETS



BOMBER FORCE REQUIRED

Appendix	System of Targets	Total Number of Sorties Required	Operation Bomber Force Required	Total Bomber Force Required
G I	Pursuit Airplane Ass.Plants	6,318	216	288
G II	Bomber Airplane Ass.Plants	8,424	284	379
G III	Aero-engines Plants	7,632	256	341
G IV	Submarine Yards	10,332	347	462
G V	Transportation	9,348	314	418
G VI	Power	13,449	452	603
G VII	Oil	8,322	280	373
G VIII	Alumina	1,932	65	87
G IX	Rubber	288	11	14
	TOTAL	66,045	2,225	2,965

BOMBER FORCE

	Heavy Bombers B 17e's	Medium Bombers
Number of Groups	42	15
Number of Bombers per Group	48	63
Total Number of Bombers - in class	2016	945
Total Number of Bombers	2961	
Number of Operational Bombers (i.e. less approx. 25%)	1512	720
Total Number of Operational Bombers	2232	

NOTES:

1. In calculating the number of bombers required to make a given number of sorties over a target an allowance of fifteen (15) percent has been made for bombers which are dispatched but do not attack the target.
2. The number and weight of bombs required to be dropped on each target have been calculated according to the vulnerability and area of the target. They vary between 300 lb. and 1000 lb. bombs.
3. The prosecution of this complete plan involves the dropping of a total of about two hundred seventy-three (273,000,000) million pounds of bombs.
4. This plan is to be carried out in a period of six months during which thirty-five (35) days should be favorable for operations.

EUROPEAN THEATRE APPENDIX GI — PURSUIT AIRCRAFT ASSEMBLY PLANTS

LIST OF TARGETS

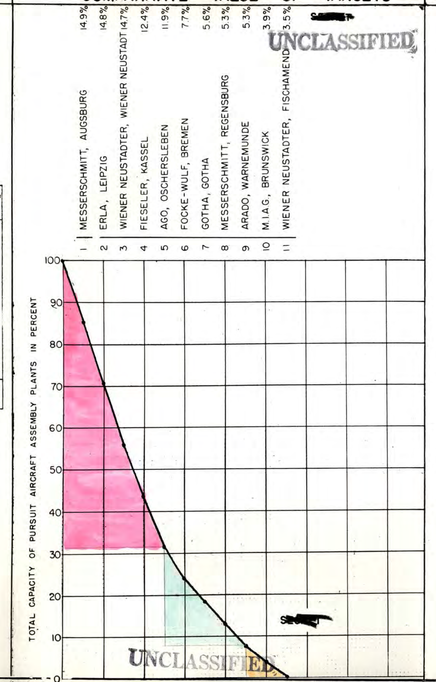
No.	Place	Plant	Estimated Monthly Production He 109	F.W. 190	Me110 & Me210	Total	Percentage of Total
1.	Augsburg	Messerschmitt	----	----	80	80	14.8
2.	Leipzig	Erla	80	----	----	80	14.8
3.	Weiner Neustadt	Weiner-Neustadter	80	----	----	80	14.8
4.	Kassel	Fieseler	65	----	----	65	12.1
5.	Oschersleben	A.G.O.	65	----	----	65	12.1
6.	Bremen	Focke-Wulf	----	40	----	40	7.5
7.	Gotha	Gothar	----	----	30	30	5.5
8.	Regensburg	Messerschmitt	30	----	----	30	5.5
9.	Warnemunde	Heinkel (Arado)	----	30	----	30	5.5
10.	Brunswick	M.I.A.G.	----	----	20	20	3.7
11.	Fischamend	Weiner-Neustadter	----	----	20	20	3.7
		TOTAL	320	70	150	540	100.0

NOTES:

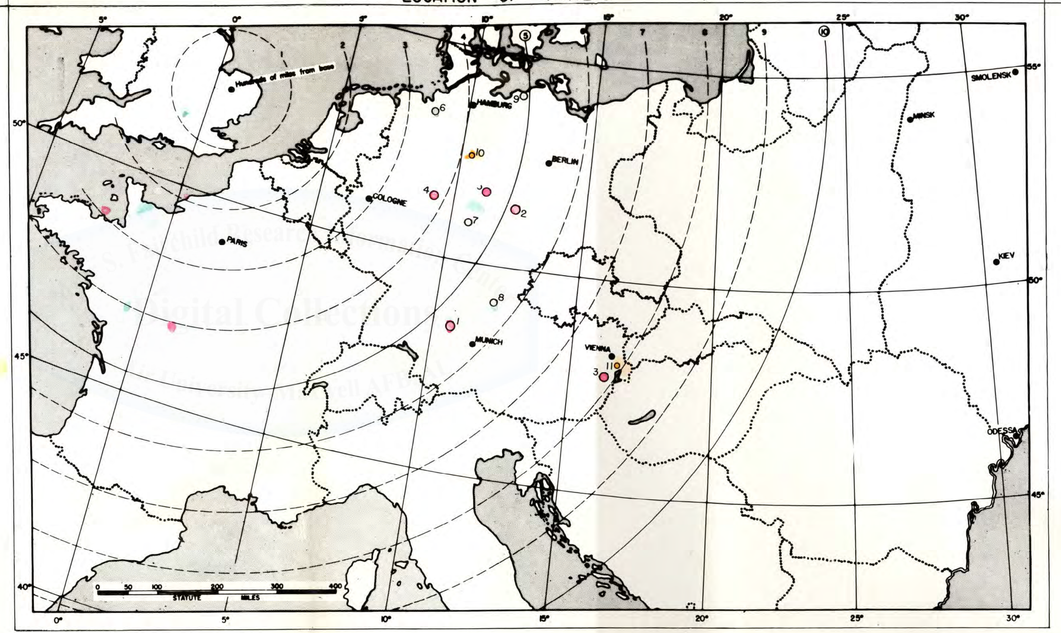
1. A successful attack on this type of target is likely to reduce production to zero for a period of about two (2) months. Thus, if all eleven (11) targets were dealt with, the effect would be to reduce the output by about one thousand (1000) airplanes, after which production would return to normal and further attacks would become necessary on these or new locations.

2. Successful attack on the first five (5) plants is likely to reduce production by 68.8 percent.

COMPARATIVE VALUE OF TARGETS



LOCATION OF TARGETS



BOMBER FORCE REQUIRED

1. DESCRIPTION OF TARGETS

An airplane assembly plant usually comprises a series of several buildings, fairly widely dispersed around a factory airfield. These buildings comprise Assembly Sheds, Flight Hangers, Stores, Administrative Buildings, Canteen, etc. The total ground area of these buildings in the case of these particular targets varies from 400,000 to 1,700,000 square feet. A careful examination of the various plants indicates that the vital portions of the target are about 3 to 5 main assembly sheds, each about 400'x400' (480,000 to 800,000 square feet total area).

2. NUMBER OF DIRECT HITS AND TYPE OF BOMB REQUIRED

It is considered that at least six (6) direct hits are required on each of the main sheds to cause effective destruction. The buildings and jigs are of comparatively light construction and it is considered that 300 lb. bombs will be required.

3. NUMBER OF SORTIES AND BOMBER FORCE REQUIRED

Based upon detailed calculations taking into account all operational factors involved in making attacks against highly defended targets with appropriate allowances for probabilities, aiming errors, losses, etc., etc., it appears that a total of 2,106 sorties would be required to attack each of the targets once. Due to the rapidity with which these assembly sheds and jigs can be rebuilt, it is considered necessary to repeat the attacks at intervals of two months. In the period of six months, therefore, three (3) attacks are required on each plant giving a total of:-

6,318 SORTIES

In order to carry out these sorties in 35 operational days, a force of:-

216 BOMBERS

must be set up.

EUROPEAN THEATRE — APPENDIX GII — BOMBER AIRCRAFT ASSEMBLY PLANTS

LIST OF TARGETS

No.	Place	Name of Plant	Number and Type	Total	Percent of Total
1.	Oranienburg	Heinkel	65 - He 111,5-He 177	95	17.8
			25 - JU 88		
2.	Schonfeld	Henschel	35 - JU 88,20-Hs 129	55	10.3
3.	Rostock	Heinkel	35 - He 111,5-He 177	40	7.5
4.	Dessau	Junkers	40 - JU 88	40	7.5
5.	Allmansweiler	Dornier	35 - Du 217	35	6.5
6.	Brandenburg - Neuendorf	Arado	35 - JU 88	35	6.5
7.	Oberpfaffenhofen	Dornier	35 - Du 217	35	6.5
8.	Bernburg	Junkers	30 - JU 88	30	5.6
9.	Bremen	Weser	30 - JU 87	30	5.6
10.	Lemwerder	Weser	30 - JU 87	30	5.6
11.	Leipzig	A.T.G.	30 -JU 88	30	5.6
12.	Wismar	Dornier	30 - JU 88	30	5.6
13.	Halle	Siebel	25 - JU 88	25	4.7
14.	Furth	Bachmann	20 -JU 87	20	3.7
15.	Bremen	Focke-Wulf	5 -FW 200	5	1.0
	TOTAL			535	100.0

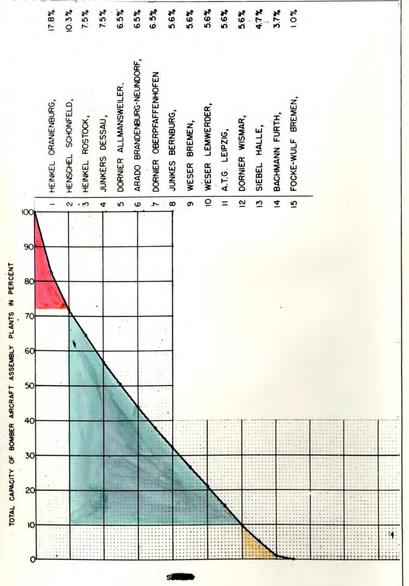
NOTES:

1. A successful attack on this type of target is required to reduce production to zero for a period of about two (2) months. Thus, if all fifteen (15) targets were dealth with, the effect would be to reduce the output by about one thousand (1000) airplanes, after which production would return to normal and further attacks would become necessary on these or new locations.

2. Successful attacks on the first seven (7) plants is likely to reduce production by 62.6 percent.

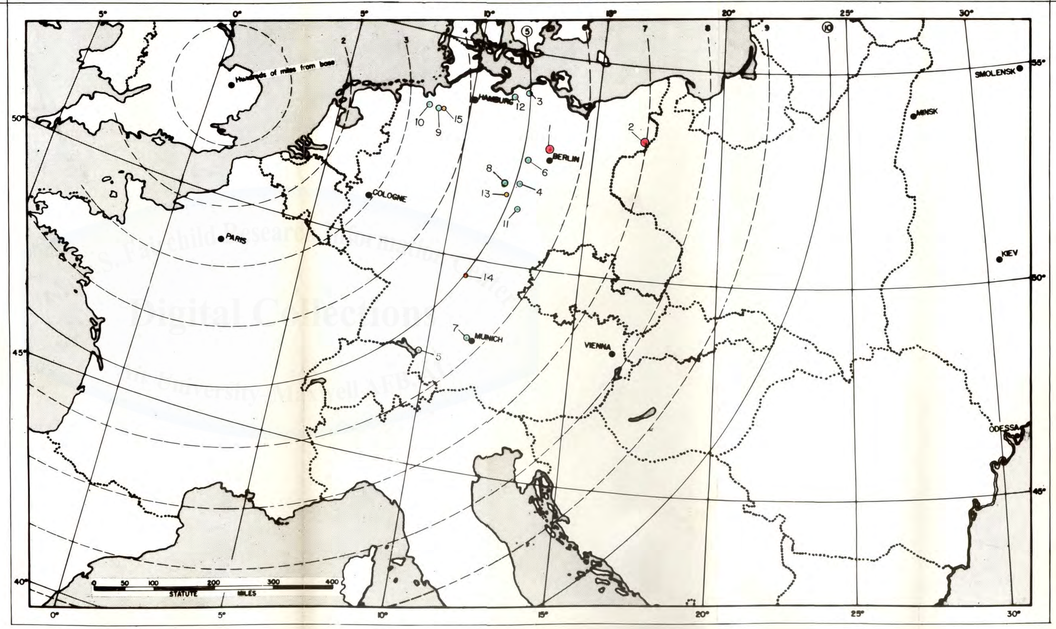
COMPARATIVE VALUE OF TARGETS

UNCLASSIFIED



UNCLASSIFIED

LOCATION OF TARGETS



BOMBER FORCE REQUIRED

1. DESCRIPTION OF TARGETS

An airplane assembly plant usually comprises a series of several buildings, fairly widely dispersed around a factory airfield. These buildings comprise Assembly Sheds, Flight Hangars, Stores, Administrative Buildings, Canteen, etc. The total ground area of these buildings in the case of these particular targets varies from 600,000 to 1,600,000 square feet. A careful examination of the various plants indicates that the vital portions of the target are about 2 to 6 main assembly sheds, each about 400' x 400' (320,000 to 960,000 square feet total area).

2. NUMBER OF DIRECT HITS AND TYPE OF BOMB REQUIRED

It is considered that at least six (6) direct hits are required on each of the main sheds to cause effective destruction. The buildings and jigs are of comparatively light construction and it is considered that 300 lb. bombs will be required.

3. NUMBER OF SORTIES AND BOMBER FORCE REQUIRED

Based upon detailed calculations taking into account all operational factors involved in making attacks against highly defended targets with appropriate allowances for probabilities, aiming errors, losses, etc., etc., it appears that a total of 2,808 sorties would be required to attack each target once. Due to the rapidity with which these assembly sheds and jigs can be rebuilt, it is considered necessary to repeat the attacks at intervals of two months. In the period of six months, therefore, three (3) attacks are required on each plant giving a total of:-

8,424 SORTIES

In order to carry out these sorties in 35 operational days, a force of:-

284 BOMBERS

must be set up.

EUROPEAN THEATRE APPENDIX G III — AERO ENGINE PLANTS

LIST OF TARGETS

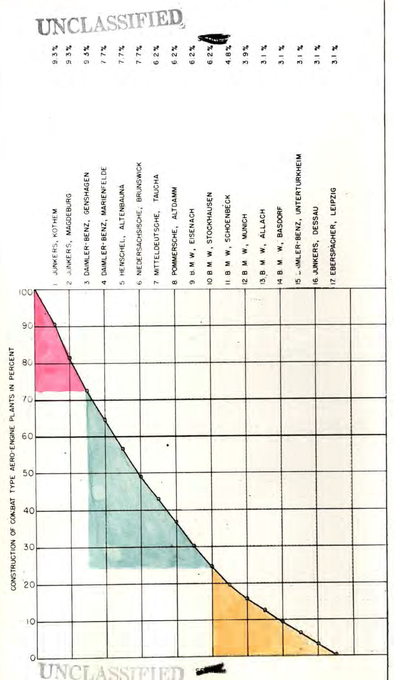
No.	Place	Name of Plant	Output	Percentage of Total
1.	Kothen	Junkers	300	9.3
2.	Magdeburg	"	300	9.3
3.	Genshagen	Daimler Benz	300	9.3
4.	Marienfelde	Daimler Benz	250	7.7
5.	Altenbauna	Henschel	250	7.7
6.	Brunswick	Niedersachsische	250	7.7
7.	Taucha	Mitteldeutsche	200	6.2
8.	Altdamm	Pommersche	200	6.2
9.	Eisenach	B.M.W.	200	6.2
10.	Stockhausen	B.M.W.	200	6.2
11.	Schoenbeck	"	150	4.8
12.	Munich	"	125	3.9
13.	Allach	B.M.W.	100	3.1
14.	Basdorf	"	100	3.1
15.	Unterturkheim	Daimler Benz	100	3.1
16.	Dessau	Junkers	100	3.1
17.	Leipzig	Eberspacher	100	3.1
		TOTAL	3,225	100.0

NOTES:

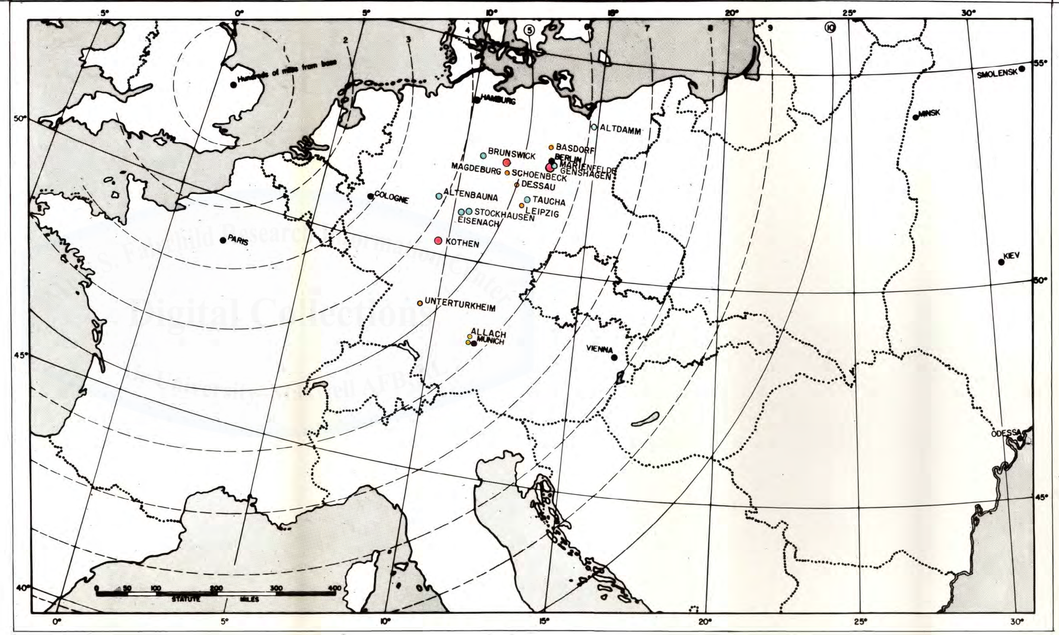
1. Of all the components required by an airplane assembly plant, the aero-engines are by far the most important. As will be seen from the table above, it is estimated that the present output of combat type aero-engines is about three thousand two hundred twenty-five (3,225) per month, which are required for the pursuit and bomber airplane assembly plants mentioned in the previous study.

2. If the seventeen (17) plants were effectively destroyed, the output of combat airplanes in Germany would be brought to a standstill.

COMPARATIVE VALUE OF TARGETS



LOCATION OF TARGETS



BOMBER FORCE REQUIRED

1. DESCRIPTION OF TARGETS

An aero engine manufacturing plant comprises an ordinary engineering works with foundry, pressing shop, machine shops, etc. However, it would not be classed as a heavy engineering works. The layout may vary from plant to plant and no average figures for size exist.

2. NUMBER OF DIRECT HITS AND TYPE OF BOMBS REQUIRED

It is considered that a weight of attack should be made upon these targets such that not less than one hundred 300-lb. bombs fall within the target area of 1000' x 1000'. Due to the fact that the component parts of the works are in some cases widely dispersed, several aiming points would be taken, each involving the weight of attack just mentioned.

3. NUMBER OF SORTIES AND BOMBER FORCE REQUIRED

Based upon detailed calculations taking into account all operational factors involved in making attacks against highly defended targets with appropriate allowances for probabilities, aiming errors, losses, etc., etc., it appears that in order to attack the whole of the 17 targets proposed with the weight of attack set out above, the total requirements will comprise:-

1,632 SORTIES

In order to carry out these sorties in 35 operational days, a force of:-

256 BOMBERS

must be set up.

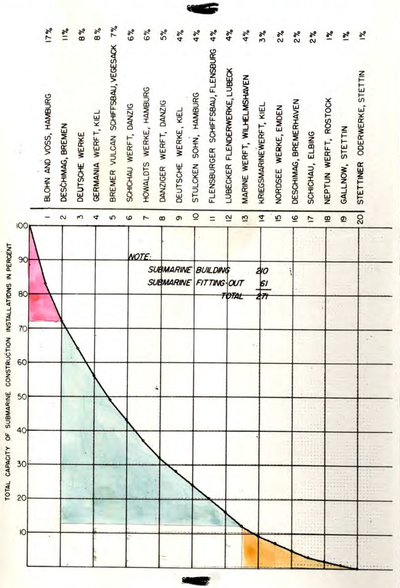
LIST OF TARGETS

No.	Place	Name of Yard	U-Boat Building June 1942			Percent Total German Production
			On Slips	Fitting Out	Total	
1.	Hamburg	Blohm & Voss	36	9	45	17
2.	Bremen	Deschimag	20	9	29	11
3.	Hamburg	Deutsche Werke (Finkenwarder)	16	6	22	8
4.	Kiel	Germania Werft (Krupp)	18	5	23	8
5.	Vegesack	Bremer Vulcan Schiffsbau	14	4	18	7
6.	Dansig	Schichau Werft	12	3	15	6
7.	Hamburg	Howaldts Werke	16	1	17	6
8.	Danzig	Dansiger Werft	9	5	14	5
9.	Kiel	Deutsche Werke	10	2	12	4
10.	Hamburg	Stulcken Sohn	6	5	11	4
11.	Flensburg	Flensburger Schiffsbau	8	3	11	4
12.	Lubeck	Lubecker Flenderwerke	8	2	10	4
13.	Wilhelmshaven	Marine Werft	10	1	11	4
14.	Kiel	Kriegsmarinewerft	7	2	9	3
15.	Emden	Nordsee Werke	6	1	7	2
16.	Bremerhaven	Deschimag (Seebeck)	3	3	6	2
17.	Elbing	Schichau	6	0	6	2
18.	Rostock	Neptun Werft	2	0	2	1
19.	Stettin	Gollnow	1	0	1	1
20.	Stettin	Stettiner Oderwerke	2	0	2	1
		TOTAL	210	61	271	100

NOTES:

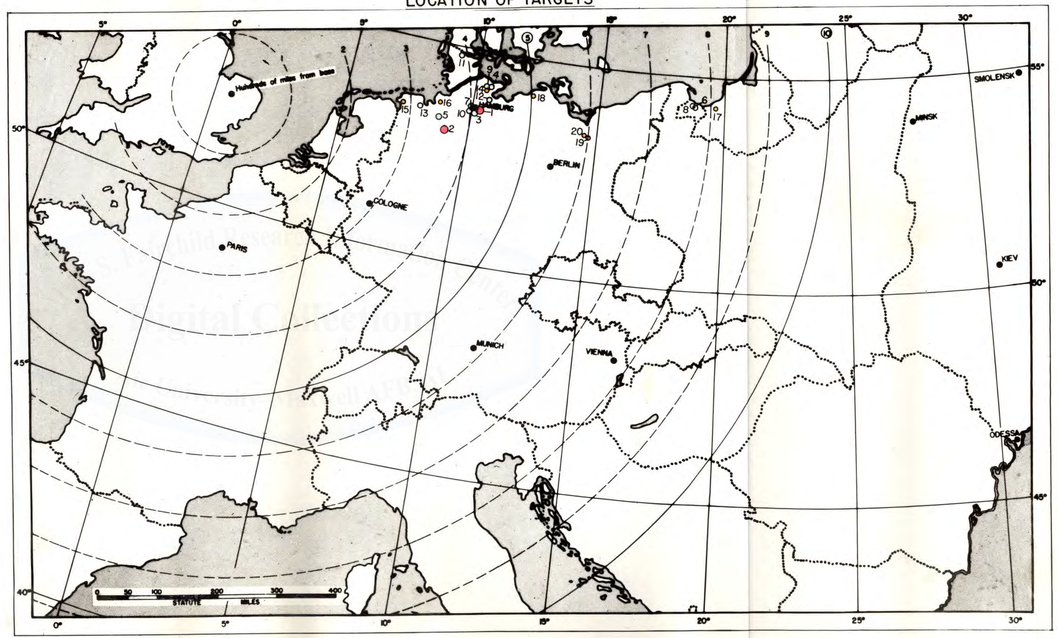
1. To be successful, attacks on these yards must be heavy in order to damage irrevocably not only the submarines but also the shipyard facilities, cranes, gantries, workshops, etc. If all the yards are successfully attacked, the U-boat building program will be effectively brought to a standstill.
2. If the first seven yards are destroyed, the building program will be reduced by 63%.
3. Submarine Depots or Pens are not included in the list of targets as they are considered to be of such very heavy construction that it would be difficult actually to damage the submarines within.
4. Submarine components, such as Diesel Engines, Accumulators, Electrical Motors, etc., are not included in the list of targets, as the centers of production of these components are widely dispersed and it is felt that a more direct result will obtain by attacking the yards themselves.

COMPARATIVE VALUE OF TARGETS



UNCLASSIFIED

LOCATION OF TARGETS



BOMBER FORCE REQUIRED

1. DESCRIPTION OF TARGETS

The main target comprises the slipways upon which submarines are built, and the primary aim is to destory the submarines themselves. However, it is also desirable to destory the shipyard facilities, including the cranes, gantries, workshops, etc., if possible. The lengths of the slips vary between about 280 and 1,000 feet, and they may be arranged in groups of several closely adjacent slips or in separate groups some distance apart at different points in the shipyards. A careful examination of the various yards indicates that the groups of slips may vary from 1 to 4, depending upon the size of the yard and the aiming points have been calculated appropriately.

2. NUMBER OF DIRECT HITS AND TYPE OF BOMBS REQUIRED

In order to effectively destory both submarines and shipyard facilities it is considered that weight of attack should be laid on such as will give not less than 50 hits within the aiming point area of 1,000' x 1,000'. The construction of the U-boats and shipyard plant is such that it is considered that bombs of at least 1,000 lb. will be required.

3. NUMBER OF SORTIES AND BOMBER FORCE REQUIRED

Based upon detailed calculations taking into account all operational factors involved in making attacks against highly defended targets with appropriate allowances for probabilities, aiming errors, losses, etc., etc., and allowing for the fact that with the very heavy weight of attack proposed the destruction will be so considerable that no further attacks would be necessary within a six month period, it appears that it would be necessary to have:

10,332 SORTIES

In order to carry out these sorties in 35 operational days, a force of:-

347 BOMBERS

must be set up.

EUROPEAN THEATRE APPENDIX G V – TRANSPORTATION

LIST OF TARGETS

No.	Place	Name of Plant	Units	Percentage of Total
1.	LOCOMOTIVE BUILDING PLANTS			
1a.	Kassel	Henschel & Sohn	200	7.7
2.	Essen	F. Krupp	150	5.7
3.	Vienna (Floridsdorf)	Wiener Locomotiv Fabrik) (Henschel)	150	5.7
4.	Wiener Neustadt	Wiener Locomotiv Fabrik) (Henschel)		
5.	Pilsen	Skodawerke	150	5.7
6.	Chrzanow	Locomotivewerke	150	5.7
7.	Lille	Cie de Fives-Lille	150	5.7
8.	Le Creusot	Schneider & Cie	150	5.7
		TOTAL	1100	41.9

No.	Place	Number of Locomotives	Percentage of Total
11.	LOCOMOTIVE REPAIR SHOPS		
9.	Brandenburg-West	40	2.87
10.	Leinhausen	38	2.6
11.	Tempelhof	38	2.6
12.	Sebaldsbrucke	38	2.6
13.	Munchen-Freimann	34	2.34
14.	Schwerte	33	2.22
15.	Konigsberg	30	2.05
16.	Opladen	28	1.97
17.	Chemnitz	28	1.88
18.	Stargard	28	1.86
19.	Nurnberg	26	1.76
20.	Potsdam	26	1.76
21.	Leipzig	25	1.69
22.	Koln-Nippes	25	1.69
23.	Cottbus	24	1.63
	TOTAL	461	31.52

No.	Place	Capacity - Wagons 24 hours
III.	MARSHALLING YARDS IN RUHR AREA (Typical)	
24.	Hamm	10,000
25.	Osnabrucke	2,100
26.	Soest	4,000
27.	Schwerte	2,200
28.	Koln-Kalk-Nord	4,500
29.	Koln-Nippes	3,500
30.	Duhrort	5,000
31.	Dusseldorf-Derendorf	2,100

IV. VULNERABLE POINTS OF INLAND WATERWAYS

32. Rothensee Ship Elevator on Mittelland Canal (Weser Elbe Section)
33. Niederfinow Ship Elevator on Hohenzollern Canal
34. Hohenwarthe Ship Elevator on Mittelland Canal (Weser Elbe Section)
35. Henrichenberg Ship Elevator on Dortmund Ems Canal
36. Munster Locks and Aqueducts on Dortmund Ems Canal
37. Olfen Canal Banks on Dortmund Ems Canal
38. Minden Canal Banks on Mittelland Canal.

NOTES:

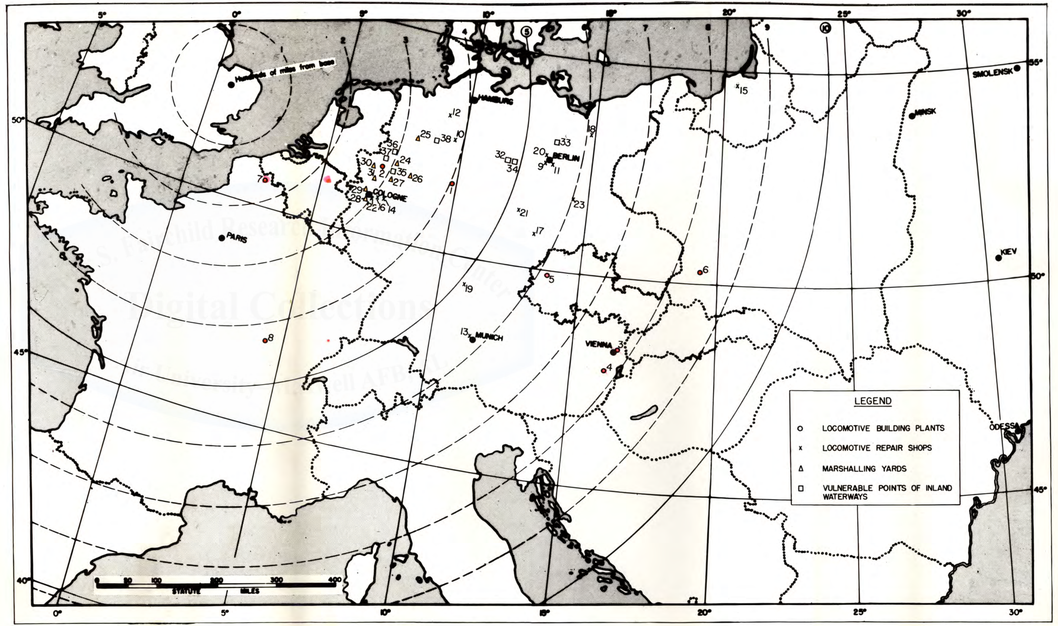
1. Germany's greatest need in railroad transport relates to her lack of sufficient locomotives as evidenced by the steps which have recently been taken to make an enormous increase in the number of locomotives being built. Of all the locomotive works available in Germany and the occupied countries, the eight (8) plants given under Section I represent over forty (40) percent of the total productive capacity of all the works.

2. Due to increased wear and tear resulting from having to keep the locomotives in service for much longer periods than normal, the locomotive repair shops are considered to be extremely important objectives, particularly as they constitute points at which large numbers of locomotives are likely to be concentrated in various stages of repair. The fifteen (15) repair shops given in the second part of the schedule, represent over thirty (30) percent of the available repair shop capacity in Germany and the occupied countries.

3. A most important means of disrupting the transportation system is by concentrating attacks on carefully selected marshalling yards serving an industrial area. The yards serving the Ruhr area are considered to be the most vital in the present German war effort and, accordingly, the eight (8) yards given under Section III have been selected. If these yards are heavily attacked, the transportation system in this most important industrial area will be rendered chaotic.

4. As some twenty-five (25) percent of internal traffic in Germany is carried on inland waterways, these constitute important objectives and under Section IV of the notes seven (7) objectives are given the destruction of which would interfere very considerably with the inland waterway traffic.

LOCATION OF TARGETS



BOMBER FORCE REQUIRED

1. DESCRIPTION OF TARGETS

(a) Locomotive Building Plants comprise heavy engineering workshops with foundries, forges, stamping plants, machine shops, etc., and there is no standardized size or layout for such works.

(b) Locomotive Repair Shops are similarly comparable to engineering works and comprise forges, machine shops, etc. The area of these plants varies from plant to plant.

(c) Marshalling Yards comprise receiving sidings, marshalling sidings, hump, control tower, etc., but whilst the last two are vital to the operation of the yard, they are of extremely small area. The greatest concentration of rolling stock is in the marshalling sidings and these may cover an area up to 2400 yards by 400 yards.

(d) Ship Elevators comprise heavy engineering constructions supported on latticed steel or concrete frameworks, but relative to the other targets the area is comparatively small being about twice the width of the canal and of a length suitable for accommodating a tug and short train of barges.

2. NUMBER OF DIRECT HITS AND TYPE OF BOMBS REQUIRED

(a) For the Locomotive Building Plants, it is considered that 500-lb. bombs are required and that a weight of attack should be such that not less than 100 of these bombs fall within an area of 1000' x 1000'.

(b) Locomotive Repair Shops call for a similar weight of attack, namely, such as will cause one hundred 500-lb. bombs to fall within an area of 1000' x 1000'.

(c) For Marshalling Yards where the destruction is concerned with railroad tracks and rolling stock thereon, it is considered that 300-lb. bombs can be used and that the weight of attack should be such that not less than 50 of these bombs fall upon every 1/10th of a square mile of marshalling yard area.

(d) For Ship Elevators, which are of heavy construction, it is considered that 1000-lb. bombs should be used and that the weight of attack should be such that not less than 6 of these bombs fall within a target area of 400 ft. by 100 ft.

3. NUMBER OF SORTIES AND BOMBER FORCE REQUIRED

Based upon detailed calculations, taking into account all operational factors involved in making attacks against highly defended targets with appropriate allowances for probabilities, aiming errors, losses, etc., etc., it appears that in order to attack the whole of 38 targets proposed and with the weights of attack set out above, the total requirements will comprise:-

9,348 SORTIES

In order to carry out these sorties in 35 operational days, a force of:-

314 BOMBERS

must be set up.

UNCLASSIFIED

EUROPEAN THEATRE APPENDIX G VI – ELECTRIC POWER

LIST OF TARGETS

No.	Place	Name of Plant	Capacity KW
	I. RUHR AND RHINELAND AREA		
1.	Knapsack (Nr. Koln)	Goldenberg	500,000
2.	Quadrath (Nr. Koln)	Fortuna I and II	200,000
3.	Stockum	Gersteinwerk	100,000
4.	Dusseldorf	Reisholz	115,000
5.	Hattingen	Gemeinschaft	120,500
6.	Essen	Karnap	220,000
7.	Herdecke	Koepchenwerk	140,000
8.	Brauweiler (Nr. Koln)	Brauweiler	Switching & Transformer Station
	II. BERLIN AREA		
9.	Berlin	Klingenberg	270,000
10.	Berlin	Westcroft	220,000
11.	Berlin	Charlottenberg	54,000
12.	Berlin	Spandau	49,400 & Switching & Transformer Station
13.	Zschornewitz	Golpa	440,000
14.	Trattendorf	Trattendorf	160,000
15.	Lauta	Lauta	130,000
16.	Finkenheerd	Finkenheerd	290,000
17.	Berlin	Friedrichsfelde	Switching & Transformer Station
	III. SOUTHERN AREA		
18.	Schwandorf	Schwandorf	120,000
19.	Walchenseewerk	Walchenseewerk	125,000
20.	Nurnberg	Nurnberg	59,600 & Switching & Transformer Station
21.	Mannheim	Grosskraftwerk	130,000
22.	Rheinau	Rheinau	Switching & Transformer Station
23.	Aschaffenburg	Aschaffenburg	"
24.	Karlsfeld (Nr. Munich)	Karsfeld	"
	IV. NORTHERN AREA		
25.	Harburg	Neuhof	130,000
26.	Hamburg	Tiefstack	90,000
27.	Hamburg	Schulau	50,000
28.	Lubeck	Herremwyck	50,000
29.	Hamburg	Harburg	Switching & Transformer Station
30.	Hannover	"	"
31.	Stettin	Lehrte	150,000
		Pomerandorf	

No.	Place	Name of Plant	Capacity KW
	V. CENTRAL AND SOUTHEASTERN AREA		
32.	Bohlen	Bohlen	238,000
33.	Espenhain	Espenhain	150,000
34.	Borken	Borken	145,000
35.	Groskayna	Groskayna	56,000
36.	Harbke	Harbke	150,000 Approx.
37.	Hirschfelde	Hirschfelde	145,000

NOTES:

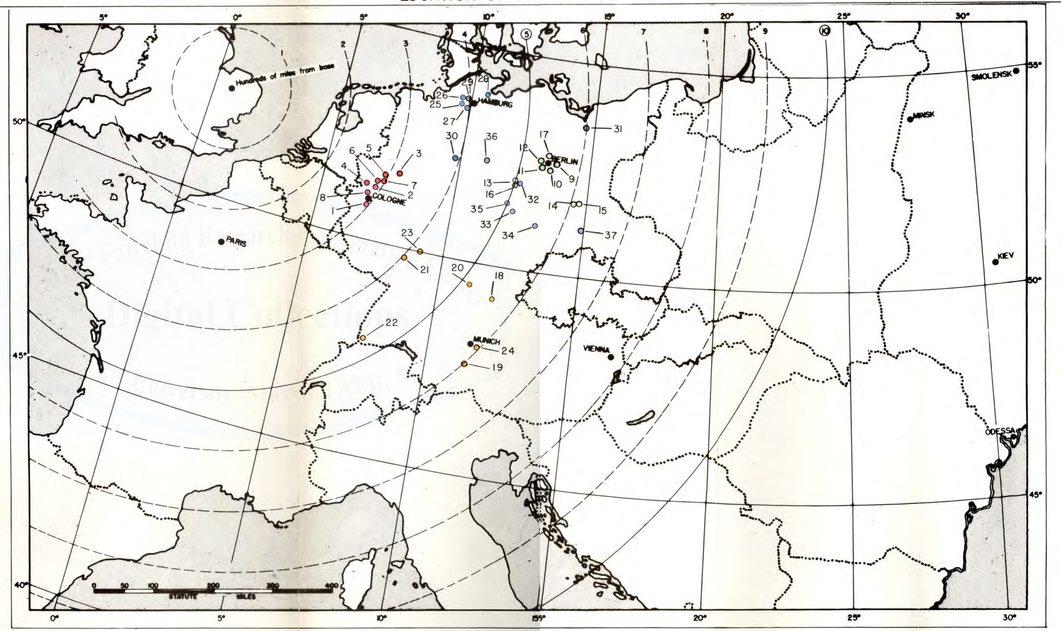
1. Electric power is not a comodity which can be satisfactorily treated in terms of the total capacity of the country and must be considered in terms of areas. The total capacity of all of the plants within any one of the areas does not represent a high percentage of the total installed plant capacity in the whole of Germany,but it does represent a very high proportion of the capacity of the plants within the areas concerned.

2. The selection of the targets has been made after a technical examination of the power network,and the targets not only include the major generating stations but also those switching and transformer stations through which external supplies might be imported to make up the deficiency due to the destruction of the power plants.

3. If all the plants selected in any one group are successfully destroyed, very wide areas will be completely denuded of electric power supplies, and if all five areas are dealt with, the electric power supply system in the whole of Germany would break down. This would not only have the effect of bringing a very large portion of industry to a standstill, but would also have an enormous effect on morale.

UNCLASSIFIED

LOCATION OF TARGETS



BOMBER FORCE REQUIRED

1. DESCRIPTION OF TARGETS

An electric power station comprises 3 main units - the Turbine House, Boiler House and Switch House. The plant in the Turbine House, if destroyed, may take anything from 18 months to 2 years to replace. Boiler Plant may take an equal time to repair, but it is unlikely that a complete boiler unit will be destroyed and will be only damaged and repairs can probably be made in from 9 months to one year. Plant in the Switch House may take from 6 months to a year to replace, but temporary repairs can often be made to continue the operation of the Power House whilst the switchgear is being repaired. Hence, the Turbine House is considered to be the main objective. The sizes of this house may vary from plant to plant, but a good average for a large capacity station is about 400' x 100'.

2. NUMBER OF DIRECT HITS AND TYPE OF BOMBS REQUIRED

It is considered that at least 6 direct hits are required upon the Turbine House in order to effectively destroy the generating capacity of the station. In order to obtain this number of hits on the comparatively small area of 400' x 100', it is inevitable that many of the bombs will fall on the adjacent Boiler House and Switch House.

3. NUMBER OF SORTIES AND BOMBER FORCE REQUIRED

Based upon detailed calculations taking into account all operational factors involved in making attacks against highly defended targets, with appropriate allowances for probabilities, aiming errors, losses, etc., etc., and allowing for the fact that with the weight of attack proposed the destruction will be such that the plant will take more than 6 months to repair-and, hence, that no further attacks will be required it appears that it will be necessary in order to deal with the 37 plants to have:-

13,440 SORTIES

In order to carry out these sorties in 35 operational days a force of:-

452 BOMBERS

must be set-up.

EUROPEAN THEATRE APPENDIX G VII — OIL

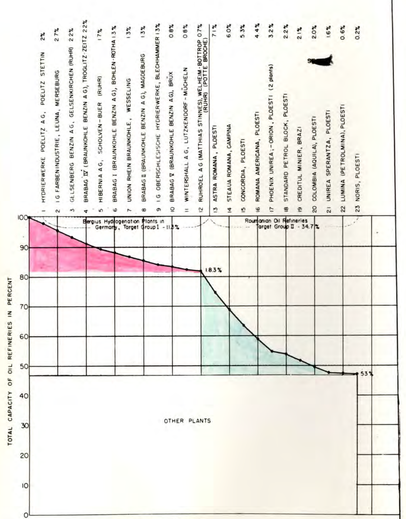
LIST OF TARGETS

No.	Place	Name of Plant	Output tons p/a	Percentage of Total	
I.	BERGIUS HYDROGENATION PLANTS IN GERMANY				
1.	Poelitz Stettin	Hydrierwerke Poelitz	300,000	2.0	
2.	Leuna, Merseburg	I.G.Farbenindustrie	400,000	2.7	
3.	Gelsenkirchen	Gelsenberg Benzin	325,000	2.2	
4.	Troplitz-Zeitz	Brabag IV	320,000	2.2	
5.	Scholven-Buer	Hibernia	250,000	1.7	
6.	Bollen-Botha	Brabag I	200,000	1.3	
7.	Wesseling	Union Rhein Braunkohle	200,000	1.3	
8.	Magdeburg	Brabag II	200,000	1.3	
9.	Blechhammer		200,000	1.3	
10.	Brux	Brabag V	125,000	0.8	
11.	Lutzkendorf-Mucheln	Wintershall	125,000	0.8	
12.	Welheim-Bottrop	Ruhrocl	100,000	0.7	
			2,745,000	18.3	18.3
II.	ROUMANIAN OIL REFINERIES				
13.	Ploesti	Astra Romana	1,060,000	7.1	
14.	Campina	Steaua Romana	900,000	6.0	
15.	Ploesti	Concordia	785,000	5.3	
16.	Ploesti	Romana Americana	665,000	4.4	
17.	Ploesti	Phoenix Unirea (Orion)	485,000	3.2	
18.	Ploesti	Standard Petrol Block	330,000	2.2	
19.	Brazi	Creditul Minier	320,000	2.1	
20.	Ploesti	Colombia (Aquila)	300,000	2.0	
21.	Ploesti	Unirea Sperantza	240,000	1.6	
22.	Ploesti	Lumina (Petrolmina)	85,000	0.6	
23.	Ploesti	Noris	30,000	0.2	
			5,200,000	34.7	34.7
III.	OTHER PLANTS				
	Total for other plants		7,055,000	47.0	
		GRAND TOTAL	15,000,000	100.0	

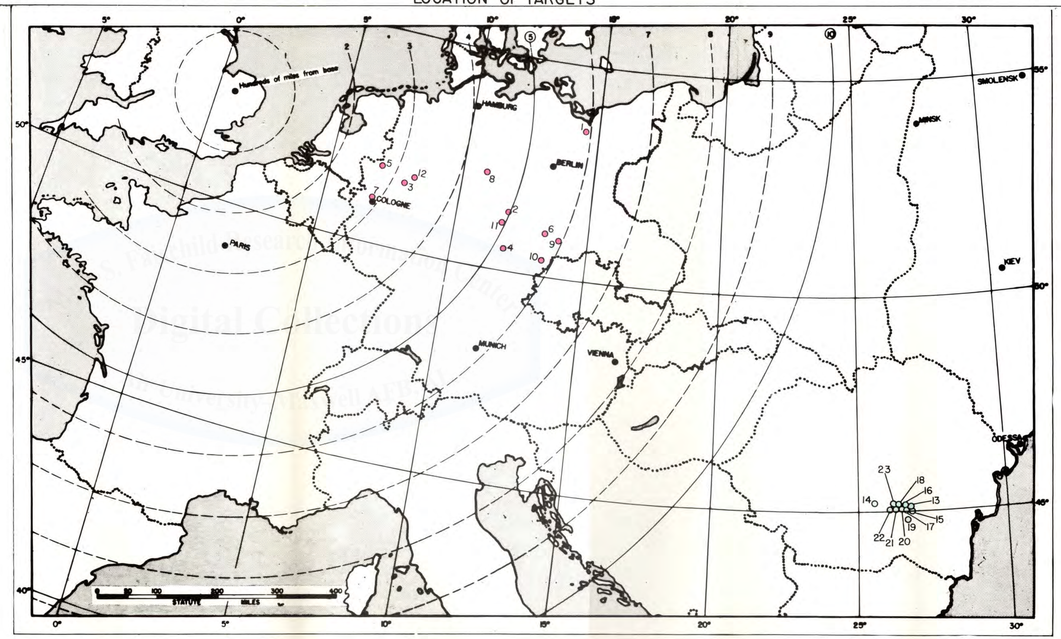
NOTES:

1. The total estimated output of all primary finished products in Axis Occupied Europe is about fifteen million (15,000,000) tons per year and this is produced in a variety of ways and a number of plants.
2. The most profitable groups of targets are considered to be the Bergius Hydrogenation Plants in Germany and the Rounanian Oil Refineries. These two sources account for some forty-seven (47) percent of the total.
3. If these plants were destroyed, the oil supply position would be very critically effected and would probably be decisive.

COMPARATIVE VALUE OF TARGETS



LOCATION OF TARGETS



BOMBER FORCE REQUIRED

1. DESCRIPTION OF TARGETS

Hydrogenation Plants and Oil Refineries embody a considerable number of component parts, some of which are of very heavy construction, such as the thick walled vertical steel cracking chambers, etc. The arrangements of the plants vary considerably and it is not possible to give any average figures for layouts. The main aim would be to destroy completely one of the groups of plants which constitutes a bottle-neck in the complete contimuous process, as for example, the compressor house.

2. NUMBER OF DIRECT HITS AND TYPE OF BOMBS REQUIRED

It is considered that at least 6 direct hits with 500-lb. bombs should be obtained on the selected aiming point, which would probably only have an area of about 200' x 100'. It follows that a heavy weight of attack is required upon a target area of such small dimensions and, as a result, many bombs aimed thereat, would fall upon other portions of the plant.

3. NUMBER OF SORTIES AND BOMBER FORCE REQUIRED

Based upon detailed calculations taking into account all operational factors involved in making attacks against highly defended targets with appropriate allowances for probabilities, aiming errors, losses, etc., etc., it appears that in order to deal with the 53 plants suggested for this system, it would be necessary to have a total of:-

8,322 SORTIES

In order to carry out these sorties in 35 operational days, a force of:-

280 BOMBERS

must be set up.

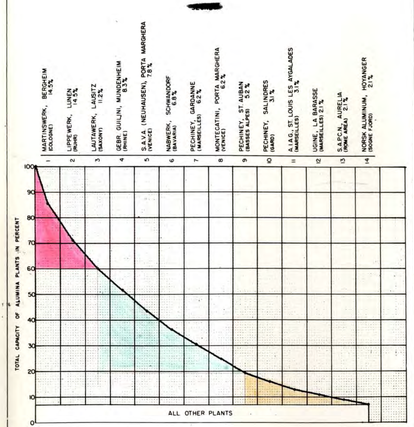
LIST OF TARGETS

No.	Place	Name of Plant	Alumina Capacity Metric Tons p.a.	Percentage of Total
1.	Bergheim (Cologne)	Martinswerk	140,000	14.5
2.	Lunen (Ruhr)	Lippewerk	140,000	14.5
3.	Lausitz (Saxony)	Lautawerk	108,000	11.2
4.	Mundenheim(Rhine)	Gebr.Guilini	80,000	8.3
5.	Porta Marghera (Venice)	S.A.V.A. (Neuhausen)	75,000	7.8
6.	Schwandorf (Bavaria)	Nabwerk	65,000	6.8
7.	Gardanne (Marseilles)	Pechiney	60,000	6.2
8.	Porta Marghera (Venice)	Montecatini	60,000	6.2
9.	St. Auban (Basses-Alpes)	Pechiney	50,000	5.2
10.	Salindres (Gard)	Pechiney	30,000	3.1
11.	St.Louis Les Aygalades (Marseilles)	A.I.A.G.	30,000	3.1
12.	La Barasse (Marseilles)	Ugine	20,000	2.1
13.	Aurelia (Rome Area)	S.A.P.C.N.	20,000	2.1
14.	Hoyanger (Sogne Fjord)	Norsk Aluminium	20,000	2.1
	Other plants in Germany, Italy, Yugoslavia, Hungary and Sweden		66,000	6.8
		TOTAL	964,000	100.0

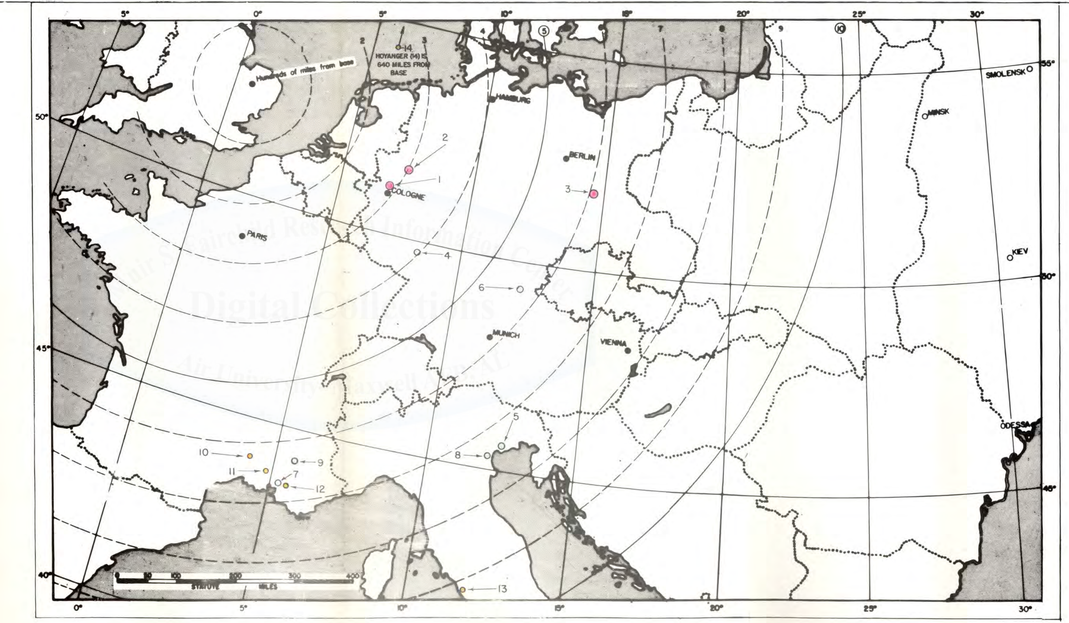
NOTES:

1. The total number of alumina plants in Germany and German occupied countries is twenty-one (21) with a total capacity of 964,000 tons per annum, whichis equivalent to 482,000 tons of aluminum. However, the fourteen (14) plants listed above account for 93.2 of the total, namely 898,000 tons of alumina or 449,000 tons of aluminum.
2. The estimated minium war needs of Germany, allowing for the substitution of zinc, copper, magnesium, and stainless steel, for 1942, are 325,000 metric tons of aluminum. However, allowing also for the substitution in aircraft design of plywood, etc. under drastically restricted aluminum availability, it is possible that the minimum requirement could be reduced to approximately 200,000 tons peryear for which about 400,000 tons of alumina is required.
3. The destruction of the first eight (8) plants given in the schedule above represents an output of 75.5%, leaving a balance of 24.5% which is well below the minimum requirements. This, of course, igmores any temporary relief which might be obtained for a short period by drastic requisitioning of any available aluminum in the country.

COMPARATIVE VALUE OF TARGETS



LOCATION OF TARGETS



BOMBER FORCE REQUIRED

1. DESCRIPTION OF TARGETS

The layout of alumina plants can very considerably, but essentially the components comprise grinding plant, gas producing plant and gas holders, calcining furnace, precipitation plant, etc. In view of the variations that can occur in the layout it is not possible to give any average figures for areas of plants,

2. NUMBER OF DIRECT HITS AND TYPE OF BOMBS REQUIRED

In view of the fact that some of the plant involved is of heavy construction and others are light, it is considered that these targets can best be attacked by the use of a mixture of 500 lb. and 300 lb. bombs, and, for purposes ot calculation, it has been assumed that the weight of attack should be such that not less than 30 - 500 lb. bombs and 60 - 300 lb. bombs should fall within an aiming point area of 1,000' x 1,000'.

3. NUMBER OF SORTIES AND BOMBER FORCE REQUIRED

Based upon detailed calculations taking into account all operational factors involved in making attacks against highly defended targets with appropriate allowances for probabilities, aiming errors, losses, etc., etc., and allowing for the fact that with the weight of attack proposed the destruction will be such that the plant will take from 6 to 8 months to replace, and hence no further attacks will be required within a six month period, it appears that it will be necessary to have:—

1,932 SORTIES

In order to carry out these sorties in 35 operational days a force of:-

65 BOMBERS

must be set up.

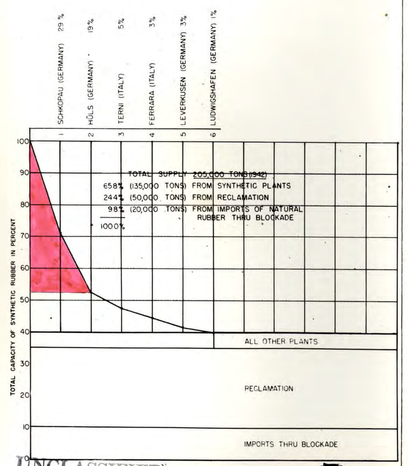
LIST OF TARGETS

No.	Place	Name of Plant	Output in tons/annum	Percentage of Total
1.	Schkopau (Merseburg)	Bunawerke G.m.b.H.	38,000	18½%
2.	Huls (Recklinghausen)	Chemischewerke Huls G.m.b.H.	59,500	29%
		TOTAL	97,500	47½%

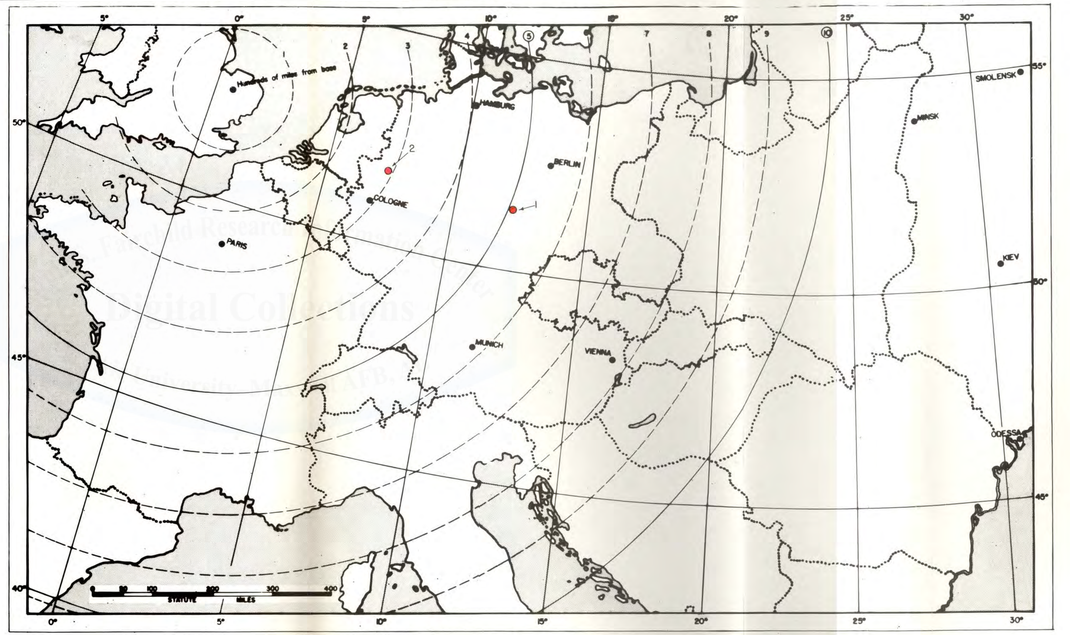
NOTES:

1. It is estimated that the minimum operational requirements of Germany call for a consumption of about 200,000 tons of rubber per annum. This total production is obtained from four main sources - natural rubber by blockade running from the Far East, reclamation, production of synthetic rubber and available stocks. It is not possible accurately to forecast the amount of rubber which can be brought in by blockade running, but it is clear that the output of the two synthetic rubber plants mentioned above represents practically 50% of requirements and, if destroyed, would reduce available supplies below absolute minimum requirements and would render the rubber situation extremely critical and probably decisive.

COMPARATIVE VALUE OF TARGETS



LOCATION OF TARGETS



BOMBER FORCE REQUIRED

1. DESCRIPTION OF TARGETS

The synthetic rubber plant layout is complicated and involves many chemical processes, and it is not possible to detail these within the scope of these notes. Whilst they are large and laid out with a view to minimising the effects of bombing, they are highly vulnerable to air attack in view of the nature of the materials employed and the complicated chain of continuous processes involved.

2. NUMBER OF DIRECT HITS AND TYPE OF BOMBS REQUIRED

It is considered that it is desirable to employ 600 lb. bombs and to lay on such a weight of attack that not less than 50 of these bombs fall within an aiming point area of 1000' by 1000'.

3. NUMBER OF SORTIES AND BOMBER FORCE REQUIRED

Based upon detailed calculations taking into account all operational factors involved in making attacks against highly defended targets, with appropriate allowances for probabilities, aiming errors, losses, etc., etc., and allowing for the fact that with the weight of attack proposed the destruction will be such that the plant will take more than 6 months to repair and, hence, that no further attacks will be required it appears that it will be necessary to have:—

288 SORTIES

In order to carry out these sorties in 35 operational days a force of:-

11 BOMBERS

must be set-up.

Tab B–1–*b*

Combined Offensive—Europe

COMBINED OFFENSIVE

When the German strength has been reduced through the air offensive to the point at which an invasion becomes feasible, then a combined land, sea, and air offensive will probably have to be launched from the British Isles.

The strategic objective of such an invasion will be the decisive defeat of the German Armed Forces and the occupation of vital industrial and political areas of the German nation.

At that time the entire United Nations Air Force in the European Theater will be employed for the direct and indirect support of the surface invasion.

The Air operations will include :

Direct attack of enemy troops.
Attack of enemy air forces.
Attack of logistic facilities supporting the enemy ground forces.
Attack of transportation means of all kinds.
Attack of munitions factories.
Fighter defense of our own troops and their vital establishments.

FORCE REQUIRED

Additional Air Forces, primarily light and dive bombers and observation, for close cooperation with the ground forces, and fighters to insure local air superiority, will be required for this phase.

ADDITIONAL AIR UNITS REQUIRED

Light Bomb		Fighters		Observation		Dive Bomb		Tr Carriers	
Gps.	Airp	Gps.	Airp	Gps.	Airp	Gps.	Airp	Gps.	Airp
4	256	10	1000	7	588	4	384	8	416

TOTAL AIR UNITS REQUIRED IN U.K.

Heavy Bomb		Medium Bomb		Light Bomb		Fighters		Observation		Dive Bomb		Troop Carriers		TOTAL	
Gp	Airp	Gp	Airp	Gp	Airp	Gp	Airp	Gp	Airp	Gp	Airp	Gp	Airp	Gp	Airp
42	2016	15	960	5	320	25	2500	8	672	4	384	8	416	107	7268

It is anticipated that this phase might be initiated by Spring or Summer of 1944.

Tab B–2

Air Operations—North Africa

AIR OPERATIONS IN NORTHWEST AFRICA

1. Mission.

The purposes of the operations in Northwest Africa are substantially as follows:

a. To secure Northwest Africa as a base for future operations.

b. To clear the western half of the Mediterranean as a sea route.

c. Ultimately to extend control of the south shore of the Mediterranean toward Cairo with a view to clearing the entire Mediterranean as a sea route.

d. To provide a base for air operations against Italy.

e. To provide additional bases for air operations against Germany in connection with the Air forces stationed in the U.K.

2. Situation.

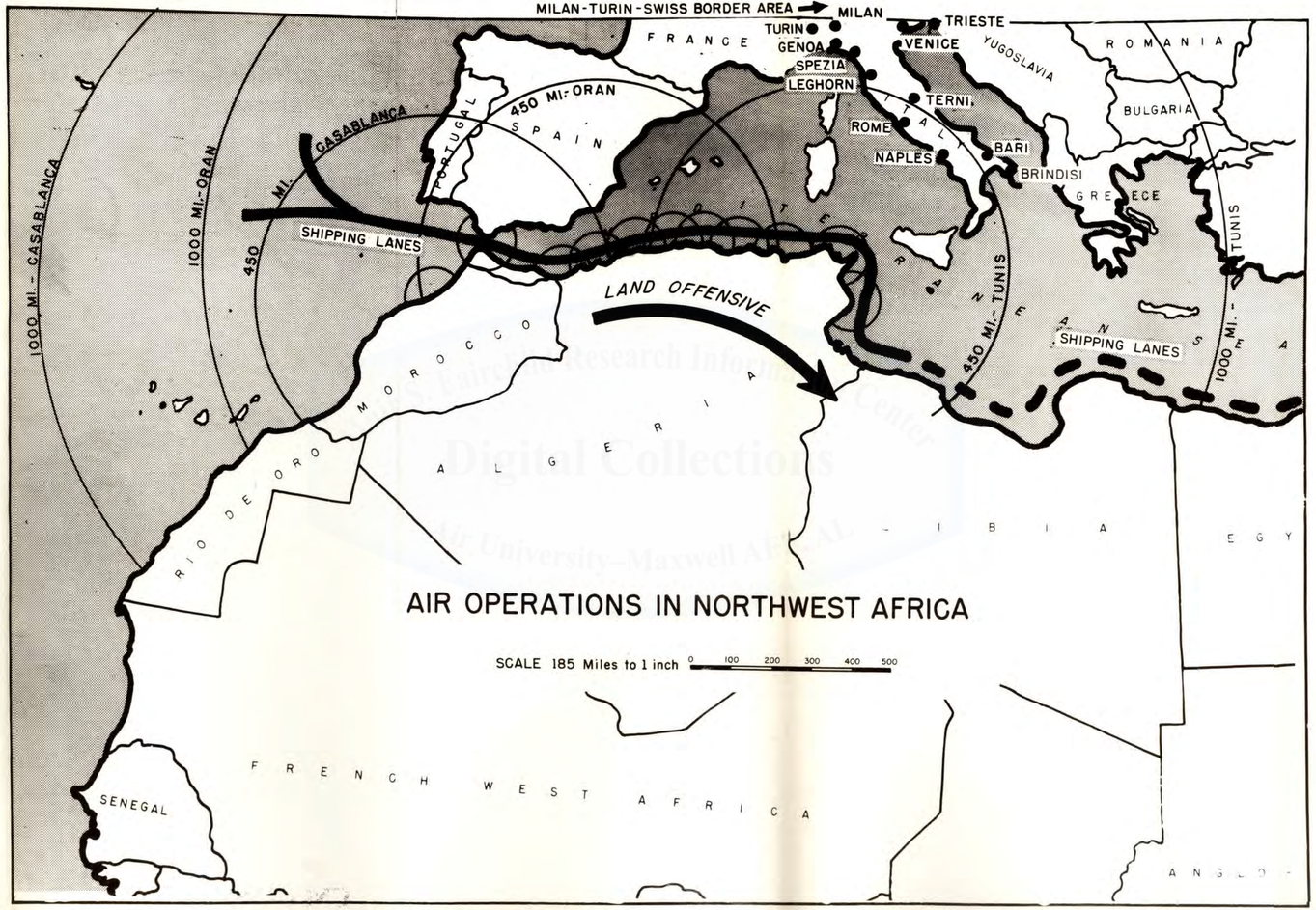
It will be assumed that these operations have met with sufficient success to provide a firm foothold in Northwest Africa extending eastward to include Tunisia.

3. Air Operations.

Under these circumstances it will be necessary to provide fighter forces along the southern shore of the Mediterranean from Spanish Morocco to Tunisia in sufficient quantity to provide air cover for shipping. It will be further necessary to provide bomber forces to interdict movement by sea from Italy toward Libya or toward Tunisia. In addition, bombers will be required to operate against Axis sea forces in the Western Mediterranean. Bomber forces will also be required to interdict air bases in Italy, Sicily, and Sardinia. Bombers will also be required for air operations against Italian ports and key Italian industries. The Italian industries which might be interdicted from Northwest Africa include:

(1) Shipbuilding industries in Trieste, Venice, Genoa, Spezia, Leghorn, and others;
(2) Aircraft industries at Turin, Milan, Trieste, Naples, Rome, et al;
(3) Chemical industries at Oschir, Meran, Terni, Rome;
(4) Hydroelectric plants concentrated in Milan-Brescia-Swiss border area;
(5) Oil refineries at Bari (40% of all aviation gasoline), Leghorn (40% of all aviation gasoline), Venice, Brindise, Trieste, Naples, Spezia.

During the winter months when weather may seriously interfere with air operations from the British Isles, considerable bomber forces may be flown to North Africa for operations against key elements in Italy.



AIRCRAFT REQUIREMENTS

The following Air forces, initially provided for the seizure of Northwest Africa, will probably be retained there for the operations listed above.

Types	Units	Aircraft	Level Reserves	Rate of Attrition
Heavy Bombers	3 Groups	48 ea.	50%	20% per mo.
Medium Bombers	4 Groups	64 ea.	50%	20% per mo.
Light Bombers	1½ Groups	64 ea.	50%	20% per mo.
Fighters	8 Groups	100 ea.	50%	20% per mo.
Observation	1 Group	72	50%	20% per mo.
Photo & Reconnaissance	½ Group		50%	20% per mo.
Troop Carriers	3 Groups	52 ea.	50%	20% per mo.

Tab B–3

Air Operations—Middle East

AIR OPERATIONS IN MIDDLE EAST

1. Mission.

To support United Nations land forces in defending the Middle East from Axis operations.

2. Situation.

It is assumed that land forces of the Axis and of the United Nations will be heavily engaged in the Middle East. It does not seem reasonable to speculate at this time as to the areas in which such operations will be taking place by late 1943 or early 1944. However, it is certain that Axis forces in North Africa and the Middle East must be sustained by shipping which crosses the Mediterranean and uses the North African ports. Furthermore, it may reasonably be assumed that Axis shipping is active in the transportation of oil across the Black Sea and through the Bosporus, the Aegean Sea and the Corinth Canal.

3. Air Operations.

It may be anticipated that the air operations required for this Theater include:

a. Direct support of our ground forces by attack of Axis ground forces.

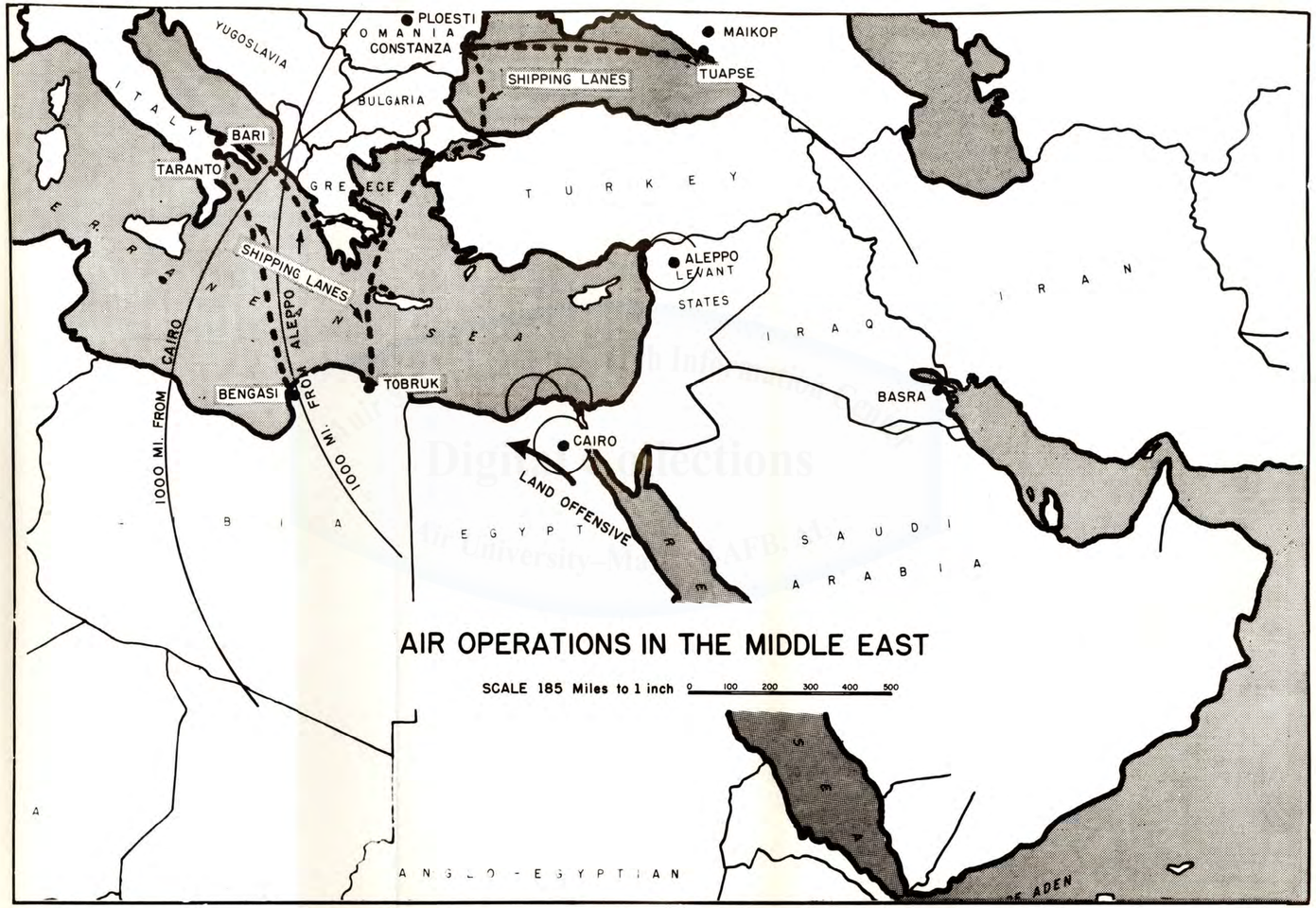
b. Air attack of Axis Air forces at their airdromes.

c. Indirect support of our ground forces by air attacks against Axis shipping and ports in North Africa.

d. Air defense of our own forces and our own vital installations.

e. Air attacks against Axis oil installations in Rumania and the Caucasus.

f. Air attacks against Axis shipping and ports in the Black Sea and the Aegean Sea.



AIRCRAFT REQUIREMENTS

First Phase (Destruction of Axis ground forces)

Aircraft Requirements	Objectives
4 Heavy Bomb Groups	Ports of Embarkation
3 Light Bomb Groups	Ports of Debarkation
1 Medium Bomb Group	Axis Shipping Concentrations of Supplies Motor Transport Troop Concentrations Tanks Supplies Ground Installations Air Bases Aircraft
6 Fighter Groups	Air defense of own ground forces, air bases, other vital installations
2 Photo Squadrons	

Second Phase (Clearing of Mediterranean)

Additional Aircraft Requirements	Objectives
2 Heavy Bomb Groups	Air bases and seaports in Crete, Dodecanese and other Mediterranean Axis - held islands
1 Medium Bomb Group (Torpedo carrying)	
1 Light Bomb Group (Dive)	

Third Phase (Destruction of Industry and Resources)

Additional Aircraft Requirements	Objectives
2 Heavy Bomb Groups	Heavy industries in Italy and in Axis-held countries (particularly Roumanian and Caucasus oil industries). Lines of sea and land communication.

TOTAL

Heavy Bomb Groups	8
Medium Bomb Groups	2
Light Bomb Groups	4
Fighter Groups	6
Photo Squadrons	2
Transport Groups	

Tab B–4–*a*

Air Operations—Far East—1st Phase—Support

AIR OPERATIONS IN THE JAPANESE THEATER

In accordance with the agreed general strategy of the United Nations, the air operations contemplated in the Japanese Theater in 1943 and early 1944 are in pursuit of the Strategic Defensive. However, it is appreciated that some limited offensive operations are necessary in order to gain base areas suitable for the ultimate offensive against Japan.

The reopening of the Burma road is also recognized as a proper necessary step in sustaining China. There is also a recognized need for land-based aviation for the defense of Alaska, the Island Chain to Australia, and Australia itself. Hence provision is made for all the land-based medium and heavy bombers considered necessary for the air support of the U.S. Navy and Army in the conduct of amphibious operations from Australia as a base, for the support of United Nations land forces operating from India and China as bases, and for the defense of Alaska, Hawaii, the Island Chain, and Australia.

Adequate fighter forces (land-based) are also provided. It is anticipated that considerable land-based dive bomber forces will be provided by the U.S. Marine Corps, and that adequate carrier forces will be provided by the U.S. Navy.

North Pacific

The air forces in Alaska and the Aleutian Islands are primarily for defensive operations. A strong reconnaissance unit for employment over the water has been provided and a striking force of heavy and medium bombardment is made available to attack any targets located. A single fighter group to furnish defense for the key bases is also provided. One transport group is required to insure that communications are maintained. The weather in this theater is definitely a limiting factor and seriously curtails operations.

Central Pacific

(Includes Midway, Hawaiian Islands, Johnston, Palmyra and Christmas)

Hawaii is the main base of the U.S. Fleet west of the continental United States and its security is of primary importance. For this reason a strong air force balanced between local defense forces and reconnaissance and striking units has been provided. The necessity for insuring the security of the advanced base at Midway and of the islands on the line of communication to Australia also demands a considerable force for these bases. Some aircraft for the direct support of the ground forces has been included in order that these ground units may operate at maximum efficiency. A part of the long range aircraft of this area are considered as available to support the North and South Pacific.

South Pacific

(Includes Canton, Bora Bora, Tutuila, Upolu, Savaii, Wallis, Viti Levu, Tonga Tabu, New Caledonia, Efate, Espiritu Santu, Guadalcanal, New Zealand)

If the line of communication from Hawaii to Australia is to be maintained, the individual bases scattered from the equator near Christmas Island to New Caledonia must be retained. To accomplish this purpose, air forces of two types have been supplied: first, local forces to provide

fighter protection, short range reconnaissance, and close support bombing; second, a long range, mobile force capable of moving rapidly along the island chain to search out and attack in some strength any enemy units which may threaten our lines of communication.

These long range forces obviously serve to supplement our naval surface forces in the area and form a reserve for employment in the Central or Southwest Pacific.

Southwest Pacific

In this area it is necessary to provide an air force for defensive as well as for offensive operations. Contact with the enemy is continuous and the enemy is especially active. Units have been provided for a local defense at several points, for direct support of the ground forces, for direct support of naval forces and for operations of strategic nature. In addition the extremely long distances involved and scarcity of surface transportation make communication and supply such a major problem that a large number of transport aircraft have been furnished. Shortage of air base facilities at the proper places will limit the number of aircraft that can be brought to bear on the enemy. However, since the action is continuous it is believed advisable to provide sufficient units to permit relief and rotation of organizations at frequent intervals. Logistic difficulties will develop due to distance from supply sources but these will have to be overcome by use of air transport and by construction of supply depots where required.

Pacific Attack Forces

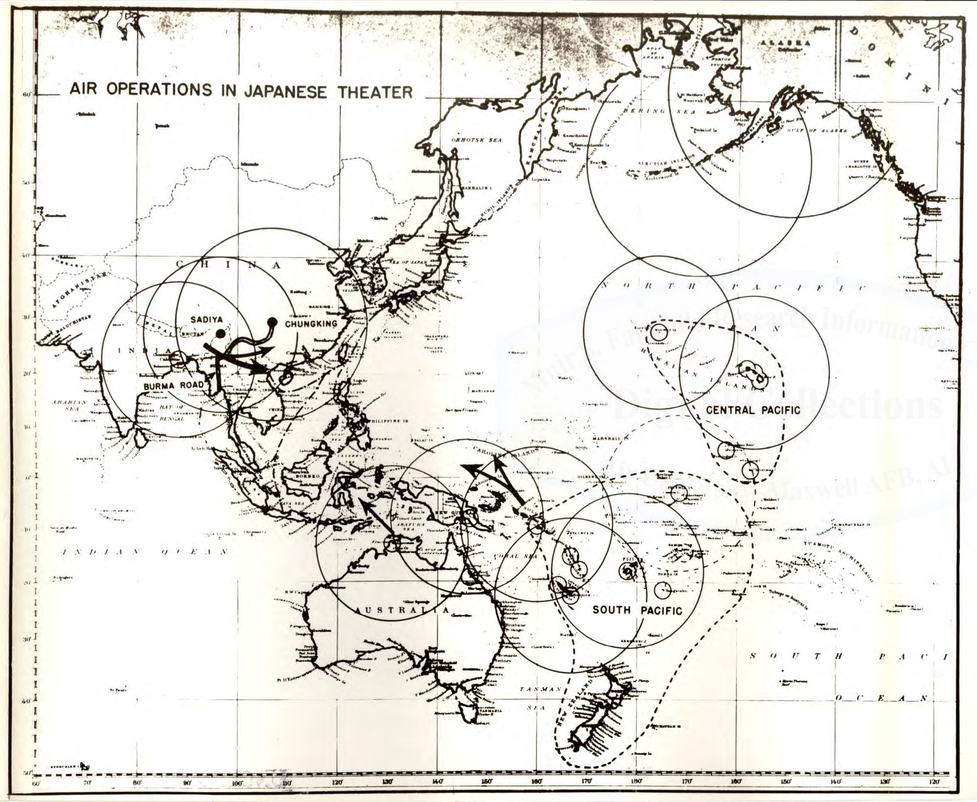
For the seizure of air and naval bases and for support of surface forces, particularly of the naval forces, a mobile organization is required. Such a requirement has been set up by the U.S. Navy in its plans for April 1944. The Heavy and Medium bombers needed for this force are provided by the Army Air Forces.

India - Burma - China - Ceylon

In this theater operation will be jointly conducted by the British and Chinese ground forces with the possible assistance of a small contingent of U.S. Army troops. Air support will come principally from the U.S. and British air units with a small amount of aid from the Chinese Air Force. A major ground effort is required to reopen the Burma Road and adequate air support is mandatory. In view of the difficult terrain and lack of communications, great dependence must be placed in air transport.

Eastern Siberia

The availability of Eastern Siberia as a base is highly questionable. However, the forces required there should be provided for, in case it does become possible to exploit such an advantage. Eastern Siberia is suitable as an air base for strategic bombing of Japan. The offensive portion of this force is covered elsewhere in the paper but it will be necessary to move in a ground and air defensive force capable of supporting the strategic bombardment units. For this reason air units should be prepared to exploit this advantage of position. Japanese retaliatory measures, both ground and air may be expected and the joint U.S. and Russian forces must be strong enough to prevent loss of the air bases within range of Honshu. A maximum amount of air transport must be furnished to insure logistic support. Since Russian forces will probably fight alongside the U.S. troops and form the bulk of the ground forces, and since supply of aircraft from European sources will no doubt be severed, we must plan to provide all the aircraft to be used in this theater.



AIRCRAFT REQUIREMENTS

North Pacific	U.S. Army	U.S. Navy
Heavy Bombers	48	
Medium Bombers	32	
Fighters Day Single Seat	100	
Patrol Bomber Boat Medium		72
Patrol Bomber Land Light 1 Eng - Incl VSO		24
Transports	52	
Total	232	96

Central Pacific	U.S. Army	U.S. Navy
Heavy Bombers	96	
Medium Bombers	64	
Light Bombers		48
Scout Dive Bombers	72	42
Observation	126	
Fighters Day Single Seat	350	72
Fighters Night Multiseat		12
Patrol Bomber Boat Heavy		72
Patrol Bomber Boat Medium		24
Patrol Bomber Land Light 2 Eng		24
Patrol Bomber Land Light 1 Eng Incl VSO		30
Transport	52	12
Total	760	336

South Pacific	U.S. Army	U.S. Navy	RNZAF
Heavy Bombers	48		
Medium Bombers	16		
Light Bombers		24	
Scout/Dive Bombers	96	40	40
Observation Army and Fleet Coop	42		72
Fighters Day Single Seat	300	72	126
Fighters Night Multiseat		12	
Patrol Bomber Boat Heavy		24	
Patrol Bomber Land Light 2 Eng			81
Patrol Bomber Land Light 1 Eng (Incl VSO)		48	12
Transports	26	8	
Total	528	228	331

Southwest Pacific	U.S. Army	U.S. Navy	RAAF	NEI
Heavy Bombers	240			
Medium Bombers	192			18
Scout/Dive Bombers	192		216	
Torpedo Bombers			72	
Observation and Army and Fleet Coop	168		116	
Fighters Day and Single Seat	600		288	24
Photo	52			
Fighters Day Multiseat			168	
Patrol Bombers Boat Medium		36	45	
Patrol Bombers Land Light 2 Eng			126	
Transports	312		81	
Total	1758	36	1111	42

Pacific Attack Forces	U.S. Army	U.S. Navy
Heavy Bombers	144	
Medium Bombers	128	
Light Bombers		24
Scout/Dive Bombers		362
Observation		36
Fighters Day Single Seat	300	447
Fighters Night Multiseat		36
Photo	52	24
Patrol Bomber Boat Heavy		48
Patrol Bomber Boat Medium		180
Transports	52	108
Total	676	1255

India - Burma - China - Ceylon	U.S. Army	British	Chinese
Heavy Bombers	96	18	
Medium Bombers	128	36	64
Light Bombers	64	198	
Scout/Dive Bombers		28	
Torpedo Bombers		80	
Observation		28	
Photo	52		
Fighters Day Single Seat	300	288	150
Fighters Day Multiseat		72	
Patrol Bomber Boat Medium		108	
Patrol Bomber Land Medium		40	
Patrol Bomber Land Light 2 Eng		60	
Transports	312	100	
Total	952	1056	214

Reserve Force for Eastern Siberia	U.S. Army	Russia
Medium Bombers	128	100
Light Bombers	64	50
Scout/Dive Bombers	96	100
Observation	84	80
Photo	52	
Fighters Day Single Seat	600	600
Transports	26	100
Total	1050	1000

RECAPITULATION

	U.S. Army	U.S. Navy	British RAAF RNZAF	China NEI Russia	Total
Heavy Bombers	672		18		690
Medium Bombers	688		36	182	906
Light Bombers	128	96	198	50	472
Scout/Dive Bombers	456	454	284	100	1274
Torpedo Bombers			152		152
Observation	420	36	216	50	721
Fighters Day Single Seat	2550	591	702	774	4617
Fighters Day Multiseat			240		240
Fighters Night Multiseat		60			60
Photo	208	24			232
Patrol Bomber Boat Heavy		144			144
Patrol Bomber Boat Medium		312	153		465
Patrol Bomber Land Medium			40		40
Patrol Bomber Land Light 2 Eng		24	247		271
Patrol Bomber Land Light 1 Eng		102	12		114
Transports	832	128	181	100	1241
Total	5954	1951	2478	1256	11639

Tab B–4–*b*

Air Operations—Far East—2d Phase—Air Offensive

Tab B–4–*b*, Air Operations—Far East—
2d Phase—Air Offensive

JAPANESE THEATRE — SUMMARY OF SYSTEMS

TARGET SYSTEMS

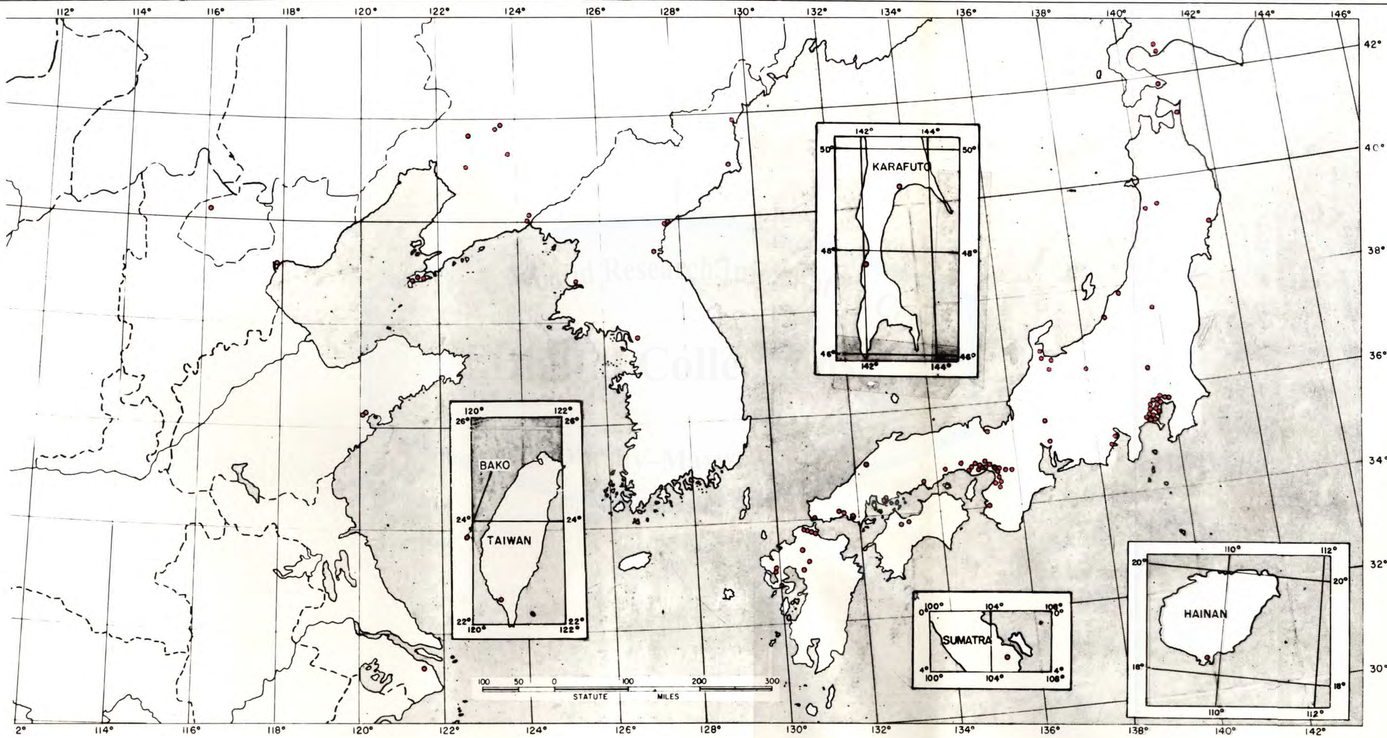
Appendix	System of Targets	Number of Targets	Percentage of Total Production Represented by Targets
J I	Aircraft and Engines	14	78.1
J II	Submarine Yards	5	100
J III	Naval and Commercial Bases	20	99.2 (Naval) 92.7 (Commercial)
J IV	Alumina and aluminum	20	100 (Alumina) 77.1 (Aluminum)
J V	Iron and Steel	21	100 (Iron) 94.3 (Steel)
J VI	Oil	15	87
J VII	Chemicals	14	--
J VIII	Rubber	14	100
	Total Number of Targets	123	

NOTES:

1. The systems are arranged in the order in which it is suggested they be attacked.
2. The first system relates to the Japanese Air Force and is a combination of aircraft assembly and air engine plants. The destruction of the 14 targets named would reduce the aircraft building program of Japan's to such a figure that she would be unable to support her Air Force for very long.
3. The second system relates to the Submarine Yards, which are few in number and small in size.
4. The third system relates to Naval and Commercial Bases, which covers ship building yards, repair yards, docks, ports and concentrations of shipping. It is considered that shipping is one of the most important items in the Japanese war program and for that reason an extremely heavy scale of attack is proposed against these objectives. The heavy interference in transportation which would result from successful attacks on shipping and ship yards would render Japan impotent to continue her war effort more rapidly than any of the individual remaining industrial objectives
5. The fourth group - Alumina and Aluminum - are of paramount importance to Japan, particularly in respect to her aircraft industry and the destruction of the plants proposed would have an immediate effect upon that industry.
6. The fifth group - Iron and Steel - are also of great importance to Japan and the destruction of the various plants proposed would have a great effect on her war effort. This industry can also be attacked indirectly by heavy attacks on shipping and transportation.
7. The three remaining systems - Nos. VI, VII and VIII - represent the three next most important industrial systems required for the Japanese war effort and the complete destruction of the various targets would have an immediate reaction thereon.
8. There is no doubt that if the targets included in these systems were successfully destroyed the effect would be decisive and Japan would be unable to continue her war effort.

SECRET

LOCATION OF TARGETS



BOMBER FORCE REQUIRED

Appendix	System of Targets	Total Number Sorties Required (In terms of B 17e sorties)	Operation Bomber Force Required B 17e	Operation Bomber Force Required B29	Total Bomber Force Required B17e	Total Bomber Force Required B29
J I	Aircraft and Engines	4,800	66	10	88	14
J II	Submarine Yards	1,260	14	4	19	6
J III	Naval and Commercial Bases	22,440	298	46	397	62
J IV	Alumina and Aluminum	2,760	37	6	49	8
J V	Iron and Steel	9,060	118	19	158	25
J VI	Oil	7,920	105	16	140	21
J VII	Chemicals	1,920	27	3	36	4
J VIII	Rubber	1,320	19	3	25	4
	TOTAL	51,480	684	108	912	144
			792		1056	

BOMBER FORCE

	B 17e's	B 29's
Number of Groups	19	3
Number of Bombers per Group	48	48
Total Number of Bombers in class	912	144
Total Number of Bombers	1056	
Number of Operational Bombers (i.e. less approx. 25%)	684	108
Total Number of Operational Bombers	792	

NOTES:

1. In calculating the number of bombers required to make a given number of sorties on a target area, one B 29 has been taken as equal to three B 17e sorties.
2. The number and weight of bombsss required to be dropped on each target have been calculated according to the vulnerability and area of the target. They vary between 300 lbs. and 1000 lb. bombs.
3. The prosecution of this complete plan involves the dropping of about two hundred nine million (209,000,000) pounds of bombs.
4. This plan is to be carried out in a period of six (6) months during which sixty (60) days should be favorable for operations.

[redacted]

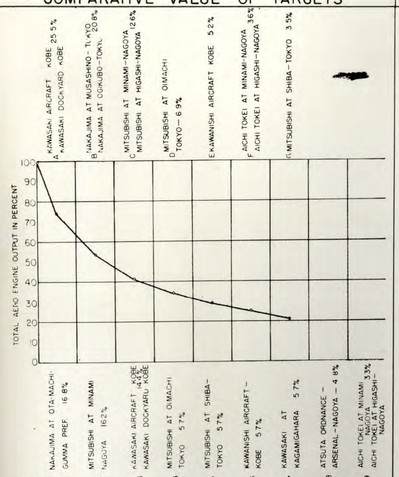
Japanese Summary

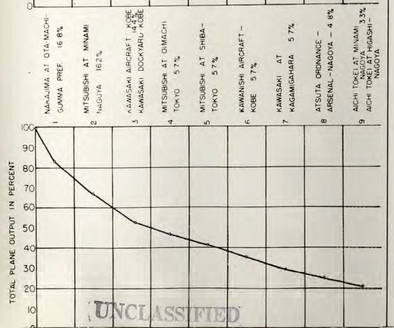
LIST OF TARGETS

No.	Name and Location	Monthly Capacity Planes	Percent Total	Monthly Capacity Engines	Percent Total
1.	Kawasaki Aircraft - Kobe	1,300	14.4	4,400	25.5
2.	Kawasaki Dockyard - Kobe				
3.	Mitsubishi - Minami Ku - Nagoya	1,605	16.2	2,170	12.6
4.	Mitsubishi - Higashi Ku - Nagoya				
5.	Nakajima - Musashino - Tokyo	-	-	3,600	20.8
6.	Nakajima - Ogikubo - Tokyo	-	-		
7.	Mitsubishi - Oimachi - Tokyo	600	5.7	1,200	6.9
8.	Kawanishi - Kobe	600	5.7	900	5.2
9.	Nakajima - Ota	1,790	16.8	-	-
10.	Mitsubishi - Shiba - Tokyo	600	5.7	600	3.5
11.	Aichi Tokei - Minami Ku - Nagoya	340	3.2	600	3.4
12.	Aichi Tokei - Higashi Ku - Nagoya				
13.	Kawasaki - Kagamigahara	600	5.7	-	-
14.	Atsuta Ordnance Arsenal - Nagoya	500	4.8	-	-
	Total Above	8,135	77.2	13,470	77.1
	All Others	2,520	22.8	4,020	22.2
	Total All	10,655	100.0	17,490	100.0

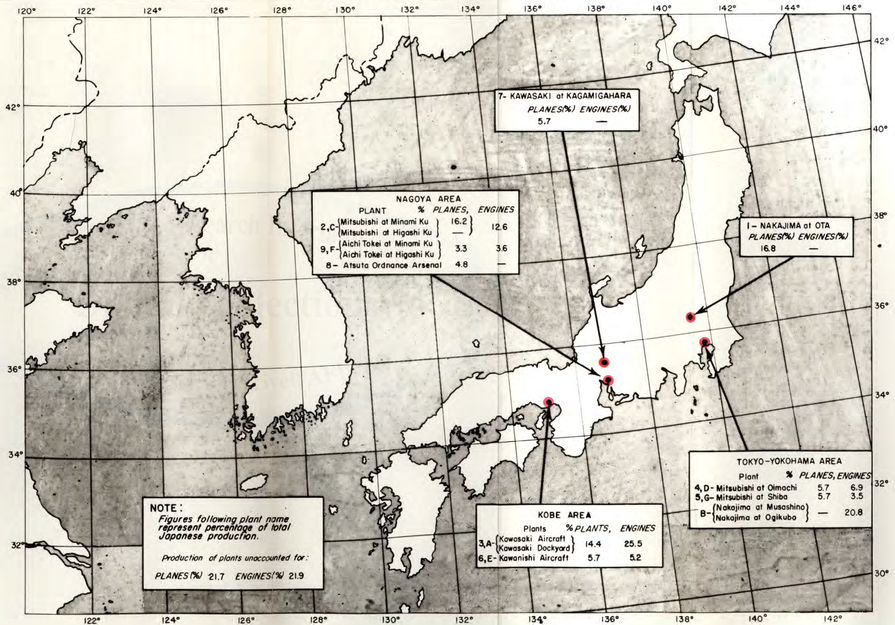
SECRET: In establishing the foregoing priorities, principal weight has been given to engine production. Reliable sources indicate a minimum of 600 factories in Japan producing aircraft, engines and/or parts. In addition, plants at Hoten (Manchukuo) and Seijo (Korea) should be considered as important contributors. On this basis, total Japanese plane production is roughly estimated at about 10,000, with engines at 17,000. Taking the reasonable assumption that the aircraft industry is given top priority in the matter of skilled labor and raw materials, plane output could run to 12,000-15,000 per annum. Destruction of the indicated targets would eliminate 77.1% of Japan's plane and 77.1% of her engine production, as indicated elsewhere in this report, the vulnerability of Japan's aluminum industry by reason of the concentration of alumina production (10 targets) constitutes a principal key to the destruction of her aircraft industry.

COMPARATIVE VALUE OF TARGETS





LOCATION OF TARGETS



BOMBER FORCE REQUIRED

1. DESCRIPTION OF TARGETS

An aircraft assembly plant usually comprises several buildings fairly widely dispersed around a factory airfield. In Japan, however, pursuit planes, bombers, and aircraft engines are usually all three manufactured in different portions of the same plant. The aircraft engine manufacturing portion usually comprises an ordinary engineering works with foundry, pressing shop, machine shop, etc. The layout of this complex of plants varies so considerably that it is not possible to give any average figure for size.

2. NUMBER OF DIRECT HITS AND TYPES OF BOMBS REQUIRED

It is considered that at least six (6) direct hits with 300 lb. bombs are required on each of the main buildings in order to cause effective destruction. The number of aiming points has been worked out according to the total size of the plants.

3. NUMBER OF SORTIES AND BOMBER FORCE REQUIRED

Based upon detailed calculations taking into account all operational factors involved in making attacks against highly defended targets with appropriate allowances for probabilities, aiming errors, losses, etc., etc., allowing for the fact that in the aircraft assembly portions of the plant, repeat attacks will be required, it appears that it will be required to have a total number of:-

4,800 SORTIES

In order to carry out these sorties in sixty (60) operational days, a force of:-

10 - B-29's and
66 - B 17e's

must be set up.

JAPANESE THEATRE APPENDIX JII—SUBMARINE YARDS

LIST OF TARGETS

No.	Name and Location	No. of Submarines Built	Percent of Known Total
1.	Mitsubishi - Kobe	26	36 %
2.	Kawasaki - Kobe	18	25
3.	Sasebo Navy Yard - Sasebo	11	15
4.	Kure Navy Yard - Kure	9	13
5.	Yokosuka Navy Yard - Yokosuka	8	11
	TOTAL	72	100 %

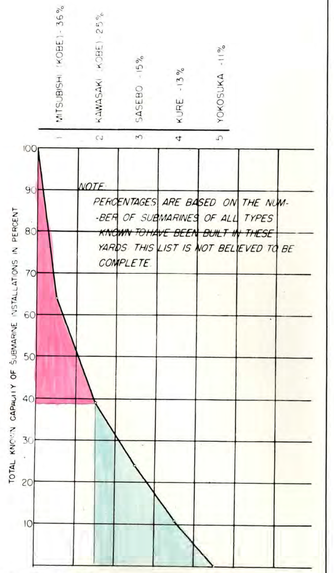
SUMMARY: This tabulation shows the number of submarines known to have been built in these shipyards from 1925 to date. No information is available concerning the number of submarines constructed in other yards. However, it may be assumed that all primary Japanese shipyards (naval and commercial) are equipped to construct submarines. For this reason, submarine shipyards alone are not to be considered among the high priority objectives in the Japanese Empire, but are to be considered in conjunction with naval bases and shipyards in general, covered in a separate section of this report.

SUBMARINE BASES

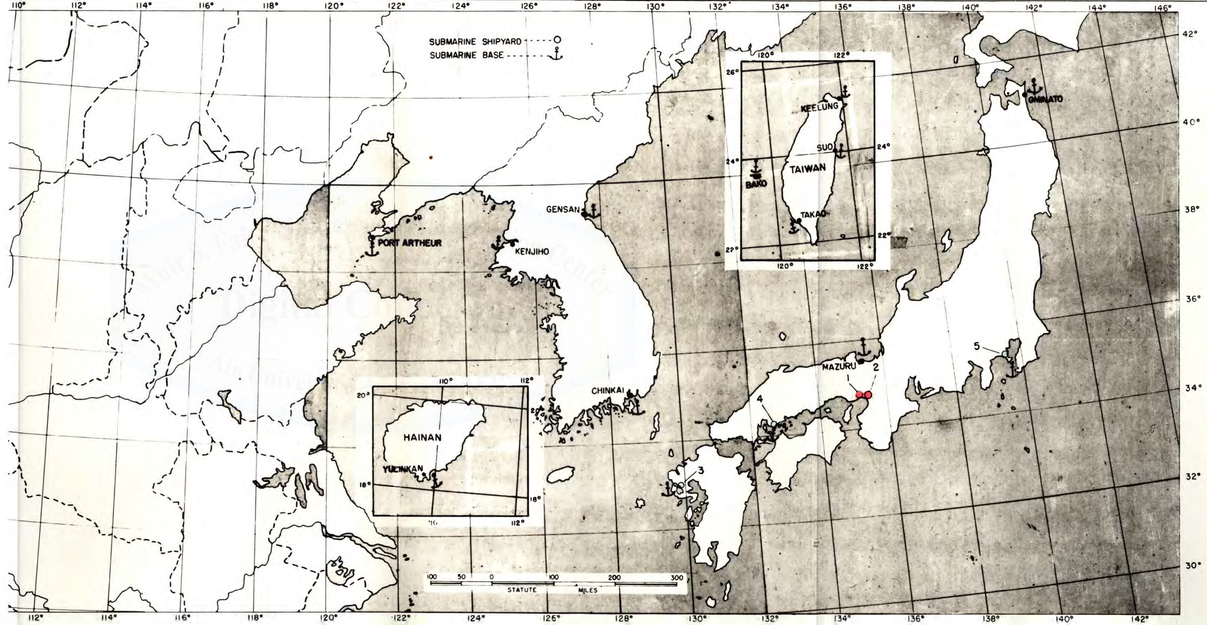
Information concerning submarine bases is too inadequate to permit of a complete listing. The known bases in Japan and along the adjacent coastline are shown on the accompanying map.

Other submarine bases are known to be located in the Japanese Mandated Islands, as well as in Japan's recently occupied territories, with definite locations for attack purposes to be established through local reconnaissance.

COMPARATIVE VALUE OF TARGETS



LOCATION OF TARGETS



BOMBER FORCE REQUIRED

1. DESCRIPTION OF TARGETS

The main target comprises the slipways upon which submarines are built. The primary aim is to destroy the submarines themselves. However, it is also desirable to destroy the shipyard facilities, including the cranes, gantries, workshops, etc., if possible.

2. NUMBER OF DIRECT HITS AND TYPE OF BOMBS REQUIRED

In order to effectively destroy both submarines and shipyard facilities, it is considered that the weight of attack should be such that not less than fifty (50) direct hits are obtained within the aiming point area of 1000' by 1000'. The construction of submarines and shipyards is such that it is considered that bombs of at least 1,000 lbs. will be required.

3. NUMBER OF SORTIES AND BOMBER FORCE REQUIRED

Based upon detailed calculations taking into account all operational factors involved in making attacks against highly defended targets with appropriate allowances for probabilities, aiming errors, losses, etc., etc. and allowing for the fact that with the very heavy weight of attack proposed, the destruction will be so considerable that no further attacks will be found necessary within a six month period, it appears that it would be necessary to have:-

1,260 SORTIES

In order to carry out these sorties in sixty (60) operational days, a force of:-

4 - B 29's and
14 - B 17e's

must be set up.

JAPANESE THEATRE APPENDIX JIII-NAVAL AND COMMERCIAL BASES

LIST OF TARGETS

No.	NAVY YARDS Name and Location	Building Capacity (a)	Repair Capacity (a)	Combined B/R Capacity	Target Priority
A.	Kure, Japan	28.0 %	26.4 %	27.2 %	1
B.	Yokosuka, Japan	26.2	20.7	23.5	2
C.	Sasebo, Japan	19.3	27.2	23.3	5
D.	Maizuru, Japan	15.0	12.8	13.9	6
E.	Port Arthur, Manchuria	7.6	6.4	7.0	10
F.	Ominato, Japan	2.5	2.2	2.4	13
G.	Bako, Pescadores	1.2	2.6	1.9	16
	(All others)		1.6	0.8	
	TOTAL	99.7 %	99.9 %	100.0 %	

No.	COMMERCIAL YARDS Name and Location	Building Capacity (b)	Repair Capacity (a)	Combined B/R Capacity	Target Priority
1.	Nagasaki, Jap. (2 yds.)	25.0 %	6.6 %	16.1%	3
2.	Kobe, Japan (2 yds.)	22.0	6.2	14.4	4
3.	Osaka, Japan (6 yds.)	8.0	17.2	12.6	8
4.	Yokohama, Jap. (2 yds.)	12.1	9.4	10.8	7
5.	Okayama, Japan	12.2	5.1	8.7	9
6.	Shanghai, China	-	11.0	6.5	11
7.	Harima, Japan.	11.0	1.8	6.4	12
8.	Innoshima, Japan	3.3	9.0	6.2	14
9.	Hiko Shima, Jap.(2 yds.)	-	6.3	3.2	15
10.	Taku, China	-	4.3	2.2	17
11.	Onomichi, Japan	-	4.1	2.1	18
12.	Dairen, Manchuria	-	3.5	1.8	19
13.	Hakodate, Japan	0.9	2.8	1.7	20
	(All others)	4.5	9.8	7.3	
	TOTAL	99.0 %	99.1 %	100.0%	

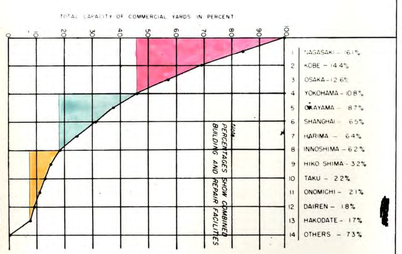
SUMMARY: Japan's annual potential shipbuilding capacity (both naval and commercial vessels) is estimated to be 800,000 gross tons. Of this, about 250,000 tons may be alloted to navy yards and 550,000 tons to commercial yards. It must be noted, however, that the large commercial yards are important builders of all classes of naval vessels.

In the assignment of priorities among the shipyards, equal weight has been given to merchant and naval tonnage as well as to building and repair facilities. Finally, certain qualitative factors, not shown in the statistics above, have influenced the over-all priorities.

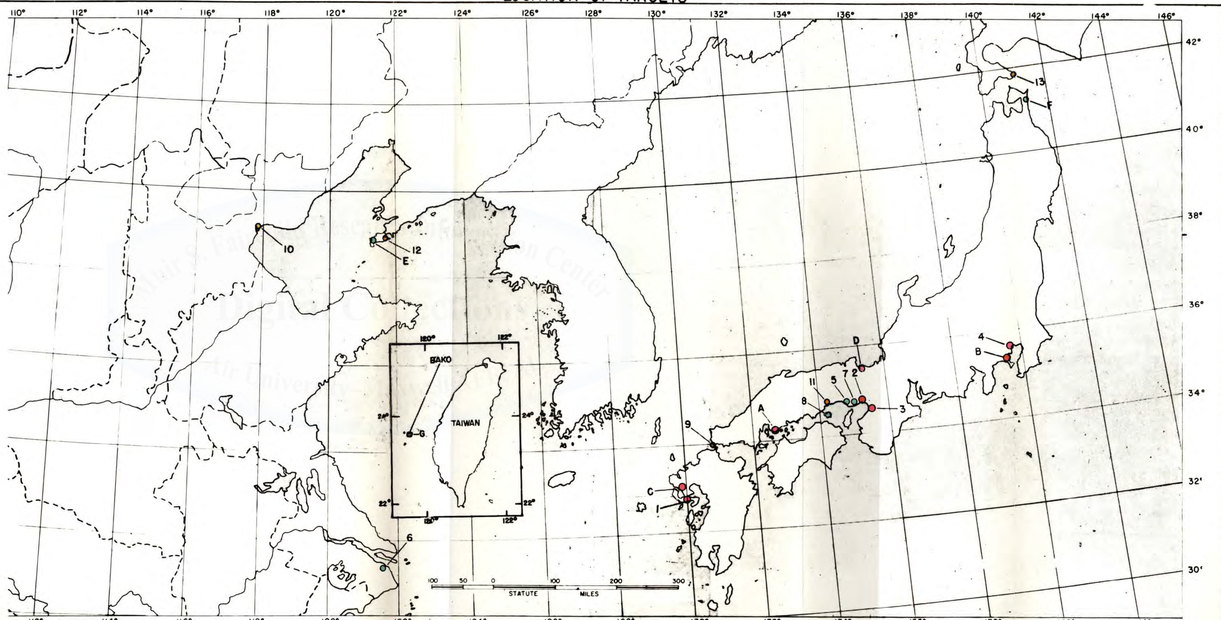
NOTE: Due to the lack of current data, such important yards as those at Soerabaja, Hong Kong, Singapore and Cavite have been omitted from this report.

(a) Percentage based on total footage of ways or docks.
(b) Percentage based on deadweight tonnage.

COMPARATIVE VALUE OF TARGETS



LOCATION OF TARGETS



BOMBER FORCE REQUIRED

1. DESCRIPTION OF TARGETS

The shipbuilding yards comprise slipways, floating docks, cranes, gantries, machine shops, work shops, etc., etc. The plant layout varies so considerably that no reliable figures can be given for areas.

2. NUMBER OF DIRECT HITS AND TYPE OF BOMBS REQUIRED

In order to do effective damage both to the shipping under construction and the various shipyard facilities and work shops, it is considered that a heavy weight of attack should be made such that not less than 50 - 1000 lb. bombs fall within an area of 1000' by 1000'. Due to the dispersed nature of these targets, several aiming points varying from two to ten will be required to be taken for each of the various targets.

3. NUMBER OF SORTIES AND BOMBER FORCE REQUIRED

Based upon detailed calculations taking into account all operational factors involved in making attacks against highly defended targets with appropriate allowances for probabilities, aiming errors, losses, etc., etc., it appears that in order to make effective attacks upon the twenty (20) shipyards included above, it will be necessary to fly:-

22,440 SORTIES

In order to carry out these sorties in sixty (60) operational days, a force of:

46 - B 29's and
298 - B 17e's

must be set up.

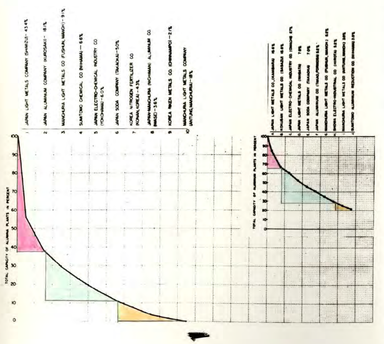
JAPANESE THEATRE APPENDIX J IV — ALUMINA AND ALUMINUM PLANTS

LIST OF TARGETS

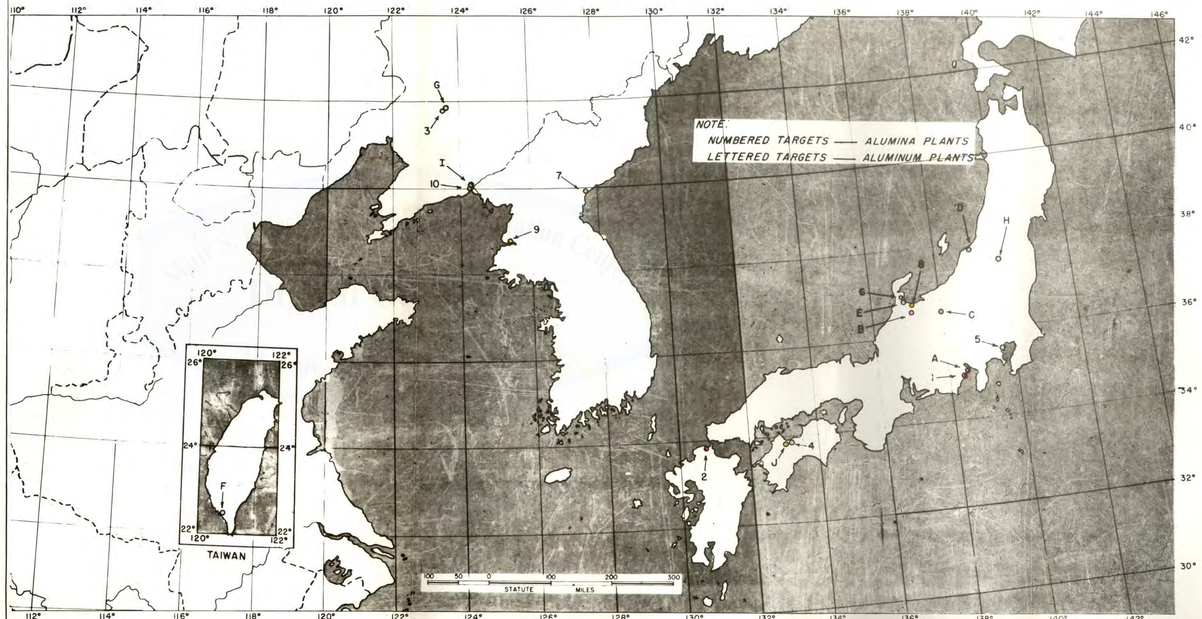
No.	Name and Location	Annual Capacity (tons)	Percent Japan Total
	PRINCIPAL ALUMINA PLANTS		
1.	Japan Light Metals Company (Shimizu)	120,000	43.4
2.	Japan Aluminum Company (Kurosaki)	50,000	18.1
3.	Manchuria Light Metals Co. (Fushun, Manchukuo)	25,000	9.1
4.	Sumitomo Chemical Co. (Niihama)	18,000	6.6
5.	Japan Electro-Chemical Industry Co. (Yokohama)	16,680	6.0
6.	Japan Soda Company (Takaoka)	13,900	5.0
7.	Korea Nitrogen Fertilizer Co. (Konan, Korea)	12,000	4.3
8.	Japan-Manchuria (Nichiman) Aluminum Co. (Iwase)	10,000	3.6
9.	Korea Riken Metals Company (Chinnampo)	6,000	2.1
10.	Manchuria Light Metals Co. (Antung, Manchukuo)	5,000	1.8
	TOTAL	276,580	100.0 %
	PRINCIPAL ALUMINUM PLANTS		
A.	Japan Light Metals Co. (Kambara)	36,000	15.6
B.	Kokusan Light Metals Co. (Sasasu)	36,000	15.6
C.	Japan Electro-Chemical Industry Co. (Omachi)	20,000	8.7
D.	Japan Light Metals Co. (Niigata)	18,000	7.8
E.	Japan Soda Co. (Takaoka)	16,000	7.0
F.	Japan Aluminum Co. (Takao, Taiwan)	12,000	5.2
G.	Manchuria Light Metals Co. (Fushun, Manchukuo)	12,000	5.2
H.	Showa Electro-Industrial Co. (Hirota)	12,000	5.2
I.	Manchuria Light Metals Co. (Antung, Manchukuo)	9,000	3.9
J.	Sumitomo Aluminum Reduction Co. (Niihama)	9,000	3.9
	TOTAL	180,000	77.1 %

SUMMARY: Strategic importance derives from accepted dependence of aircraft output upon aluminum capacity. In the case of Japan, the basic alumina is produced at a few large plants and distributed to only a moderately more dispersed group of aluminum reduction plants for conversion into metal. Key targets are thus the alumina plants, particularly vulnerable to air attack and difficult to repair. Their destruction would halt all aluminum production. Most alumina plants are located at harbor points to receive vital supplies of Netherlands East Indies and Malayan bauxite, so that nearby ships also lend themselves to air attack. Several alumina plants are components of large chemical works, making their destruction doubly important.

COMPARATIVE VALUE OF TARGETS



LOCATION OF TARGETS



BOMBER FORCE REQUIRED

1. DESCRIPTION OF TARGETS

The layout of alumina and aluminum plants can vary considerably. It consists essentially of grinding plants, gas producing plant and gas holders, calcining furnaces, precipitation plant, etc. The alumina plants are more vulnerable to attack than the aluminum plants.

2. NUMBER OF DIRECT HITS AND TYPE OF BOMBS REQUIRED

In view of the fact that some of the plant involved is of heavy and some of light construction, it is considered that these targets can best be attacked by using a mixture of 500 lb. and 300 lb. bombs. For purposes of calculation it has been assumed that the weight of attack should be such that not less than twenty (20) 500 lb. bombs and sixty (60) 300 lb. bombs should fall within an aiming point area of 1000' by 1000'.

3. NUMBER OF SORTIES AND BOMBER FORCE REQUIRED

Based upon detailed calculations taking into account all operational factors involved in making attacks against highly defended targets with appropriate allowances for probabilities, aiming errors, losses, etc., etc., it appears that in order to effectively destroy the twenty (20) targets included in the system, it would be necessary to have:-

2,760 SORTIES

In order to carry out these sorties in sixty (60) operational days, a force of:-

6 - B 19's and
37 - B 17e's

must be set up.

JAPANESE THEATRE APPENDIX V—IRON AND STEEL

LIST OF TARGETS

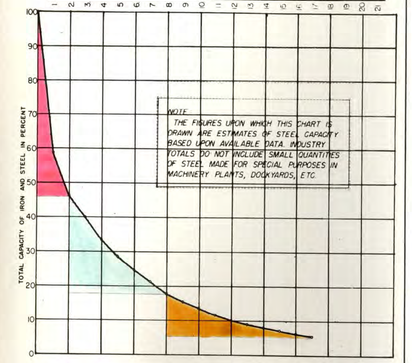
No.	Name and Location		Annual Capacity (000 tons) Pig Iron	%	Steel	%
1.	Imperial Iron & Steel	Yawata	2,080	21.0	3,190	41.3
2.	Showa Steel	Anshan, Manchukuo	1,700	17.2	1,000	12.5
3.	Japan Steel Tube Co.	Kawasaki	490	5.0	526	6.5
4.	Hirohata Iron & Steel	Himeji	700	7.0	500	6.2
5.	Kawasaki Dockyard	Kobe	-	-	432	5.0
6.	Imperial Iron & Steel	Wanishi, Muroran	1,150	11.6	300	3.7
7.	Imperial Iron & Steel	Kamaishi	522	5.3	290	3.6
8.	Kobe Steel Works	Kobe	750	7.6	282	3.5
9.	Tsurumi Iron & Steel	Tsurumi	160	1.6	187	2.3
10.	Kokura Steel Works	Kokura	130	1.3	143	1.8
11.	Osaka Steel Works	Osaka	-	-	146	1.8
12.	Nakayama Steel Works	Osaka	350	3.5	137	1.7
13.	Imperial Iron & Steel	Kenjiho, Korea	477	4.3	97	1.1
14.	Sumitomo Steel Works	Shimaycho	-	-	73	.9
15.	Nippon Seikojo	Muroran	-	-	77	.9
16.	Fuji Steel Works	Kawasaki	122	1.2	65	.8
17.	Sumitomo Steel Tube	Amagasaki	-	-	57	.7
18.	Honkeiko Iron Works	Penhsihu, Manchukuo	590	6.0	-	-
19.	Seishin Iron Works	Seishin, Korea	350	3.5	-	-
20.	Otani Iron Works	Amagasaki	255	2.6	-	-
21.	Amagasaki Iron Works	Amagasaki	130	1.3	-	-
22.	All Others		91	-	998	5.7
		TOTAL	10,000	100.0	8,500	100.0

The output of steel products so vital to the Japanese war program might conceivably be attacked through operations directed---concurrently or alternatively---against (1) the flow of iron ore and coking coal, (2) the steel mills themselves, and/or (3) the factories making finished steel products. In accordance with the terms of the directive, the present report pertains only to the second of the three methods of attack.

The plants listed above include the most important iron and steel mills in Japan and Japanese-controlled territory, accounting for 95% or more of total capacity. Although detailed statistics on steel capacity have been closely guarded in recent years, the data presented above are believed reasonably accurate.

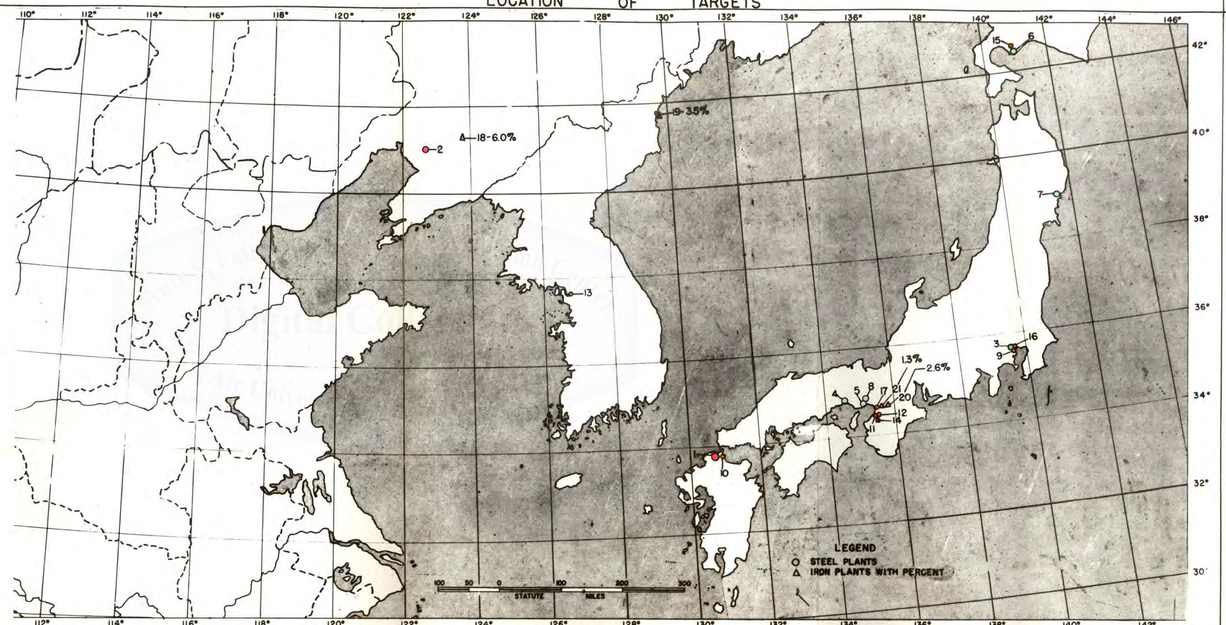
COMPARATIVE VALUE OF TARGETS

UNCLASSIFIED



UNCLASSIFIED

LOCATION OF TARGETS



BOMBER FORCE REQUIRED

1. DESCRIPTION OF TARGETS

The most important portion of these targets are the coke ovens, open hearth furnaces, and the blast furnaces. There is no standardized layout for this type of plant in Japan.

2. NUMBER OF DIRECT HITS AND TYPE OF BOMBS REQUIRED

In order effectively to destroy this type of target, it is considered that a heavy weight of attack is required, such as not less than one hundred (100) 500 lb. bombs to fall within the target aiming area of 1000' x 1000'. In the case of some of the larger plants, several target aiming points would be required.

3. NUMBER OF SORTIES AND BOMBER FORCE REQUIRED

Based upon detailed calculations taking into account all operational factors involved in making attacks against highly defended targets with appropriate allowances for probabilities, aiming errors, losses, etc., etc., it appears that in order effectively to attack the twenty-one (21) targets proposed in this system, it would be necessary to have a total of:-

9,060 SORTIES

In order to carry out these sorties in sixty (60) operational days, a force of:-

19 - B 29's and
118 - B 17s's

must be set up.

JAPANESE THEATRE APPENDIX J VI—OIL

LIST OF TARGETS

No.	Name and Location			Daily Capacity (bbls.)	Percent Japan Total
1.	Pladjoe Refinery	*	- Palembang	50,000	37.8
2.	Mitsubishi	* *	- Kawasaki	9,000	6.8
3.	Nippon	* *	- Tsurumi	7,000	5.3
4.	Ogura	* *	- Yokohama	7,000	5.3
5.	Nippon	*	- Kudumatsu	5,500	4.2
6.	Navy	* *	- Tokuyama	5,000	3.8
7.	Manshu	*	- Dairen	4,500	3.4
8.	"	*	- Amagasaki	4,000	3.0
9.	Nippon	*	- Akita	4,000	3.0
10.	Chosen	*	- Genzan	4,000	3.0
11.	Nippon	*	- Kashiwasaki	3,500	2.6
12.	Maruzen	* *	- Shimotsu	3,000	2.2
13.	Nippon	* *	- Niigata	3,000	2.2
14.	Hayama	* *	- Kawasaki	3,000	2.2
15.	Ogura	*	- Tokyo	3,000	2.2
			TOTAL	118,000	87.0

* Produce Aviation Gasoline

SUMMARY: Japan can obtain ample crude oil from The Netherlands East Indies but has only a small excess of refining capacity, which can easily be made the serious bottleneck in her petroleum position. Storage reserves are sufficient for at least one year, possible somewhat longer; but without refineries a sustained war effort is impossible.

Refineries are highly vulnerable to aerial attack, being easy to identify from the air, very susceptible to damage and requiring considerable time to repair. Since there are generally a large number of storage tanks clustered about each refinery, bombing of the latter automatically entails the destruction of a portion of Japan's reserve stocks.

Note particularly that Japanese refining capacity is concentrated in three areas:

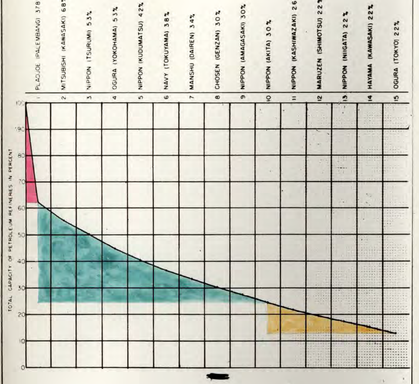
1. Palembang, Sumatra - 37.8 % of total capacity
2. Tokyo Bay Area (a) - 24.1 % of total capacity
3. Tokuyama, Kudumatsu, Hiroshima Area (b) - 11.1 % of total capacity

TOTAL 73.0 %

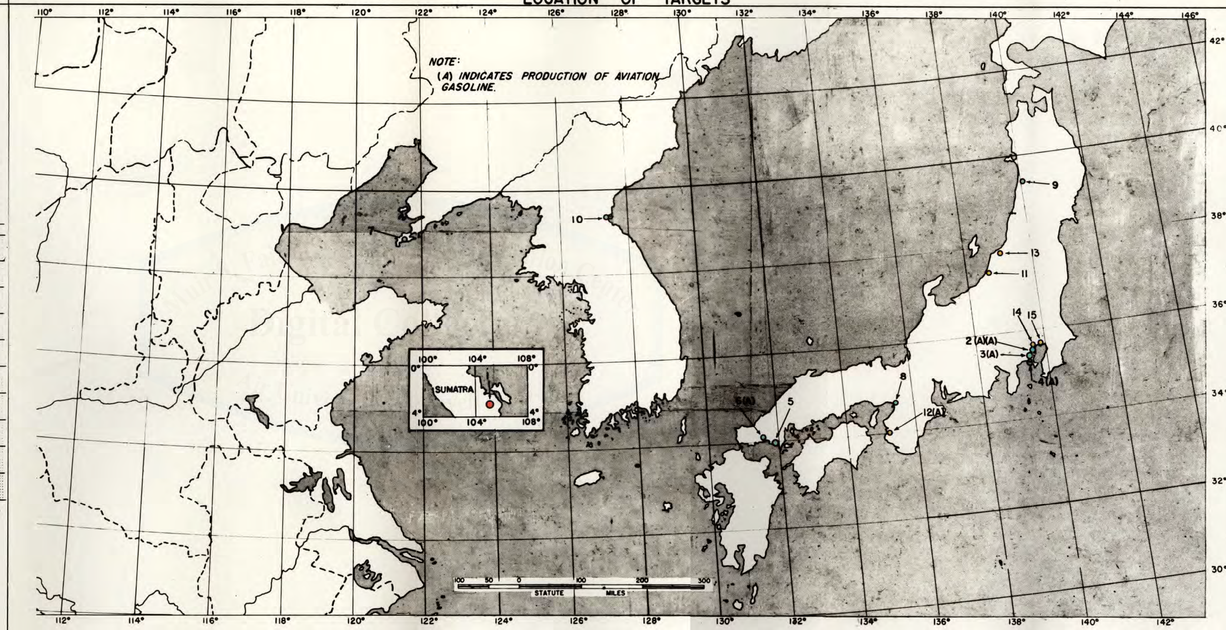
(a) Including three secondary refineries not listed in Target Schedule.

(b) Including two secondary refineries not listed in Target Schedule.

COMPARATIVE VALUE OF TARGETS



LOCATION OF TARGETS



BOMBER FORCE REQUIRED

1. DESCRIPTION OF TARGETS

Oil refineries embody a considerable number of component parts some of which are of very heavy construction, such as the thick walled vertical steel cracking chambers, etc. The main aim would be to destroy completely one of the groups of plants which constitute the bottleneck in the complete continuous process, as for example, the compressor house.

2. NUMBER OF DIRECT HITS AND TYPE OF BOMB REQUIRED

It is considered that at the least six (6) direct hits with 500 lb. bombs should be obtained on the selected aiming point, which would probably only have an area of about 200' by 100'. It follows that a heavy weight of attack is required upon an area of such small dimensions. As a result, many bombs aimed thereat would fall upon other portions of the plant.

3. NUMBER OF SORTIES AND BOMBER FORCE REQUIRED

Based upon detailed calculations taking into account all operational factors involved in making attacks against highly defended targets with appropriate allowances for probabilities, aiming errors, losses, etc., etc., it appears that in order to deal with the fifteen (15) plants suggested for this system, it will be necessary to have a total of:-

7,920 SORTIES

In order to carry out these sorties in sixty (60) operational days, a force of:-

16 - B 29's and
105 - B 17e's

must be set up.

JAPANESE THEATRE APPENDIX J VII—CHEMICALS

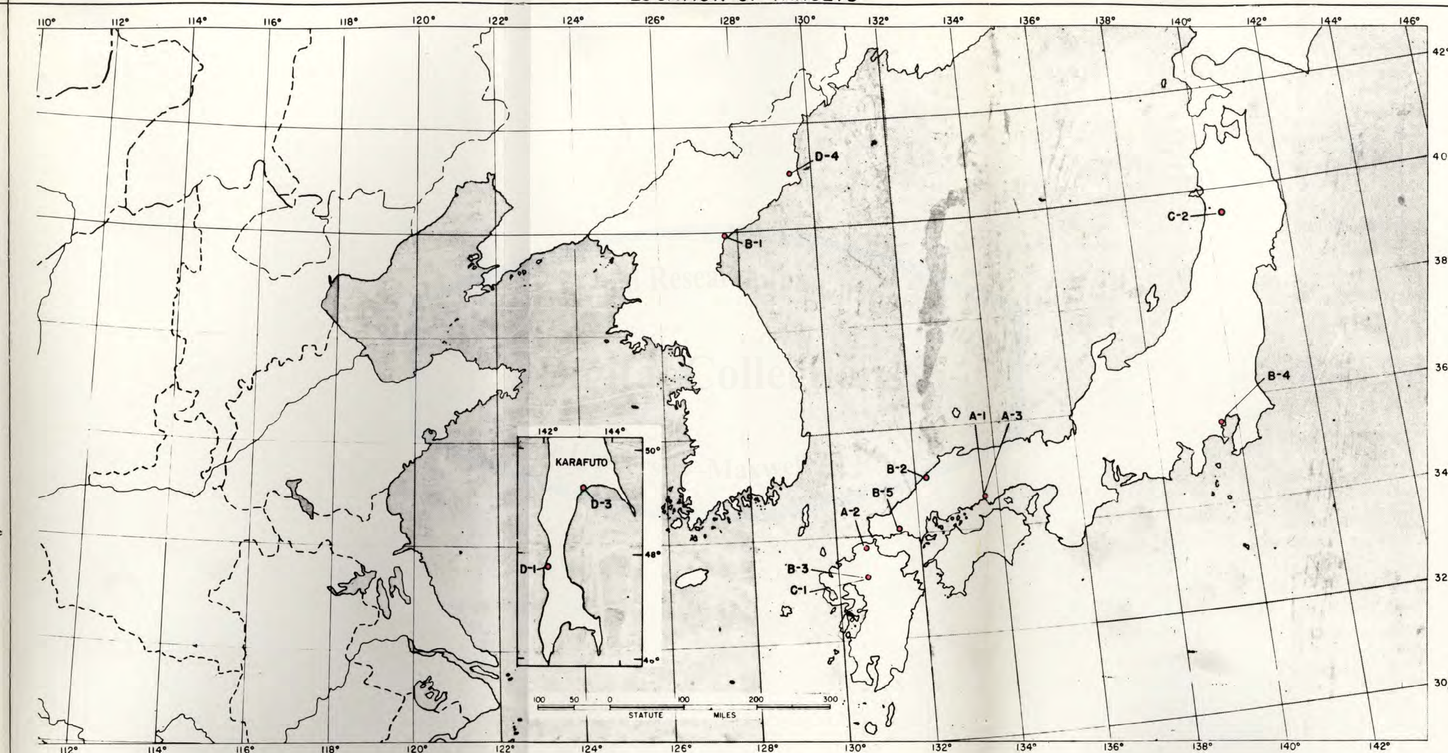
LIST OF TARGETS

No.	Name and Location		Annual Capacity (Met. Tons)	Percent Japan Total
	AMMONIA-SODA PLANTS (CAUSTIC SODA, ETC.)			
A-1	Tokuyama Soda Co.	- Tokuyama	111,000	25.8
A-2	Asahi Glass Co.	- Makiyama	111,000	25.8
A-3	Toyo Soda Industries, Ltd.	- Yamaguchi	55,500	12.9
			277,500	64.5
	NITROGEN FIXATION PLANTS			
B-1	Chosen Chisso Hiryo KK	- Konan (Korea)	104,000	13.3
B-2	Nippon Kasei Kogyo KK	- Kurosaki	85,500	10.9
B-3	Toyo High Pressure Co.	- Omuta	69,500	8.9
B-4	Showa Hiryo KK	- Kawasaki	69,000	8.9
B-5	Ube Chisso Kogyo KK	- Ube	64,000	8.1
			391,000	50.1
	ACETONE			
C-1	Denki Kagaku Kogyo KK	- Omuta	59,000	52.7
C-2	Showa Hiryo KK	- Kanose	20,000	17.9
			79,000	70.6
	CELLULOSE			
D-1	Oji Seishi KK	- 1) Noda (Karafuto)	60,000	21.4
D-2	Oji Seishi KK	- 2) Tomaye "		
D-3	Nihon Jinken Parupu KK	- Shikuka "	40,000	14.3
D-4	Hokuyo Seishi Kagaku KK	- Kisshu (Korea)	33,000	11.8
			130,000	47.5

SUMMARY: Diverse nature of the chemical industry does not lend itself to quantitative analysis in the establishment of target priorities—the various general groups of chemical products must be assigned somewhat arbitrary priorities. Japan is seriously deficient in supplies of (a) caustic soda, (b) nitric acid, (c) toluene, (d) acetone, and (e) cellulose. Caustic soda is essential for practically all heavy industrial chemical processes and deficiencies in this product would be most broadly felt, throughout Japanese industry. Because of this, Ammonia-Soda plants, the largest producers of caustic soda as well as other products vital to Japan's chemical industry are assigned top priority (A group). Other group priorities are assigned on the basis of relative contribution to the production of munitions and other war materials. Steel plants and petroleum refineries also yield important supplies of war and industrial chemicals (coke oven by-products, etc.), and are covered in other sections of this report.

[redacted]

LOCATION OF TARGETS



BOMBER FORCE REQUIRED

1. DESCRIPTION OF TARGETS

The chemical works comprise a complex of factory buildings in each of which the various chemical products are made. The layout necessarily varies according to the range of products manufactured by the particular plant concerned.

2. NUMBER OF DIRECT HITS AND TYPE OF BOMB REQUIRED

In view of the diverse nature of these plants and the fact that some of the equipment is of heavy and some of light construction, it is considered advisable to use a mixture of 500 lb. and 300 lb. bombs and that the weight of attack should be such that not less than twenty (20) 500 lb. bombs and sixty (60) 300 lb. bombs should fall on the target aiming area of 1000' by 1000'. In order to accomplish this with the fourteen (14) targets included in this system, it appears that it would be necessary to have a total of:-

1,920 SORTIES

In order to carry out these sorties in sixty (60) operational days, a force of:-

3 - B 29's and
27 - B 17e's

must be set up.

[redacted]

JAPANESE THEATRE APPENDIX J VIII — RUBBER

LIST OF TARGETS

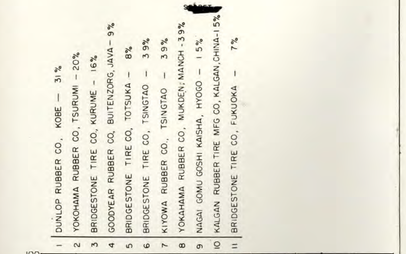
No.	Name and Location		Capacity in tires per day	Percent Japan Total
1.	Dunlop Rubber Company	- Nada (Kobe)	2,715	30.9
2.	Yokohama Rubber Co.	- Tsurumi	1,780	20.3
3.	Bridgestone Tire Co.	- Kurume	1,395	15.9
4.	Goodyear Rubber Co.	- Buitenzorg, Java	750	8.5
5.	Bridgestone Tire Co.	- Totsuka	711	8.1
6.	Bridgestone Tire Co.	- Tsingtao, China	345	3.9
7.	Kiyowa Rubber Co.	- Tsingtao, China	345	3.9
8.	Yokohama Rubber Co.	- Makden, Manch.	345	3.9
9.	Nagai Gomu Goshi Kaisha	- Hyogo	135	1.5
10.	Kalgan Rubber Tire Mfg. Co.	- Kalgan, China	135	1.5
11.	Bridgestone Tire Co.	- Fukuoka	67	.8
12.	Tokyo Rubber Engineering Co.	- Unknown (probably near Tokyo)	67	.8
13.	Japan Auto & Aircraft Tire Co.	- Tokyo	-	-
14.	(Unknown)	- Shanghai, China	-	-
	TOTAL		8,790	100.0

SUMMARY:

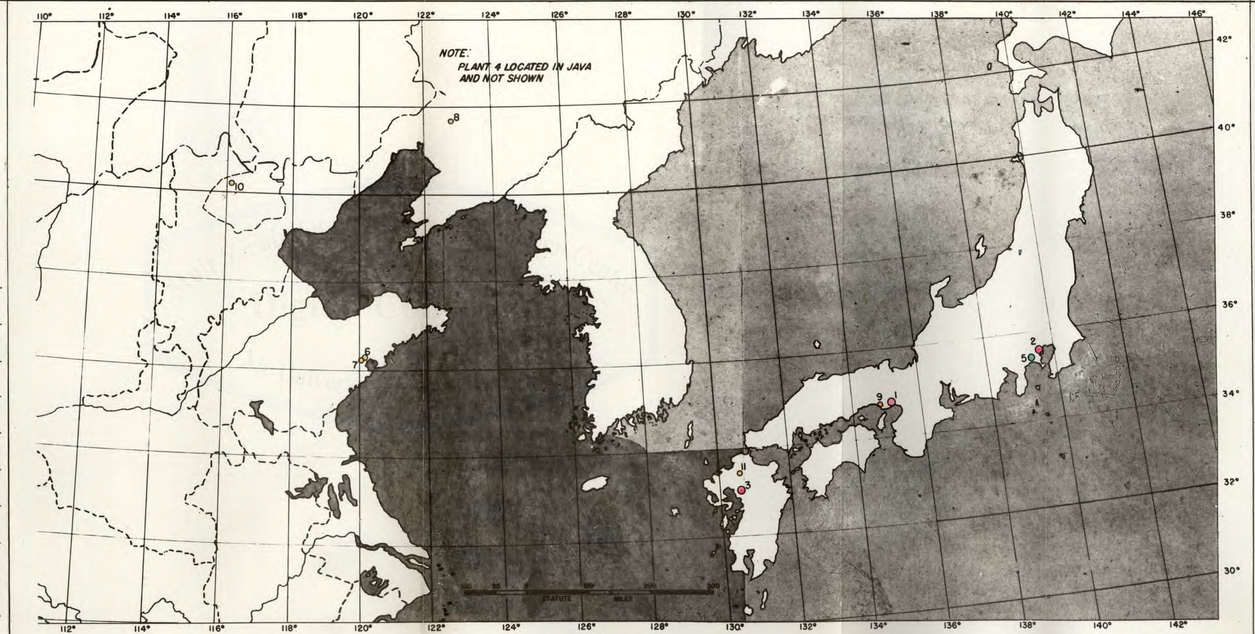
1. Vulnerability of the Industry: As the above data indicate, the output of rubber tires for trucks, aircraft, and other vitally necessary vehicles is concentrated in a very few factories. About 67% of the known tire-making capacity in all of Japanese-occupied territory is located in three large plants; the first five plants account for about 86% of the total. On the basis of information at hand, it seems highly unlikely that the Japanese have any considerable inventory of tires. Not only is the tire output highly concentrated, but it would be difficult to convert other rubber factories to the production of tires in the event that any of the leading plants should be bombed. Although stoppage of the flow of rubber tires can be effectively accomplished by destroying a few key factories, it would be impossible to achieve the same result through attacking the raw material sources. Rubber is extensively grown throughout the South Pacific area—Indo-China, Malaya, Java, Sumatra, Borneo—and any one of these countries produces enough crude rubber to supply Japan's material requirements. In order to cut off the Nipponese sources of crude rubber, millions of acres of rubber trees would have to be burned or sprayed with poisonous chemicals.

2. Military and Industrial Uses: Rubber tires are necessary equipment for all types of army aircraft and for all types of naval aircraft based on carriers. Army scout cars, gun caissons and carriers, mobile kitchens, ambulances, and all other military trucks and motor vehicles are equipped with tires. In short, the very existence of the modern mechanized, mobile army presupposes the liberal use of rubber tires.

COMPARATIVE VALUE OF TARGETS



LOCATION OF TARGETS



BOMBER FORCE REQUIRED

1. DESCRIPTION OF TARGETS

The rubber and tire making works comprise a complex of buildings in which the various operations are carried out. This is a type of target which will probably be susceptible to incendiary attack.

2. NUMBER OF DIRECT HITS AND TYPE OF BOMBS REQUIRED

It is considered desirable to use 600 lb. bombs on this type of objectives. The weight of attack should be such that not less than fifty (50) of these bombs fall within the target aiming area of 1000' by 1000'. In certain of the larger plants more than one aiming point would be taken.

3. NUMBER OF SORTIES AND BOMBER FORCE REQUIRED

Based upon detailed calculations taking into account all operational factors involved in making attacks against highly defended targets with appropriate allowances for probabilities, aiming errors, losses, etc., etc., it appears that to deal effectively with the fourteen (14) targets proposed in this system, it will be necessary to have a total of:-

1,320 SORTIES

In order to carry out these sorties in sixty (60) operational days, a force of:-

3 - B 29's
19 - B 17e's

must be set up.

Tab B–5

Air Operations—Hemisphere Defense

UNCLASSIFIED

[redacted]

BOMBARDMENT AND FIGHTER AVIATION REQUIRED FOR HEMISPHERE DEFENSE

I. PROBLEM:

To provide for Hemisphere Defense, exclusive of Hawaii and Alaska, by locating at strategic points, the minimum number of Bombardment and Fighter units capable of performing that mission during the conduct of our offensive against the Germans and Japanese.

II. MISSION:

To protect our vital economic and military objectives against carrier, or flying deck, based air attacks, by defending the Continental United States, the Northern Ferry Route to the United Kingdom, the approaches to the Panama Canal, and the bulge of Brazil.

III. FORCE REQUIRED:

a. 12-1/4 Groups of Bombardment, with a total of 800 airplanes, which includes a 25% reserve, and requires a monthly replacement at 5% per month of 34 airplanes.

b. 15-1/4 Groups of Fighters, with a total of 1,904 airplanes, which includes a 25% reserve, and requires a monthly replacement at 5% per month of 74 airplanes.

c. Totals comprise 27-1/2 Groups, with 2,704 airplanes, which includes a 25% reserve. Monthly replacements at 5% per month are 108 airplanes.

IV. DISCUSSION:

a. To the Northern Ferry Route to United Kingdom is assigned in Iceland, Greenland, and Newfoundland 2 Bombardment and 1-3/4 Fighter Groups. These will normally be disposed by squadrons, capable of reinforcement by units in the Foreign Concentration Area.

b. The Continental United States is assigned 4 Bombardment and 4 Fighter Groups, equally divided between the East and West Coasts. These can be augmented by units undergoing operational training, and units in the Foreign Concentration Area.

c. The Puerto Rico-Trinidad Area is allotted 2 Bombardment and 3 Fighter Groups. This should be essentially a mobile defense for Bombardment, with Fighter Squadrons stationed on the smaller islands.

d. Panama contains the heaviest concentration: 2 Bombardment and 4 Fighter Groups, because of the necessity of guarding both coasts, and the necessity for continual fighter alert against carrier raids against the Canal.

e. South America is assigned 2 Bombardment and 1-1/2 Fighter Groups, with the heaviest weight naturally located in the strategic bulge of Brazil.

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BOMBARDMENT

OPERATING BASE	GROUPS	COMBAT SQ	TOTAL PLANES	25% RESERVE	5% MONTHLY REPLACEMENT
Continental United States	5 H	20	240	60	12
New England Area	(1)H	(4)	(48)	(12)	(3)
Norfolk Area	(1)H	(4)	(48)	(12)	(3)
Los Angeles	(1)H	(4)	(48)	(12)	(2)
San Francisco Bay	(1)H	(4)	(48)	(12)	(2)
Seattle, Washington Area	(1)H	(4)	(48)	(12)	(2)
Iceland	1/4M	1	16	4	1
Greenland	1/2H	2	24	6	1
Newfoundland	1/4H	1	12	3	1
Puerto Rico	1M	4	64	16	3
Panama	2H	8	96	24	5
Trinidad	1M	4	64	16	3
Brazil	1-1/2	6	80	20	5
Belem	(1/2)H	(2)	(24)	(6)	(2)
Natal	(1/2)H	(2)	(24)	(6)	(1)
Rio de Janeiro	(1/2)M	(2)	(32)	(8)	(2)
Ascension	1/4H	1	12	3	1
Chile, Antofagasta	1/4M	1	16	4	1
Peru, Lima	1/4M	1	16	4	1
TOTAL	12-1/4	49	640	160	34

(H=Heavy, M=Medium)

FIGHTERS

OPERATING BASE	GROUPS	COMBAT SQ	TOTAL PLANES	25% RESERVE	5% MONTHLY REPLACEMENT
Continental United States	4	16	400	100	20
New England-Norfolk Area	(1)	(4)	(100)	(25)	(5)
Norfolk-Miami Area	(1)	(4)	(100)	(25)	(5)
Seattle-Portland Area	(1)	(4)	(100)	(25)	(5)
San Francisco-Los Angeles Area	(1)	(4)	(100)	(25)	(5)
Iceland	1	4	100	25	5
Greenland	1/2	2	50	12	2
Newfoundland	1/4	1	25	6	1
Bermuda	1/4	1	25	6	1
Bahamas, Jamaica	1/2	2	50	12	2
Puerto Rico	1	4	100	25	5
Trinidad	2	8	200	50	10
Panama	4	16	400	100	20
Brazil	1	4	100	25	5
Belem	(1/4)	(1)	(25)	(6)	(1)
Natal	(1/4)	(1)	(25)	(6)	(1)
Recife	(1/4)	(1)	(25)	(6)	(1)
Rio de Janeiro	(1/4)	(1)	(25)	(6)	(2)
Chile	1/4	1	25	6	1
Peru	1/4	1	25	6	1
Ascension	1/4	1	25	6	1
TOTAL	15-1/4	61	1525	379	74

[redacted] UNCLASSIFIED

AIR OPERATIONS - ANTI-SUBMARINE.

1. Defensive Anti-submarine air operations are divided into two categories: Offensive patrol and air convoy escort.

a. Offensive patrols are carried out from Cape Sable, Nova Scotia, to Trinidad in the Caribbean.

b. Air convoy escorts are carried out on the North Atlantic shipping route to England and along the coast of South America from Trinidad to Natal.

2. The experience of the Army Air Forces in the conduct of anti-submarine operations has brought out certain important features in connection with these operations. First, it is possible to predict with a high order of accuracy the areas in which submarine activities will be concentrated. This prediction is carried out by radio intercept of messages sent by individual submarines well out in the Atlantic. It has proved a remarkably reliable means of plotting the course of the majority of the submarines operating in the Atlantic. Second, a high degree of mobility of the offensive air patrol forces is essential in order that they may be shifted to cover these concentration areas. The problem of anti-submarine operations on the East coast of the United States and in the Caribbean is really a single operating problem and should not be complicated by artificial jurisdictional command borders. On at least one occasion a concentration of submarines in the Caribbean was predicted several days in advance, but the necessary air forces could not be concentrated in time because of the necessity for passing through several chains of command, including different zones of responsibility of the Army and of the Navy.

3. It is estimated that 20 squadrons of Heavy Bombers plus 4 squadrons of Medium Bombers, all airplanes equipped with ASV and magnetic detectors (medium squadrons operating in the Gulf) are adequate to make submarine operations unprofitable in the area west of a line from Cape Sable to 300 miles east of Trinidad. The operating force, however, must be free to move anywhere in the area and have suitable base facilities from which to operate. (See - Plan of Operation). It is essential that the force have absolute freedom of operation in order to fully exploit its mobility in combatting submarine concentrations, which can be predicted by following submarine movements with radio intercepts.

4. If the Army participation in anti-submarine operations is increased to encompass a responsibility from Natal to Iceland, it is estimated that another 10 squadrons of Heavy Bombers will be required for convoy escort outside of the area of offensive patrol. Due to adverse weather conditions obtaining over the North Atlantic, it is not believed that air operations there will have more than a fraction of the effectiveness that they now have in the Western Atlantic.

5. It is not visualized that submarines will become a serious problem on the West Coast or in the Southwest Pacific due to the distances involved to the nearest Japanese bases. Except in the Western Atlantic and around England, it is believed that submarines will be combatted by surface means.

6. August sinkings within the area of operation of the First Bomber Command were 3, a decrease of 10 from the monthly average of 13 from December 1941 to May 1942. During August, there were just as many submarines operating but they were in other waters as is evident from the total of 47 sinkings in American waters within range of aircraft. The inference is that air anti-submarine operations are effective in combatting the submarine menace, although this cannot be proven until an

adequate force with absolute freedom of movement is provided for offensive patrols to force the submarines to enter the area of our patrols in order to attack our shipping.

7. While the number of probable submarine sinkings by airplane attacks are relatively few, the airplane does drive the submarine under the surface and by continuous patrol can make submarine operations within a given area unprofitable even though the submarines are not actually destroyed. Due to the fact that the submarines surface at night, night operations against submarines with ASV equipped airplanes is more profitable than daylight missions, and it is believed that results in night operations will improve rapidly as the percentage of ASV equipped airplanes increases. (Night attacks are made by the use of ASV equipment alone.)

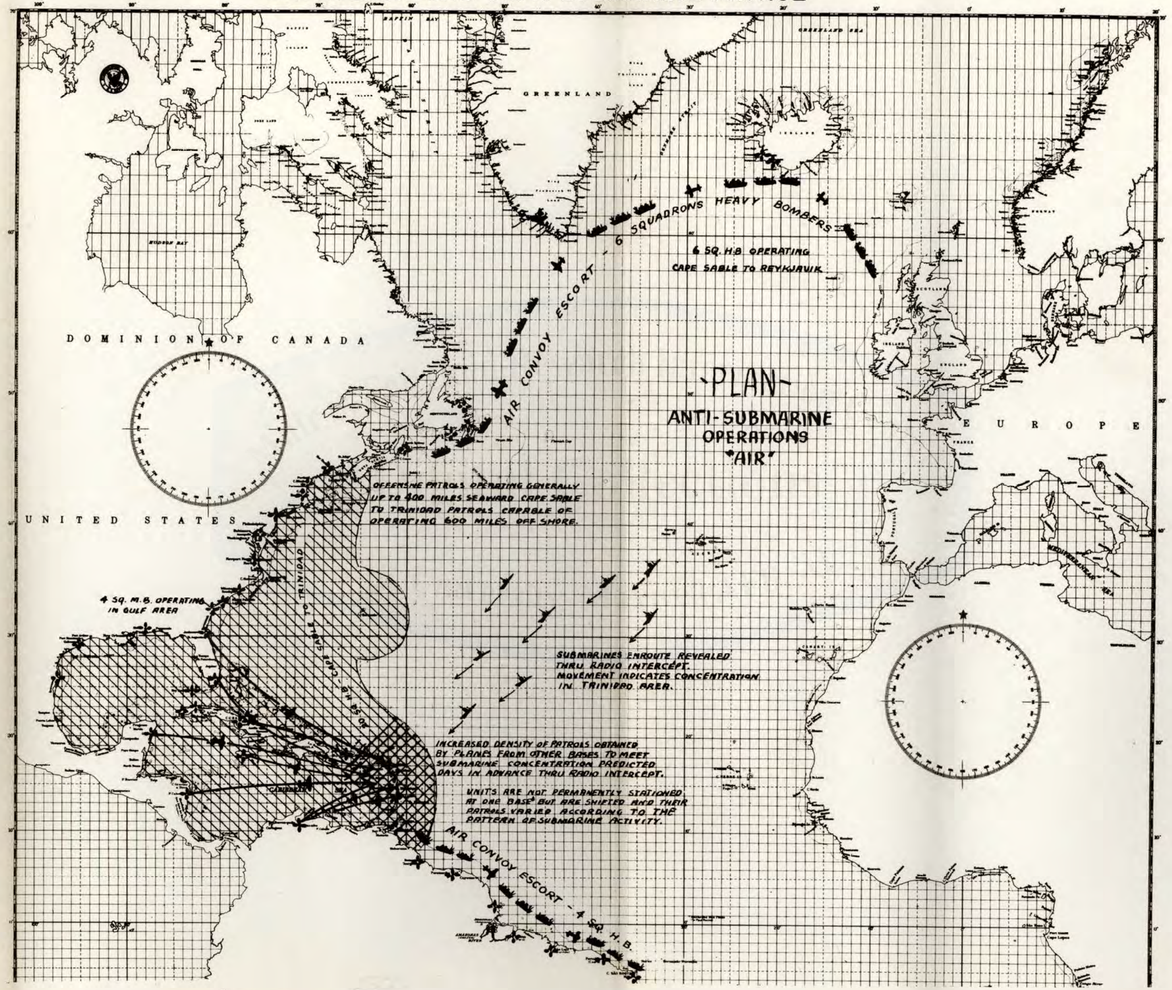
8. Whereas heavy bombers are far more effective in this operation than a like number of medium bombers would be, nevertheless in this plan medium bombers are provided in order to release the heavy bombers for the important task of conducting the air offensive directly against the enemy, including the attack of submarine building-yards and operating bases. The heavy bombers set up for normal hemisphere defense duties might be employed to supplement the mediums in the conduct of air convoy escorts in the Atlantic.

RESULTS OF FIRST BOMBER COMMAND ANTI-SUBMARINE OPERATIONS DURING JUNE, JULY AND AUGUST.

	Airplane Missions	Sightings	Attacks	Night Attacks	Probable Sinkings	Night Sinkings
June	2160	19	29		6	
July	2688	24	15	2	8	1
August	2551	14	8	1	5	

NOTE: ASV equipment is just getting into operation now. While a limited number of planes have had the equipment installed, operational difficulties have made it of little value to date.

AIR OPERATIONS - ANTI SUBMARINE PATROL



REQUIREMENTS IN AIRPLANES DURING 1943
FOR ANTI-SUBMARINE OPERATIONS

	DESIRED		Provided in this Plan
Offensive Patrols	Heavy Bombers	Medium Bombers	Medium Bombers
Trinidad to Cape Sable			
20 sq HB @ 12 planes per sq.	240		
4 sq MB @ 16 planes per sq		64	22 sq = 352
Convoy Escort			
Cape Sable to Iceland			
6 sq HB @ 12 planes per sq	72		
Trinidad to Natal			10 sq = 160
4 sq HB @ 12 planes per sq	48		
Total	360	64	512

Note: Heavy Bombers are more desirable for anti-submarine operations in all areas except the Gulf due to the inefficiency of the shorter range Medium and the necessity of following the submarine to sea when they move out beyond the range of the Medium. (Mediums can be used in the Gulf) Both Heavy and Medium Bombers must be equipped with ASV and Magnetic detectors.

See Discussion Note A

Tab C

Bombing Accuracy

BOMBING ACCURACY

The operations of the U. S. Army Air Forces in daylight bombing of defended objectives in German occupied Europe have been too limited to establish a precise gauge of bombing accuracy. Those operations have, however, definitely established the fact that:

> It is perfectly feasible to conduct precise bombing operations against selected precision targets, from altitudes of 20,000 to 25,000 feet, in the face of antiaircraft artillery and fighter defenses.

The 97th Bombardment Group, which conducted these operations, was ill-trained in comparison with other heavy bombardment units of the Army Air Forces. The bombardiers had had little opportunity to practice. Hence, the degree of accuracy which may reasonably be expected of bombardment groups in the European Theater should actually improve in the future. However, in computing the bombing expectancy of U. S. Bombardment Forces operating in daylight in this Theater, this study will be based upon the results of actual experience in combat operations, only.

An analysis of the combat bombing results of the 8th Bomber Command over German occupied Europe reveals average circular errors varying from 390 feet to 2,890 feet from bombing altitudes of 20,000-24,000 feet. After evaluating the effects of the percentage of obviously wild shots and the percentage of hits close to aiming points, it is concluded that the average circular error to be expected in the long run from 20,000 feet over German occupied Europe by this U. S. bombardment force is approximately:

1,000 feet.

This figure of 1,000 feet is approximately 1.5 times the average target practice error of the type organization being dispatched to the European Theater.

In computing the number of bombs which must be dropped to obtain the desired number of hits against each target selected, the following procedure has been used.

a. The target has been analyzed and the particular point to be destroyed has been selected.
b. The structure has been examined and the proper type bomb to achieve destruction has been selected.
c. The dimensions of the selected target point have been determined.
d. The number of individual bombs which must be dropped in order to obtain a 90% (nine to one) probability of obtaining at least the number of hits desired has been determined by applying the Law of Errors (Probabilities), based upon the above stated circular average error of 1000 feet. Thus there is being provided a force adequate to insure a nine to one probability of completely destroying the selected target in one mission.

Such a probability of success is far in excess of that normally ascribed to any military operation.

There is, of course, a tremendous amount of incidental damage to be expected from the hundreds of bombs which drop near the aiming point but do not strike the particular part of the target selected.

Following are two bomb plots drawn to scale of two typical targets: The submarine-building yard at Kiel, and an electric power station at Goldenberg.

The incidental destructive effect of bombs which do not strike the selected aiming points is at once apparent. In the Kiel target there are three aiming points, and the overlap of bombs dropped provides a very dense distribution.

Of the 3360 bombs dropped against the submarine yard at Kiel, 3024 should fall within the 90% circles shown. Of these bombs:

242 hits are shown on submarine-building slips
1862 hits are shown on buildings in the yard

making a total of 2104 bomb hits which create direct damage to the installation.

Of the 1728 bombs dropped against the power plant at Goldenberg, 1555 should fall within the 90% circle shown. Of these bombs:

19 hits are shown on the turbine house
70 hits are shown on the boiler houses
10 hits are shown on the switch house
165 hits are shown on other buildings

making a total of 264 hits on the power plant.

An addition of 15% of theoretical requirements for each target has been provided to care for aircraft which are shot down or which fail to find the target.

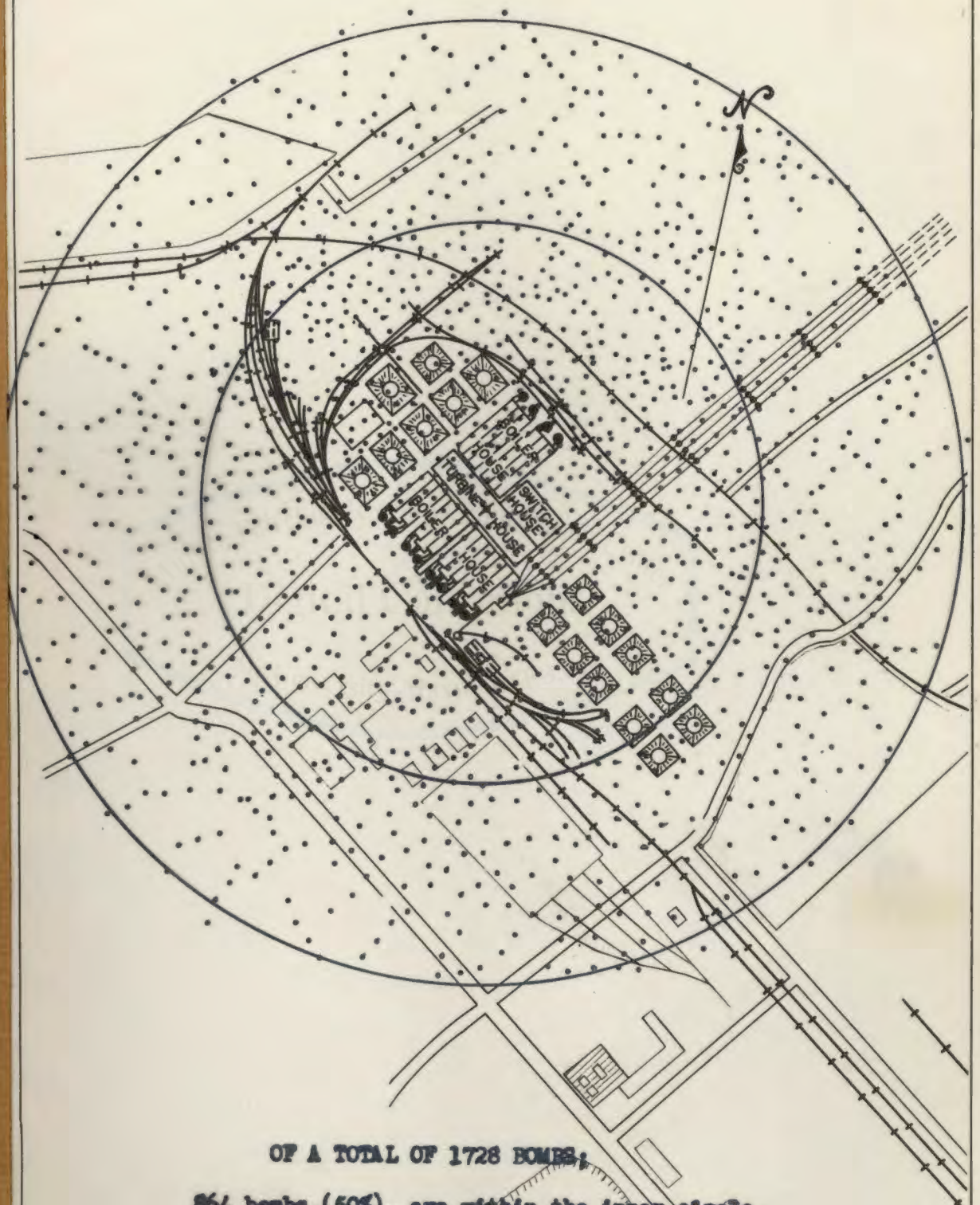
BOMB PATTERN

432 Releases, 4-bomb Trains, Bomb Spacing 75'.

GOLDENBERG POWER PLANT

Based on:

Bombing Altitude of 20,000'.
Average Circular Error of 1,000'.



OF A TOTAL OF 1728 BOMBS:

864 bombs,(50%), are within the inner circle.

1555 bombs,(90%), are within the outer circle.

173 bombs,(10%), are outside the outer circle and are not plotted.

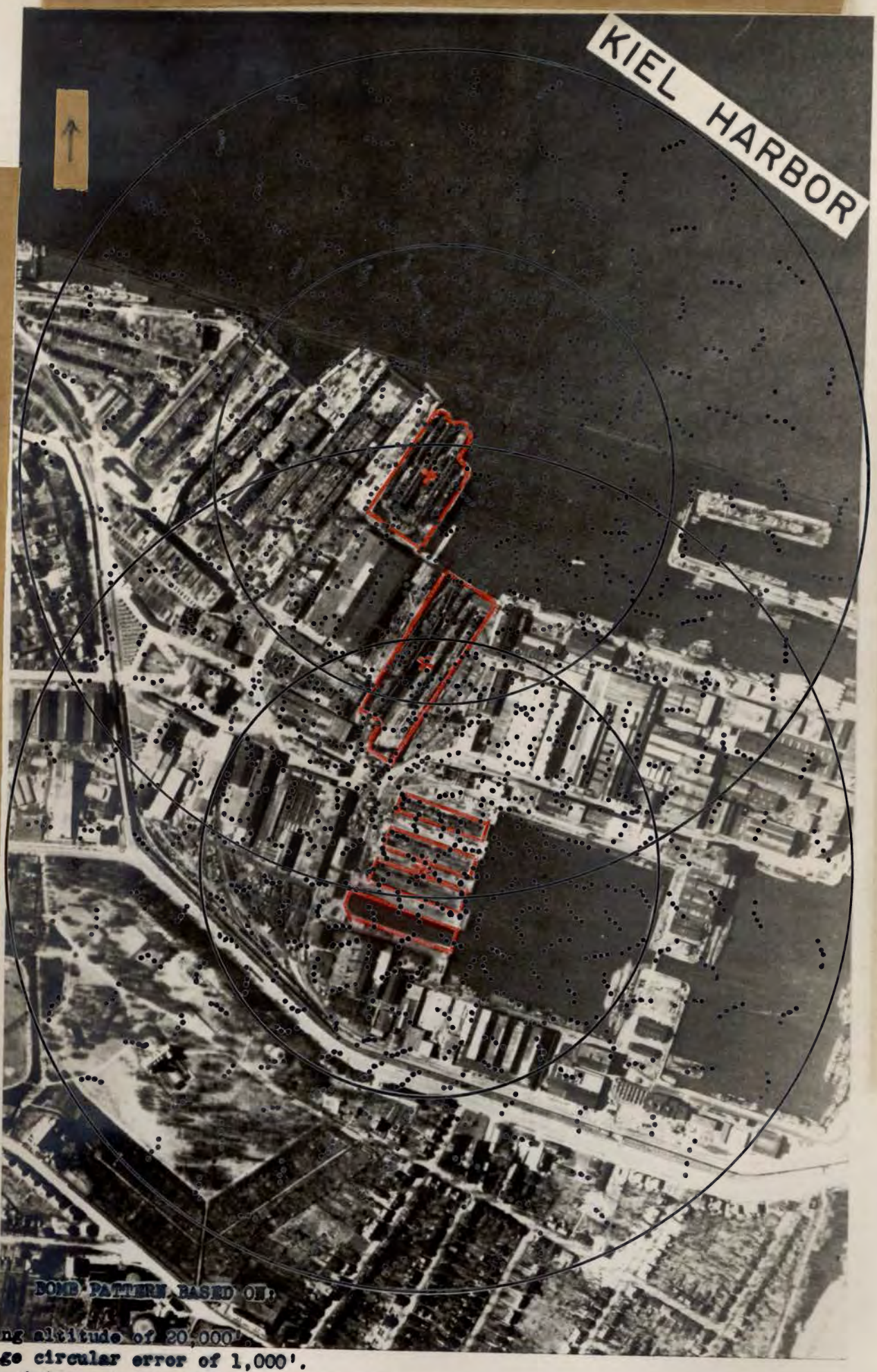
1000 500 0 1000
SCALE IN FEET

SCALE
1 inch = 508 feet

Bombing altitude of 20,000'.
Average circular error of 1,000'.
Three aiming points; 280 releases on each using trains of four bombs with 40' spacing.

Of a total of 1120 bombs dropped:

560 (50%) are within the inner circle.
1008 (90%) are within the outer circle.
112 (10%) are outside the outer circle and are not plotted.



BOMB PATTERN BASED ON:

Bombing altitude of 20,000'.
Average circular error of 1,000'.
Three aiming points; 280 releases on each using trains of four bombs with 40' spacing.

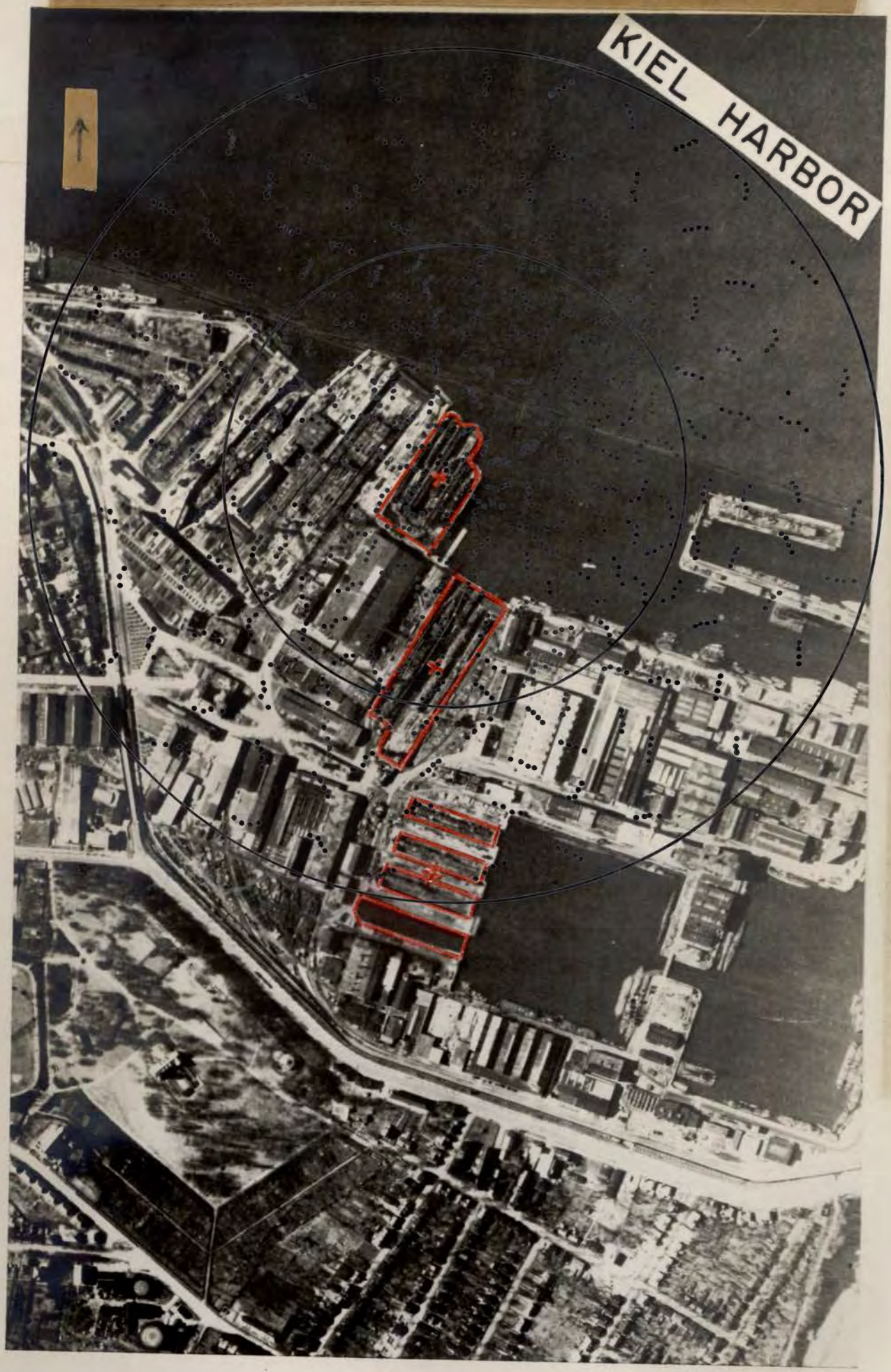
Of a total of 1120 bombs dropped:

560 (50%) are within the inner circle.
1008 (90%) are within the outer circle.
112 (10%) are outside the outer circle and are not plotted.

Bombing altitude of 20,000'.
Average circular error of 1,000'.
Three aiming points; 280 releases on each using trains of four bombs with 40' spacing.

Of a total of 1120 bombs dropped:

560 (50%) are within the inner circle.
1008 (90%) are within the outer circle.
112 (10%) are outside the outer circle and are not plotted.



DEUTSCHWERKE SUBMARINE YARD

KIEL

TARGETS SUBMARINE BUILDING SLIPS

DEUTSCHWERKE SUBMARINE YARD
KIEL

TARGETS SUBMARINE BUILDING SLIPS

Tab D

Penetration of Defenses

PENETRATION OF ANTIAIRCRAFT DEFENSES

1. When the German Air Forces launched its daylight offensive against Britain, the losses in bombers soon reached a prohibitive rate. At the peak of this rate, the Germans actually lost 185 airplanes in one day. Apparently on the assumption that this rate would continue and that the German air forces would be completely depleted within a relatively short time, the German High Command abandoned further prosecution of the daylight air offensive. This erroneous assumption on the part of the Germans was extremely fortunate for Great Britain, for at the time that the Germans abandoned the daylight offensive the British fighter forces had reached the point of exhaustion. A few more days of operation would probably have seen the collapse of the British fighter defenses, and the rate of attrition of the German forces would probably have dropped to a negligible figure.

2. A similar experience may be anticipated in the penetration of German fighter defenses by our own bombers, with one notable exception. Our bombers have corrected the principal deficiency to be found in the German bomber in 1940 - defensive fire power and armor. Our heavy bombers are far superior in fire power and capacity to absorb punishment to the bombers used by the Germans. Hence the ratio of attrition between bombers and fighters has also been radically altered. Our daylight pemetrations of German defenses has up to this time indicated a relatively low attrition rate to our bombers and a relatively high attrition rate to German fighters. Although these apparent rates may change in the future, nevertheless the situation is radically different from that of September, 1940.

3. The Commanding General of the American Army Air Forces in Great Britain has expressed the opinion that our current type bombers can penetrate existing German defenses to the limit of their radius of operation without excessive losses.

4. If we apply the same line of reasoning to our penetration of German defenses as was used in the analysis of the German attempt against Great Britain, we may reasonably expect a fairly high initial rate of attrition of our forces, which will rapidly decline as the German fighter forces become depleted.

5. The German fighter force at present on the Western Front is estimated at 657 fighter aircraft. On the assumption that one of our bombers would destroy two enemy fighters before itself being destroyed, and that one German fighter is the equivalent of 1¼ American fighters (offensive action over enemy territory) it would involve the loss of 325 of our bombers, or 820 of our fighters, to destroy the present German fighter strength.

6. It is estimated that the number of German fighter aircraft that would be available on the Western Front, if 75% of those now in Russia were released for operations in Western Europe, is 1200. On the same assumptions outlined in paragraph 5, the neutralization of this fighter force might involve the loss of 600 of our bombers or 1025 of our fighters.

7. Losses from antiaircraft fire will be negligible except at the target if bombers keep at or above 25,000 feet. Best available intelligence as to the location of German antiaircraft artillery on the Western Front is shown on the chart marked "Antiaircraft Defense". No figure is available as to the amount of German AA Artillery on the Russian front, but it may be assumed that if three-fourths of it were used to reinforce the antiaircraft defenses of the Western Front it would be concentrated around targets which already have some AAA defenses.

8. Another chart has been prepared showing what appears to be a relationship between rate of attrition and size of penetrating force for night bombing. This chart indicates that an attrition rate of around 4% may be reached by a force of 200 or more bombers operating at night and that the rate goes up materially as the force is reduced. Attrition rate for day bombing cannot be estimated from this table. Attrition for both day and night bombing will, however, decrease as neutralization of enemy fighter aircraft takes place. This decrease due to neutralization will be more pronounced in the case of day bombing as the full effect of fighter aircraft cannot be brought to bear at night.

9. CONCLUSION: Careful consideration of existing Radar, Fighter, and Antiaircraft Artillery Defenses of Germany, together with the best information available of the enemy's air defense capabilities, in the event of the withdrawal of 75% of the air defense forces now engaged with Russia, leads to the conclusion that the penetration of active air defense of the Axis' powers is feasible, without excessive losses. It is recognized that initial losses may well be heavy and apparently prohibitive. This condition will materially improve as the German Fighter Force is neutralized or destroyed. Total losses should not exceed 300 bombers and 1,025 fighters.

FIGHTER DEFENSE, RADAR LOCATIONS AND RADAR COVERAGE OF GERMANY AND OCCUPIED FRANCE.

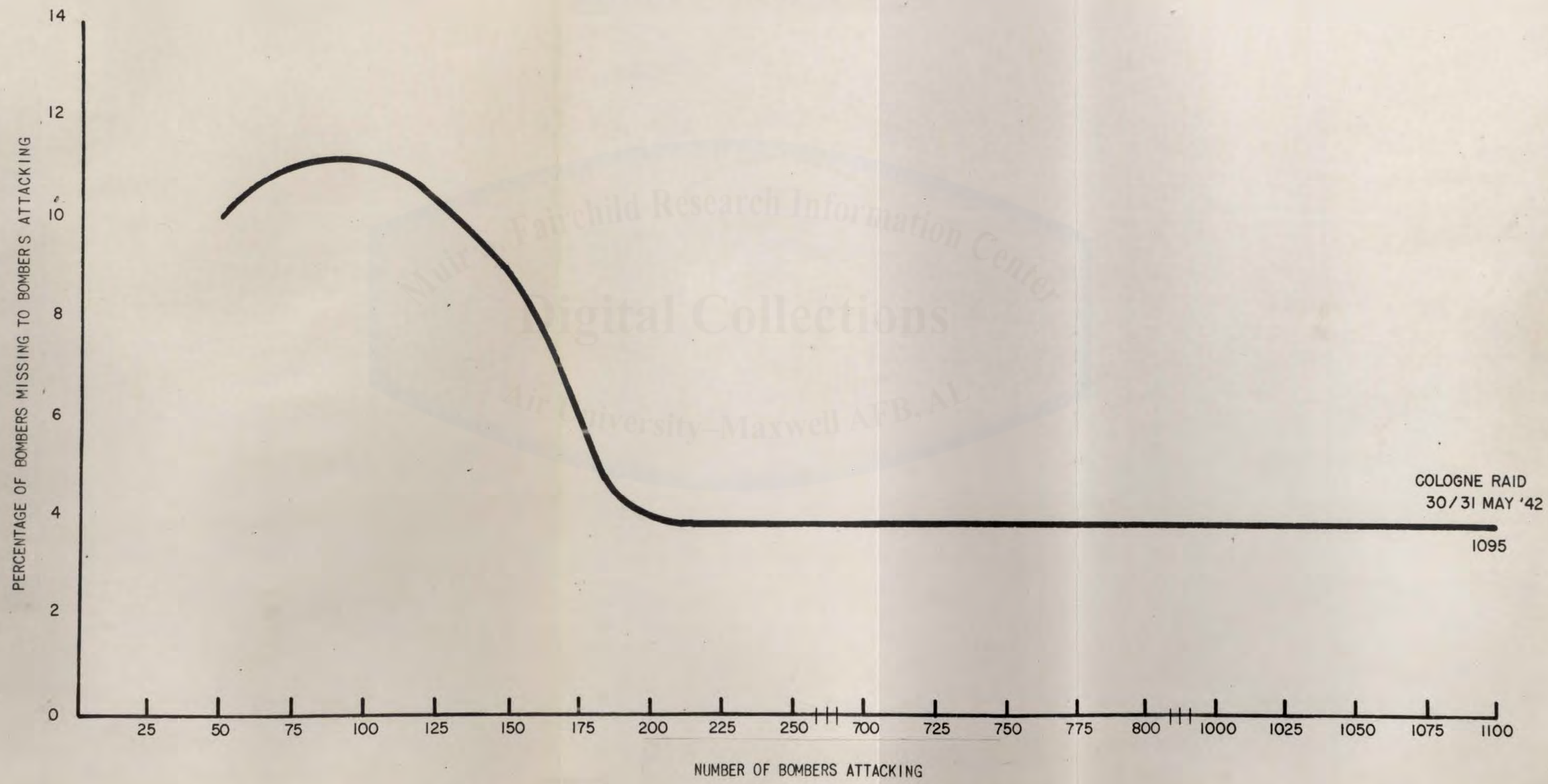
* LOCATION OF SOME FIGHTERS UNKNOWN.

ENGLAND
LONDON
DOVER
CALAIS
CHERBOURG
LE HAVRE
PARIS
BREST
LORIENT
ST. NAZAIRE
AMSTERDAM
ANTWERP
WILHELMSHAVEN
KIEL
HAMBURG
BREMEN
HANOVER
BERLIN
DUSSELDORF
KOLN

STRONGLY DEFENED AREA - FLAK
DEFENDED AREA - FLAK
SEARCHLIGHT BELT
AREAS IN WHICH SEARCHLIGHT CONCENTRATIONS ARE SITUATED
---- POSSIBLE SEARCHLIGHT BELT

ANTI-AIRCRAFT DEFENSES OF GERMANY AND OCCUPIED FRANCE

ATTACKS ON ESSEN AT NIGHT
INVOLVING 50 OR MORE AIRCRAFT
FROM 25/26 MARCH UP TO AND INCLUDING 8/9 JUNE 1942
AND ATTACK ON COLOGNE 30/31 MAY 1942



Tab E

Destructive Effect of Bombs

The Attack on the Renault Factory

An Example of the Effectiveness of Bombing Units of Enemy Industry

Properly selected and fused bombs will destroy any known industrial structure to such an extent that repair becomes virtually impossible. It is, of course, necessary to distribute such bombs in sufficient quantity to insure the degree of destruction desired. Examination of the accompanying photographs indicates that the problem of restoring the particular structures illustrated to an operating condition is a more difficult task than initial construction of new industrial structures. The mass of twisted steel left as a result of these attacks is itself quite worthless except as scrap and must be laboriously removed before a new structure can replace it.

On the following pages there will be found details of the Renault raid.

THE RENAULT RAID

On the night of March 3/4 Royal Air Force Bombers attacked the Renault plant in the suburbs of Paris. While the bombing accuracy of RAF Squadrons does not measure up to the bombing accuracy of AAF Squadrons when a similar force is directed against a specific objective such as a manufacturing plant, nevertheless sufficiently good results were obtained to give an indication of the effectiveness of an air attack carried out against an important unit of enemy industry.

The Renault Plant, covering 296½ acres on the north bank of the Seine, was the largest single armament, truck and tank works in France. The buildings were of light, one story construction and not particularly inflammable.

At the time of the British raid this plant was reported to be employing 14,000 workmen and producing from 750 to 1,000 motor trucks per month, plus at least 100 tanks and 300 airplane engines, all for the German Army.

The raid was made on a clear, moonlight night with perfect visibility. Two hundred and forty-nine planes were used and 462 tons of bombs were dropped, including twenty-six 4,000 pounders. Two airplanes did not return.

Pictures taken immediately after the raid and subsequent photographs show various degrees of damage to some 49 buildings. Destruction of such important shops as the press, machine tool, connecting rod and valve, vehicle repair, assembly and pattern, appears to have been nearly complete.

It has been stated that between five and six months after the raid the Renault plant was producing approximately 500 trucks per month. To this statement should be added the further detail that the return of the Renault plant to this state of efficiency was brought about by the use of <u>other manufacturing facilities</u> as subcontractors to turn out assemblies. In other words this target was of such importance to the enemy that the facilities of other manufacturing establishments were commandeered and labor was impressed to provide emergency replacement facilities. Thus Renault became a central assembly establishment. Renault has not returned to its role as a prime manufacturer.

The attack on the Renault plant cost the British two aircraft and 462 tons of bombs. The results and effectiveness of this bombing are shown by the attached photographs. While they do not prove the impossibility of placing the plant in operation again, they do show that the time required would be the same amount of time as is required to build a new plant plus whatever time is required to clean up the debris. Assuming that highest priorities in labor and materials were given to the task of reconstructing Renault into its original role as a prime manufacturer, with the inevitable strain that would follow the adoption of such measures, this company might go into production in November 1942. Upon completion of such a project of reconstruction another attack might be directed against the plant. It is safe to assume that a second project of reconstruction would require considerably more time than the first, especially if there were other similar projects requiring labor and materials priorities.

The construction of the Renault plant is fairly typical of an airplane factory, an aircraft engine factory or a munitions plant. In order to insure complete destruction of this type target this plan provides for recurrent full scale attacks every two months.

Atelier gde vitesse

Salle conseil administrative

Forges fabricant matrices

Usinage cylindre

Fabrication outils emboutissage.

Usinage bielles, soupapes, moteurs

Reparation vehicules industrielles

Batiments des bureaux

Traitement thermique

Traitement thermique

Reparation vehicules

Seguin Halle montage

Seguin

Seguin

Seguin Montage tourisme

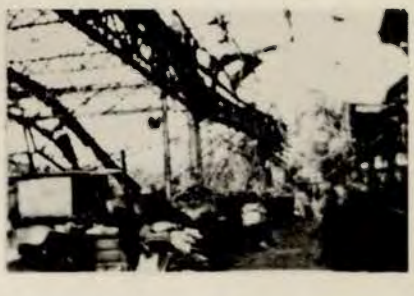
Ile Seguin

Tolerie

Tolerie

Fonderie, noyautage

Fonderie malleable



Tab F

Rates of Operation, and Weather

Tab F. Rates of Operation and Weather

TAB F

RATES OF OPERATION AND WEATHER EUROPEAN THEATRE

1. Purpose.--This study will indicate

   a. The number of days in each month (taking the average number over a period of years) when high level bombing over Germany can be carried out.

   b. The number of days for a six-months period beginning with each month of the year (using the average number as in (a) when high level bombing over Germany can be carried out.

2. Limitations on Bombing Operations.--

   a. The limiting values for the ceilings, visibilities, and cloudiness on high level bombing operations were taken as follows:

      (1) Take-off - Ceiling 500 feet
      Visib. ½ mile

      (2) Landing - Ceiling 1000 feet
      Visib. 1 mile

      (3) En route - No severe icing
      No severe turbulence
      No gale winds aloft

      (4) Over Target - Ceiling - unlimited
      Clouds - Three tenths or less of the sky covered.

      (5) Daytime operations only.

   b. If any of the five targets could be bombed, the day was counted as an operating day.

   c. Only the airdrome area near Upper Heyford was considered as available for landing or take-off. The more airdromes available and the more widely dispersed, the more days will be suitable.

3. Method of Investigation.--This study is based on two independent approaches:

   a. A careful examination of the daily weather maps of Europe for the past five years.

   b. A statistical examination of seven years of monthly cloud and ceiling data for England and Germany.

4. Tables.

   a. Table 1--Average number of days per month when the weather is better than the limiting values (see paragraph 2 a).

	J	F	M	A	M	Je	Jy	A	S	O	N	D
Average No. of Days	6	9	12	10	12	.12	10	9	10	10	7	6

b. Table 2--Average number of days per six (6) month period beginning with the month indicated when the weather is better than the limiting values.

	J	F	M	A	M	Je	Jy	A	S	O	N	D
Average No. of Days	61	65	65	63	63	58	52	48	48	50	50	55

c. Table 3--The average number of days per month when the weather is better than the limiting values and in addition when the sky over the targets is absolutely clear.

	J	F	M	A	M	Je	Jy	A	S	O	N	D
Average No. of Days	1	2	6	2	3	7	3	1	2	2	1	1

d. Table 4--The average number of days per six months period when the weather is better than the limiting values and in addition when the sky over the targets is absolutely clear.

	J	F	M	A	M	Je	Jy	A	S	O	N	D
Average No. of Days	21	23	22	18	18	16	10	8	9	13	13	15

5. Monthly Variations--

a. The maximum number of days when the weather will be better than the limiting values will be about 3 to 4 days more than the average in the winter and 5 to 6 days more than average in summer.

b. The minimum number of days when the weather will be better than the limiting values will be about 3 days less than the average and 5 to 6 days less than the average in summer.

6. Six-Month Variation--

a. The maximum number of days for a six-month period during the winter will be about 8 to 10 days more than the average and will be about 14 to 16 days more than the average in summer.

b. The minimum number of days for a six-month period will be about the same number less than the average (8 to 10 - winter, 14 to 16 - summer).

Conclusions.

1. The study indicates that even during a season of bad weather bombing operations from high altitudes can be carried out on at least 36 days during any six-months period.

2. Within certain limits, the more targets and the more widely they are dispersed, the more high altitude bombing raids can be carried out.

3. The governing factor in these high altitude raids is the amount of cloudiness over the targets. It is to be expected that with clear or scattered cloudiness over the targets, the conditions over England will not decrease appreciably the number of operating days during the summer, but will be a factor on about 40% of the days in winter. With a small amount of cloudiness over the target route weather will not cause many cancellations.

4. Within certain limits, the more airdromes available in Great Britain and the more they are dispersed, the more operations can be carried out.

5. It is believed that in general, the favorable operating days will occur in sequences of from two (2) to five (5) consecutive days.

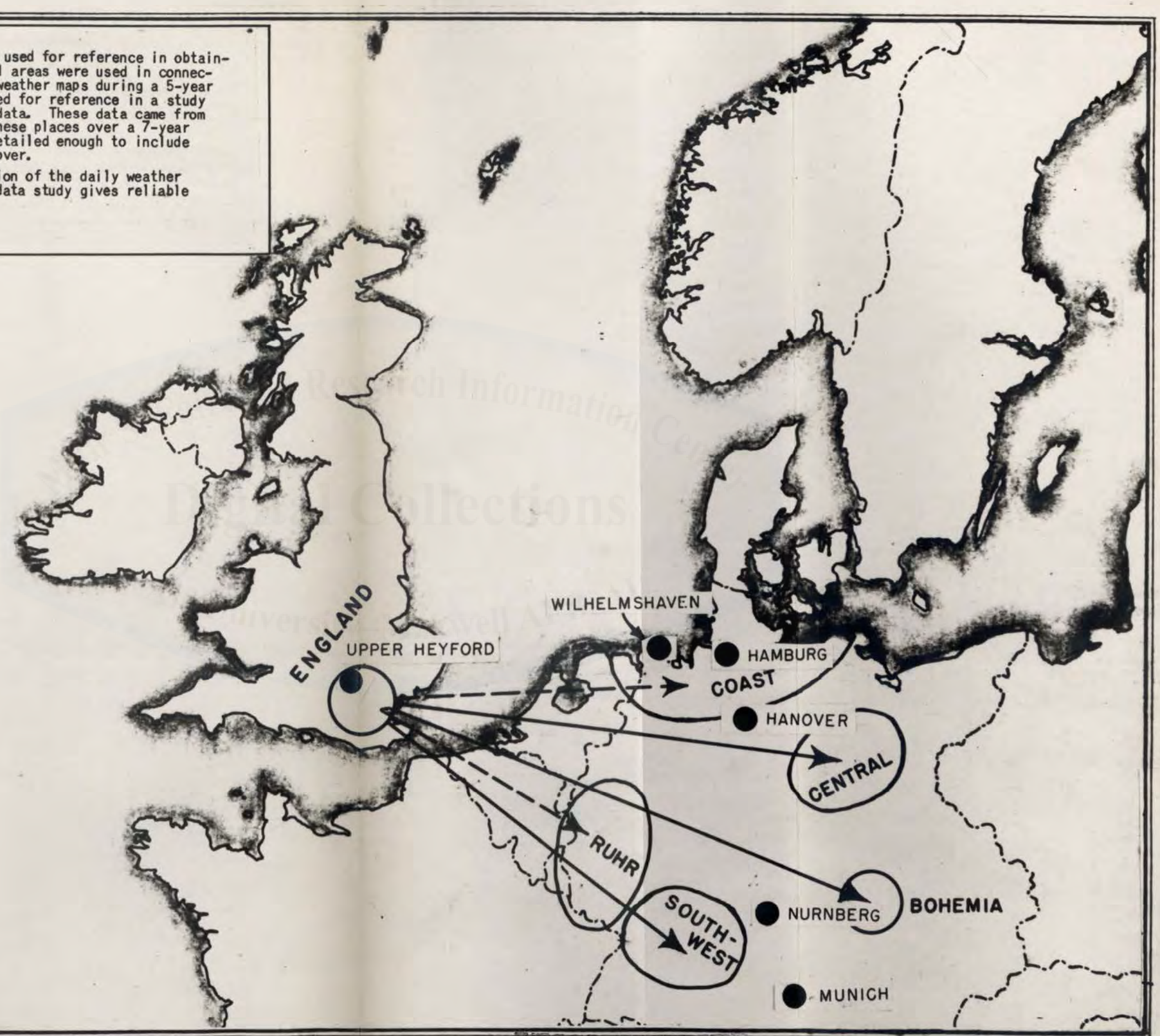
6. The coastal areas will be relatively more favorable for high altitude bombing operations in summer than the inland regions.

POSSIBLE BOMBING OPERATIONS

FROM ENGLISH BASES TO OBJECTIVES IN GREATER GERMANY

The map shows the specific areas used for reference in obtaining meteorological data. The oval areas were used in connection with the study of the daily weather maps during a 5-year period. The cities shown were used for reference in a study of seven years of climatological data. These data came from the actual observations made at these places over a 7-year period of time. These data are detailed enough to include ceiling and percentage of cloud cover.

It is believed that the combination of the daily weather map study and the climatological data study gives reliable results.



Prepared by: FORECAST RESEARCH SECTION
WEATHER CENTRAL DIVISION

Tab G

Total Combat Air Units Required by Type

RECAPITULATION OF COMBAT UNITS

ARMY AIR FORCES

(As Of December 31, 1943)

Air Operation	HEAVY BOMBERS (48/Group)		MEDIUM BOMBERS (64/Group)		LEVEL BOMBERS (64/Group)		DIVE BOMBERS (96/Group)		FIGHTERS (100/Group)		OBSERVATION (84/Group)		PHOTO-RECON-NAISSANCE (52/Group)		TROOP CARRIER TRANSPORTS (52/Group)		TOTAL TACTICAL		GLIDERS	GRAND TOTAL AIRCRAFT
	Gps.	Air-planes	Gps.	Air-planes	Gps.	Air-planes	Gps.	Air-planes	Gps.	Air-planes	Gps.	Air-planes	Gps.	Air-planes	Gps.	Air-planes	Gps.	Air-planes		
1. Air Offensive German Theater	42	2,016	15	960	1	64			15	1,500	1	84	4	208			78	4,832		
2. Air Operations in support - North Africa	3	144	4	256	2	128			8	800	2	168	½	26	4	208	23½	1,730	624	2,354
3. Air Operations in support - Middle East	8	384	2	128	4	256			6	600			½	26	4	208	24½	1,602	624	2,226
4. Air Operations in support - Japanese Theater	14	672	11	704	2	128	7	672	26	2,600	5	420	4	208	16	832	85	6,236	2,496	8,732
5. Air Operations Hemisphere Defense and Strategic Reserve	9	432	3	192	5	320	5	480	15	1,500	12	1,008	3	156	10	520	62	4,608	1,560	6,168
Antisubmarine Patrol and Eventual Reserve			8	512													8	512		512
PROGRAM "A" - TOTAL	76	3,648	43	2,752	14	896	12	1,152	70	7,000	20	1,680	12	624	34	1,768	281	19,520	5,304	24,824
a. Air Offensive - Japanese Theater	19 3*	912 144															19 3	912 144		912 144
b. Air Operations in support - Combined Offensive in Europe					4	256	4	384	10	1,000	7	588			8	416	33	2,644	1,248	3,892
PROGRAM "B" - TOTAL	98	4,704	43	2,752	18	1,152	16	1,536	80	8,000	27	2,268	12	624	42	2,184	336	23,220	6,552	29,772

* B-29 Type.

AAF - Management Control

Office, Director Statistical Control
September 9, 1942

Tab H

Total Aircraft Required by Type

Tab H Total Aircraft Required by Type

UNCLASSIFIED

[redacted]

TACTICAL AND TRAINING TYPE AIRPLANES REQUIRED FOR ARMY AIR FORCES ONLY

(All Theatres and Training Program)

PROGRAM "A"
DURING CALENDAR YEAR 1943

	TACTICAL TYPES OF AIRPLANES									OTHER TYPES OF AIRPLANES			Grand Total
	Heavy Bombers	Medium Bombers	Light Bombers	Dive Bombers	Fighters	Photographic*	Transport T.C.C.	Transport A.T.C.	Total Tactical	Liaison	Glider	Trainer	
Unit Equipment	3,765	2,791	1,376	1,132	7,480	468	1,768	1,888	20,668	720	3,536	-	24,924
O.T.U. &.R.T.U.	1,136	851	510	424	960	234	1,346	-	5,461	72	646	-	6,179
Training and Other	556	1,417	570	20	3,486	13	393	-	6,455	915	886	21,140	29,396
Ready Reserve	17	13	666	720	3,426	96	265	283	5,486	58	-	-	5,544
Depot Reserve	1,263	909	436	360	2,107	140	631	-	5,846	198	1,307	-	7,351
Attrition (Cum)	5,862	4,499	1,983	1,535	11,727	627	2,910	117	29,260	1,197	5,227	5,622	41,306
Total	12,599	10,480	5,541	4,191	29,186	1,578	7,313	2,288	73,176	3,160	11,602	26,762	144,700
Estimated On Hand As Of January 1, 1943**	1,560	1,872	554	361	4,783	100	807	71	10,108	3,044	3,318	14,530	31,000
Total Airplanes Required During Calendar Year 1943	11,039	8,608	4,987	3,830	24,403	1,478	6,506	2,217	63,068	116	8,284	12,232	83,700

PROGRAM "B"
1943 SUPPLEMENTAL PROGRAM

	TACTICAL TYPES OF AIRPLANES									OTHER TYPES OF AIRPLANES			Grand Total
	Heavy Bombers	Medium Bombers	Light Bombers	Dive Bombers	Fighters	Photographic*	Transport T.C.C.	Transport A.T.C.	Total Tactical	Liaison	Glider	Trainer	
Unit Equipment	4,821	2,791	1,800	1,516	8,648	468	2,184	2,195	24,423	972	4,368	-	29,763
O.T.U. & R.T.U.	1,424	851	622	520	1,208	234	1,658	-	6,517	144	885	-	7,546
Training and Other	656	1,362	628	20	4,636	13	393	-	7,708	915	886	27,854	37,363
Ready Reserve	17	13	927	960	4,131	96	328	329	6,801	107	-	-	6,908
Depot Reserve	1,605	909	570	480	2,461	140	772	-	6,937	279	1,572	-	8,788
Attrition (Cum)	5,896	4,452	2,601	2,275	13,297	627	3,382	136	32,666	1,505	6,106	9,392	49,669
Total	14,419	10,378	7,148	5,771	34,381	1,578	8,717	2,660	85,052	3,922	13,817	37,246	140,037
Estimated On Hand As Of January 1, 1943**	1,560	1,872	554	361	4,783	100	807	71	10,108	3,044	3,318	14,530	31,000
Total Airplanes Required During Calendar Year 1943	12,859	8,506	6,594	5,410	29,598	1,478	7,910	2,589	74,944	878	10,499	22,716	109,037

* Light Bombers and Fighters include Observation Group requirements for same. Heavy Bombers and Medium Bombers include Photographic requirements for same.

** Excludes all planes undergoing modification and acceptances in factories.

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[redacted]

Office, Director Statistical Control
September 8, 1942

Tab I

Personnel Required

~~SECRET~~

ARMY AIR FORCES

Summary of Personnel Requirements
to Meet Programs "A" and "B" by January 1, 1944
(Including present on hand and estimated attrition)

PROGRAM "A"

	Air Force	Arms and Services	Total
Officers	230,243	72,600	302,843
Enlisted Men	1,554,104	877,400	2,431,504
Total	1,784,347	950,000	2,734,347

PROGRAM "B"

	Air Force	Arms and Services	Total
Officers	253,000	86,260	339,260
Enlisted Men	1,963,000	1,048,740	3,011,740
Total	2,216,000	1,135,000	3,351,000

AAF - Management Control

Office, Director Statistical Control
September 8, 1942

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Program "A"

Estimated Personnel Requirements By Specialty
Calendar Year 1943*
(Air Force Personnel Only)

OFFICERS	Required as of 1/1/43	Total Req. as of 1/1/44	Est. Over or Short 1/1/43	Total Req. during 1943
4 Engine Pilots	5,702	14,805	- 3,773	12,876
2 Engine Pilots	16,362	37,885	- 6,675	28,198
1 Engine Pilots	26,110	64,933	- 14,830	53,653
Glider Pilots	1,384	3,639	- 299	2,554
Bombardier	5,593	12,927	- 2,789	10,123
Navigator	7,130	16,391	- 4,081	13,342
Observer	848	1,774	- 191	1,117
Engineering	3,240	5,376	- 2,006	4,142
Armament	1,188	2,114	- 26	952
Weather	1,609	3,155	- 963	2,509
Communications	1,637	2,667	+ 40	990
Radar	197	880	- 87	770
Photographic	983	1,610	- 605	1,232
Guard	1,012	1,542	- 864	1,394
Student Officers	(4,602)	(5,000)		
Replacement Pool		(2,000)		
All Other Officers	35,153	53,545	- 2,101	20,493
TOTAL OFFICERS	112,750	230,243	- 39,250	154,345
ENLISTED MEN				
Clerk-Administrative and Technical	124,430	194,023	- 35,975	105,568
Aircraft Mechanic	129,778	214,640	- 8,956	93,818
Glider Mechanic	4,366	7,364	- 4,833	7,831
Machinist	2,011	3,331	+ 1,643	- 323
Metal Worker	7,530	12,763	- 1,228	6,451
Parachute Rigger	3,609	6,139	- 1,015	3,545
Welder	3,283	5,774	+ 2,518	- 27
Link Trainer Instructor	4,868	7,779	- 448	3,359
Radio Mechanic-Radio Operator-Control Tower Operator	42,459	72,003	- 15,422	44,966
Teletype Repairman	4,884	8,443	- 3,609	7,168
Armorer	32,373	57,955	- 14,646	40,228
Photographer	1,162	1,735	+ 3,499	- 2,926
Aircraft Electrical Spec.	4,027	6,821	- 1,231	4,025
Aircraft Instrument Spec.	6,550	10,845	- 1,800	6,095
Aircraft Propeller Spec.	3,398	5,512	- 1,375	3,489
Radar Operator ASV	508	1,267	+ 138	621
Radar Mechanic ASV	547	1,358	+ 308	503
Radar Mechanic IFF	1,333	2,469	- 586	1,722
Radar Operator AI	-	-	-	-
Radar Mechanic AI	66	166	+ 84	16
Radar Operator MAD	-	-	- 82	82
Radar Mechanic MAD	-	-	- 82	82
HF Operator	572	1,119	- 577	1,124
HF Mechanic	156	271	- 156	271
VHF Operator	3,212	4,900	- 2,554	4,242
VHF Mechanic	974	1,664	- 875	1,565
DF Operator	1,690	2,621	- 1,527	2,458
DF Mechanic	144	237	- 74	167

[redacted]

Program "A"

Estimated Personnel Requirements By Specialty
Calendar Year 1943*
(Air Force Personnel Only)

ENLISTED MEN (Cont'd)	Required as of 1/1/43	Total Req. as of 1/1/44	Est. Over or Short 1/1/43	Total Req. during 1943
Weather Forecaster	1,876	3,172	- 503	1,799
Bombsight Repairman	2,360	3,866	- 764	2,270
Power Turret & Gunsight Mechanic	1,661	2,740	- 179	1,258
Photographic Laboratory Tech.-Camera Repairman	8,658	14,053	- 5,344	10,739
Aerial Gunner	7,032	13,462	- 872	7,302
Pilot - Airplane	796	1,938	- 331	1,473
Pilot - Glider	5,250	17,117	- 1,643	13,510
Draftsman	1,842	3,093	- 163	1,414
Teletype Operator	1,893	3,422	- 543	2,072
Cook - Baker	26,869	42,130	- 8,637	23,898
Cable and Wire Worker	240	454	- 141	355
Dope & Fabric Worker-Painter	2,114	3,567	+ 3,144	- 1,691
Woodworker	3,215	5,310	- 216	2,311
Automobile Mechanic	16,584	27,526	- 8,581	19,523
Truck Driver-Tractor Driver	31,180	49,902	+ 9,868	8,854
General Electrician	1,498	2,397	+ 1,021	- 122
Telephone Lineman	872	1,751	+ 637	242
Weather Observer	5,718	9,964	- 2,456	6,702
Bandsman	4,353	6,177	- 1,795	3,619
Guard	26,373	42,168	- 34,898	50,693
Students in School	(245,102)	(500,000)		
Non-Specialist	116,517	168,686	+103,342	- 51,173
TOTAL ENLISTED MEN	895,933	1,554,104	- 37,915	441,168

* Requirements as of Jan. 1, 1944, show required strength plus estimated attrition during 1943.

NOTE: The categories "Student Officers", "Replacement Pool", and "Students in School", show the amount of personnel required to be actually in school and in a replacement pool as of the date indicated in the column heading.

AAF Management Control

Office, Director, Statistical Control
September 7, 1942

[redacted]

Program "B"

Estimated Personnel Requirements By Specialty
Calendar Year 1943*
(Air Force Personnel Only)

	Required as of 1/1/43	Total Req. as of 1/1/44	Est. Over or Short 1/1/43	Total Req. during 1943
OFFICERS				
4 Engine Pilots	5,602	16,756	- 3,673	14,827
2 Engine Pilots	14,233	44,016	- 4,546	34,329
1 Engine Pilots	25,119	73,938	- 13,839	62,658
Glider Pilots	1,384	4,007	- 299	2,922
Bombardier	6,058	15,189	- 3,254	12,385
Navigator	6,989	18,436	- 3,940	15,387
Observer	848	1,999	- 191	1,342
Engineering	3,240	5,946	- 2,006	4,712
Armament	1,188	2,337	- 26	1,175
Weather	1,609	3,490	- 963	2,844
Communications	1,637	2,951	+ 40	1,274
Radar	197	956	- 87	846
Photographic	983	1,790	- 605	1,412
Guard	1,012	1,706	- 864	1,558
Student Officers	(4,602)	(5,000)		
Replacement Pool		(2,000)		
All Other Officers	35,153	59,220	- 2,101	26,168
TOTAL OFFICERS	109,854	259,737	- 36,354	183,839
ENLISTED MEN				
Clerk-Administrative and Technical	124,430	213,126	- 35,975	124,671
Aircraft Mechanic	129,778	236,121	- 8,956	115,299
Glider Mechanic	4,366	8,036	- 4,833	8,503
Machinist	2,011	5,768	+ 1,643	2,114
Metal Worker	7,530	14,046	- 1,228	7,744
Parachute Rigger	3,609	6,869	- 1,015	4,275
Welder	3,283	6,271	+ 2,518	470
Link Trainer Instructor	4,868	9,845	- 448	5,425
Radio Mechanic-Radio Operator-Control Tower Operator	42,459	79,303	- 15,422	52,266
Teletype Repairman	4,884	9,291	- 3,609	8,016
Armorer	32,373	63,731	- 14,646	46,004
Photographer	1,162	1,912	+ 3,499	- 2,749
Aircraft Electrical Spec.	4,027	7,509	- 1,231	4,713
Aircraft Instrument Spec.	6,550	11,943	- 1,800	7,193
Aircraft Propeller Spec.	3,398	6,180	- 1,375	4,157
Radar Operator ASV	508	1,387	+ 138	741
Radar Mechanic ASV	547	1,486	+ 308	631
Radar Mechanic IFF	1,333	2,603	- 586	1,856
Radar Operator AI	-	-	-	-
Radar Mechanic AI	66	180	+ 84	30
Radar Operator MAD	-	-	- 82	82
Radar Mechanic MAD	-	-	- 82	82
HF Operator	572	1,120	- 577	1,125
HF Mechanic	156	497	- 156	497
VHF Operator	3,212	5,406	- 2,554	4,748
VHF Mechanic	974	1,836	- 875	1,737
DF Operator	1,690	2,858	- 1,527	2,695
DF Mechanic	144	260	- 74	190

Program "B"

Estimated Personnel Requirements By Specialty
Calendar Year 1943*
(Air Force Personnel Only)

ENLISTED MEN (Cont'd)	Required as of 1/1/43	Total Req. as of 1/1/44	Est. Over or Short 1/1/43	Total Req. during 1943
Weather Forecaster	1,876	4,036	- 503	2,663
Bombsight Repairman	2,360	4,259	- 764	2,663
Power Turret & Gunsight Mechanic	1,661	4,123	- 179	2,641
Photographic Laboratory Tech.-Camera Repairman	8,658	15,566	- 5,344	12,252
Aerial Gunner	7,032	14,783	- 872	8,623
Pilot - Airplane	796	2,665	- 331	2,200
Pilot - Glider	5,250	18,167	- 1,643	14,560
Draftsman	1,842	3,432	- 163	1,753
Teletype Operator	1,893	3,952	- 543	2,602
Cook - Baker	26,869	46,521	- 8,637	28,289
Cable and Wire Worker	240	537	- 141	438
Dope & Fabric Worker-Painter	2,114	4,924	+ 3,144	- 334
Woodworker	3,215	6,031	- 216	3,032
Automobile Mechanic	16,584	30,535	- 8,581	22,532
Truck Driver-Tractor Driver	31,180	55,008	+ 9,868	13,960
General Electrician	1,498	2,650	+ 1,021	131
Telephone Lineman	872	1,964	+ 637	455
Weather Observer	5,718	11,185	- 2,456	7,923
Bandsman	4,353	6,855	- 1,795	4,297
Guard	26,373	46,661	- 34,898	55,186
Students in School	(245,102)	(500,000)		
Replacement Pool	-	-	-	-
Non-Specialist	116,517	187,081	+103,342	- 32,778
TOTAL ENLISTED MEN	895,933	1,668,519	- 37,915	555,603

* Requirements as of Jan. 1, 1944, show required strength plus estimated attrition during 1943.

NOTE: The categories "Student Officers", "Replacement Pool", and "Students in School", show the amount of personnel required to be actually in school and in a replacement pool as of the date indicated in the column heading.

AAF Management Control

Office, Director Statistical Control
September 9, 1942

- ARMS AND SERVICES UNITS REQUIRED TO MEET A PROGRAM IN 1943 -

(In accordance with paragraph 5, R and R, AFDAS to AFAAP, dated 9-5-42, subject as above)

REQUIREMENTS TO MEET AIR COMBAT UNITS ONLY

Unit Type and Designation	German Theatre Offensive	North Africa Air Support	Middle East Air Support	Japanese Theatre Air Support	Hemisphere Defense Air Operation	Anti Submarine Patrol	Japanese Theatre Air Offensive	European Offensive Air Operation	Aggregate	Officers	Enlisted Men
CHEMICAL WARFARE SERVICE											
CHEMICAL DEPOT CO (AVN)	5	2	2	6	4	1	2	2	24		
CHEMICAL CO AIR OPERATIONS (H)	42	3	8	14	9	0	22	0	98		
CHEMICAL CO AIR OPERATIONS (M)	15	4	2	11	3	8	0	0	44		
CHEMICAL CO AIR OPERATIONS (L)	1	2	4	2	5	0	0	4	18		
CHEMICAL CO AIR OPERATIONS (D)	0	0	0	7	5	0	0	4	16		
CHEMICAL CO MAINTENANCE (AVN)	5	2	2	6	4	1	2	2	24		
CHEMICAL CO IMPREGNATING (AVN)	5	2	2	6	4	0	1	2	22		
										1,042	38,378
CORPS OF ENGINEERS											
ENGINEER HQ CO AF	5	2	2	6	4	1	2	2	24		
ENGINEER REGIMENT AVN	1	1	1	1	1	0	0	0	5		
ENGINEER BN AVN	39	11	12	43	28	4	11	17	165		
ENGINEER CAMOUFLAGE BN AVN	39	11	12	43	28	4	11	17	165		
ENGINEER TOPO CO AVN	5	2	2	6	4	1	2	2	24		
ENGINEER CO DEPOT AVN	5	2	2	6	4	1	2	2	24		
										10,319	212,740
ORDNANCE DEPARTMENT											
ORDNANCE CO A M	5	2	2	6	4	1	2	2	24		
ORDNANCE CO DEPOT	5	2	2	6	4	1	2	2	24		
ORDNANCE CO MEDIUM MAINT	5	2	2	6	4	1	2	2	24		
ORDNANCE CO AVN (AB)	39	11	12	43	28	4	11	17	165		
ORDNANCE CO MEDIUM MAINT (AVN) Q	58	16	18	64	42	6	16	26	246		
ORDNANCE CO DEPOT MOTOR TRANSPORT (AVN) Q	5	2	2	6	4	1	2	2	24		
										1,680	35,640
QUARTERMASTER CORPS											
QM CO TRK (AVN)	58	16	18	64	42	6	16	26	246		
QM CO SERVICE GROUP (AVN)	39	11	12	43	28	4	11	17	165		
QM CO DEPOT SUBSIST (AVN)	5	2	2	6	4	1	2	2	24		
QM CO DEPOT CLASS III (AVN)	5	2	2	6	4	1	2	2	24		
QM PLATOON AIR DEPOT GP	20	6	6	22	14	2	6	9	85		
										1,358	40,634
SIGNAL CORPS											
SIGNAL CO AVN	13	4	4	14	10	1	4	6	56		
SIGNAL BN GROUND-AIR SUPPORT	5	2	2	6	4	1	2	2	24		
SIGNAL CO RADIO INTELLIGENCE	5	2	2	6	4	1	2	2	24		
SIGNAL BN CONSTRUCTION	5	2	2	6	4	1	2	2	24		
SIGNAL CO DEPOT AVN	20	6	6	22	14	2	6	9	85		
SIGNAL CO SERVICE GP	39	11	12	43	28	4	11	17	165		
SIGNAL CO WING	20	6	6	22	14	2	6	9	85		
SIGNAL HQ & HQ CO FIGHTER COMMAND	1	1	1	1	1	0	0	1	6		
SIGNAL A W REGIMENT	1	1	1	1	1	0	0	1	6		
SIGNAL A W (SEP)	15	8	6	26	15	0	0	10	80		
										7,203	166,487
MEDICAL CORPS											
MEDICAL SUPPLY PLAT	20	6	6	22	14	2	6	9	85		
AIR EVACUATION GP (MED)	5	2	2	6	4	1	2	2	24		
STATION HOSPITAL, DET	39	11	12	43	28	4	11	7	165		
										4,692	16,487
AIR BASE SECURITY BN	78	23	25	85	57	8	22	34	332		
										5,976	139,304
M P CO AVN	58	16	18	64	42	6	16	26	246		
										984	24,600
OFFICERS	7,611	2,509	2,569	8,765	5,673	792	2,053	3,282		33,254	
ENLISTED MEN	157,037	49,853	50,653	176,873	114,835	15,023	41,773	68,223			674,270

Tab J

Bases

POSSIBILITIES OF BASING REQUIRED FORCES

I. European Theatre:

1. British Isles.

There will be at least 130 air bases with concrete runways in excess of 5,000 feet available to the U. S. Army Air Forces in the United Kingdom by January, 1944. The rate of completion of these air bases exceeds the rate at which we can move units to England. Capacity of these bases: maximum, 130 groups - normal, 65 groups.

2. Africa and Middle East.

See following maps for information on North African Bases.

II. Pacific Theatre:

1. North Pacific.

Sufficient air fields exist to base the required force in this area.

2. Central Pacific.

If 48 planes could be based on each existing field in this area, there would be no necessity for new construction. However, as it seems undesirable to locate more than 24 planes on any one air field, 24 new air fields will have to be constructed.

3. South Pacific.

To adequately base the required force in this area, 20 new air fields will have to be built.

4. Southwest Pacific.

Enough air fields already exist to base the required force in this area.

5. Pacific Attack Forces.

The only area which has adequate air field facilities to base this attack force is Australia.

6. India, Burma, China, Ceylon.

Enough air fields exist to base the force set up in this area.

7. Reserve Force for Eastern Siberia.

Enough air fields exist in Eastern Siberia to base this force. Before the force moves across the North Pacific, it can be concentrated in Northwestern U.S.A., Canada, and Alaska, where sufficient fields exist for this purpose.

EIRE
GREAT BRITAIN
London
NETHERLANDS
BELGIUM
GERMANY
Berlin
Dessau
Warsaw
POLAND
Prague
CZECHOSLOVAKIA
Paris
FRANCE
SWITZERLAND
Vienna
AUSTRIA
Budapest
HUNGARY
ROMANIA
Belgrade
YUGOSLAVIA
CORSICA
Rome
SARDINIA
GREECE
SICILY
PORTUGAL
SPAIN
Madrid
Lisbon
BALEARIC ISLANDS
950 Statute miles
Gibraltar
Algiers
Oran
Tunis
MALTA
5 FIELDS REPORTED
3 OPERATIONAL
SPANISH MOROCCO
153 FIELDS REPORTED
14 OPERATIONAL
158 FIELDS
70 POSSIBLE OPERATIONAL
Tripoli
1370 Statute miles
ALGERIA
LIBYA
MOROCCO

AVAILABILITY OF AIR BASES — FAR EAST

AREA "A"

OF THE 75 FIELDS REPORTED:

20 ARE PROBABLY SUITABLE FOR OPERATIONS

22 WILL REQUIRE IMPROVEMENT

42 FIELDS ARE REQUIRED

AREAS "A" AND "B" OFFER FACILITIES SHOWN

AREA "B"

33 FIELDS REPORTED TO EXIST

12 ARE PROBABLY SUITED FOR OPERATIONS

21 WILL REQUIRE IMPROVEMENT

9 MUST BE BUILT

ZONE II — 133 FIELDS TOTAL; 52 PROBABLY USABLE FOR OPERATIONS

ZONE I — 136 FIELDS TOTAL (OUTSIDE JAPAN); 29 PROBABLY USABLE FOR OPERATIONS

NOME
DUTCH HARBOR
ADAK
ATTU
KISKA
VLADIVOSTOK
TOKYO
SHANGHAI
CHUNGKING
BONIN ISLANDS
MARCUS I
WAKE I.
MIDWAY
TIWAN
MARIANAS ISLANDS
MARSHALL ISLANDS
PHILIPPINE ISLANDS
TRUK
PALAU I.
SINGAPORE
BORNEO
CELEBES
RABAUL
BOUGAINVILLE
BUKA
GUADALCANAL

300 MILES
950 MILES
1370 MILES
2000 MILES

ALBERS EQUAL AREA PROJECTION SCALE 1:15,000,000

DISTANCES IN STATUTE MILES

Tab K

Air Transport Requirements

[redacted]

AIR TRANSPORT COMMAND REQUIREMENTS

1943

AIRCRAFT

Transport Aircraft	Required	Allocated	To Be Allocated
Two Engine	806	520	286
Four Engine	1199	280	919

2000

PERSONNEL

Flight Personnel	Total Required	On Hand or Allocated	Air Corps Training	Airlines Training	Total to be Trained
Pilots	8851	3421	2715	2715	5430
Co-Pilots	6736	2239	2248	2249	4497
Navigators	3931	542	1694	1695	3389
Flight Radio Operators	5901	417	2742	2742	5484

FUEL

REQUIRED PER MONTH

Transport $30 \times \frac{8000}{6} \times 2005 = 80{,}200{,}000$ gallons.

Ferry $\frac{25{,}000}{6} \times \frac{25{,}000}{12} = \frac{8{,}680{,}000}{88{,}880{,}000}$ gallons Total

$\frac{88{,}880{,}000}{2{,}000} \times 6 = 266{,}640$ tons of fuel per month.

[redacted]

THE AIR TRANSPORT COMMAND

Functions:

The Air Transport Command will, in 1943:

1. Ferry up to 25,000 combat aircraft to combat area.

2. Carry 800 pounds per month of supplies for these aircraft to theaters of operation.

3. Carry 6,000 tons per month of supplies for the S.O.S.

4. Provide air transportation for essential people from the United States to theaters of operation.

5. Provide transportation from other countries to the United States for essential people and particularly for strategic materials.

6. Provide for operation of Air Transport Service from India to China to offset the loss of the Burma Road.

Assumptions:

1. Air Transport Command will handle all transport and all ferrying operations from United States to and from combat areas.

2. Each transport airplane averages 1,500 miles per day throughout the year.

3. Each transport flight crew averages 70 hours per month, each ferry flight crew averages 50 hours per month.

4. Average air trip from point of origin in the United States to destination in combat zone is 7,000 miles.

5. Each ferrying aircraft requires 35 hours of flying to reach destination.

6. Six thousand (6,000) tons of supplies per month will be carried for the S.O.S.

7. Required average weight of supplies to be air borne - per combat aircraft per month - 800 pounds.

8. Critical non-stop mileage of each transport trip - 2,500 miles (3,000 miles gasoline required).

9. Each transport airplane averages 8,000 pounds of fuel per day.

10. Each ferried aircraft averages 25,000 pounds of fuel to reach destination.

11. Attrition on all aircraft in transport service for the Air Transport Command will be 1% per month.

12. Attrition of flight personnel is estimated to be one person for every 2,000 plane hours.

13. In 1943, 25,000 combat aircraft will be ferried overseas. An equal number will be shipped. The total production must be domestically ferried.

14. Passengers, equivalent in weight to 20% of the tons of cargo per month, must be transported out-bound. (Sufficient space is available in-bound for that passenger movement).

15. Air Transport Command route requirements will absorb 10% of transport capacity.

[redacted]

16. Each bi-motor transport carries two and one-half tons of cargo.

17. Each four-motor transport carries three and one-half tons of cargo.

18. No Troop Carrier figures are included in this study.

19. Maximum utilization will be made of the services and facilities of the U. S. Commercial Air Lines.

[redacted]


UNCLASSIFIED
[redacted]
UNION OF SOVIET SOCIALIST REPUBLICS
CHINA
INDIA
AUSTRALIA
NORTH PACIFIC OCEAN
SOUTH PACIFIC OCEAN
INDIAN OCEAN
CORAL SEA
TASMAN SEA
BERING SEA
OKHOTSK SEA
HAWAIIAN ISLANDS
CAROLINE ISLANDS
ALASKA
DOMINION OF CANADA
UNITED STATES
HUDSON BAY
GREENLAND
BAFFIN BAY
DAVIS STRAIT
ICELAND
NORTH ATLANTIC OCEAN
SOUTH ATLANTIC OCEAN
BRAZIL
FRENCH WEST AFRICA
SAHARA
MEDITERRANEAN SEA
IRAN
ARABIAN SEA
GREENLAND SEA
BARENTS SEA
KARA SEA
NOTE
The boundaries shown upon this chart are approximate only and should not be regarded as having official significance
AIR TRANSPORT COMMAND 1943
PROPOSED ROUTES
FOREIGN ROUTES
DOMESTIC ROUTES
AFATC/PL/NL/RB/D6

Tab L

Logistic Requirements

[redacted]

LOGISTIC REQUIREMENTS

Tons of Bombs: Program A - 1,140,363 tons.
Program B - 1,238,566 tons.

Gallons of Gasoline: Program A - 4,888,941,000 gallons.
Program B - 5,372,179,000 gallons.

Ship Tons: Program A - 17,421,507 S.T.
Program B - 19,804,041 S.T.

Maximum Number of 11,000-Ton Vessels required to be in use in any one Month (average turn-around - 2.81 months):
Program A - 429 vessels
Program B - 477 vessels

1. Shipping Implications: Assuming that shipping losses do not increase beyond the average for the past six months (2.6%), that transportation of Defense Aid and war economy materials in United States bottoms will remain drastically curtailed, and that no allocations from ship production will be made to the British beyond the requirements to meet the losses, the following conclusions regarding the availability of shipping for this deployment may be drawn:

a. The Air Force requirements for shipping imposed by either hypothesis can be met, if the Navy requirements continue to increase on a straight line basis applied against 1942 requirements, and if no other increase is made in Army strengths overseas beyond that attained by January 1, 1943.

2. Gasoline Implications: The total gasoline requirement, as shown, is close to the maximum output that can be attained in the United States, using all productive facilities and without regard to any United States Navy or British requirements. This does not take into account the following off-setting factors:

a. A large portion of the requirements for tactical gasoline as shown is for use during the early part of 1944, and may not necessarily be produced and shipped during 1943.

b. A large portion of the training gasoline may be of lower octane, although the exact proportion cannot be calculated at this time.

c. Additional facilities to meet the program can be built, if the producers of gasoline are given high priorities for the construction of facilities.

3. Other Implications: Given adequate priorities, the balance of the requirements for bombs, ammunition, spare parts, operating equipment, etc., can be furnished.

[redacted]

TOTAL SHIP TONS REQUIRED

INITIAL HYPOTHESIS	1943 JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	1944 JANUARY
Quartermaster Supplies, Class I - IV	77,000	34,700	35,600	46,800	47,560	60,400	59,120	73,760	71,240	87,360	79,720	98,360	104,160
Gasoline, (Aviation)	381,836	416,835	444,215	525,215	548,265	382,595	601,675	632,110	811,729	833,890	858,329	[illegible]	709,559
Airplanes	75,572	113,715	131,796	159,943	125,468	168,413	166,208	183,232	169,295	170,674	177,205	207,284	
Organizational Equipment And Air Corps Technical Supply	275,907	203,733	232,165	221,326	234,032	179,766	248,959	200,341	231,872	191,501	203,643	154,348	
Personnel, (Individual Equipment)	212,344	178,155	184,035	193,268	190,673	170,280	217,669	199,676	218,370	196,083	219,405	184,106	
Chemical	18,030	27,712	28,989	27,522	22,529	23,579	21,157	26,266	22,091	24,613	22,550	20,960	18,963
Ordnance	66,656	44,022	76,297	83,164	87,407	86,196	107,447	98,579	116,475	118,187	117,741	118,210	100,419
TOTAL	1,107,445	1,018,872	1,133,097	1,255,355	1,255,934	1,269,229	1,422,235	1,413,962	1,641,072	1,622,308	1,678,593	1,670,574	933,101
Ships In Use Average 11,000 Tons - (Average 2.81 Month Turn-Around Time)	281	284	289	320	320	326	365	365	421	421	429	424	240
INITIAL AND ALTERNATE													
Quartermaster Supplies	92,400	41,640	42,720	56,160	57,072	72,480	70,944	88,512	85,488	104,832	95,664	118,032	124,992
Gasoline	464,489	499,488	526,868	605,985	630,918	663,248	684,328	714,763	894,[illegible]	916,543	941,[illegible]	[illegible],959	792,212
Airplanes	102,142	140,285	158,366	186,513	152,038	194,983	192,778	209,802	195,865	197,244	203,775	233,854	
Organizational Equipment And Air Corps Technical Supply	306,444	234,270	262,702	251,863	264,569	210,303	279,496	230,878	262,409	222,038	234,180	184,885	
Personnel	235,344	201,155	207,035	216,268	213,673	193,280	240,669	222,676	241,370	219,038	242,405	207,106	
Chemical	21,561	31,243	32,520	31,053	26,060	27,110	24,688	29,797	25,622	28,144	26,081	24,491	22,494
Ordnance	76,258	53,624	86,399	92,766	97,009	95,798	117,049	108,181	126,077	127,789	127,343	127,812	110,021
GRAND TOTAL	1,298,638	1,201,705	1,316,610	1,440,608	1,441,339	1,457,202	1,609,952	1,604,609	1,831,213	1,815,673	1,870,640	1,866,139	1,049,719
Ships In Use Average 11,000 Tons - (Average 2.81 Month Turn-Around Time)	331	306	337	368	368	370	410	410	466	466	477	477	269

PERSONNEL AND
INITIAL INDIVIDUAL EQUIPMENT FOR INITIAL AND FILLER PERSONNEL MOVING BY SHIP
(IN SHIP TONS) *

INITIAL HYPOTHESIS

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
Heavy Bomb.	26861	19346	23944	20426	29141	17509	26104	22586	31301	27904	32621	30660
Medium Bomb.	13399	25643	14434	10811	15008	15352	19665	8224	16271	15581	12788	13222
Light Bomb.	13418	638	14055	10223	6176	1916	15334	7163	7376	2873	2873	2872
Dive Bomb.	9818	5482	983	10309	1309	1309	1309	5974	6138	6431	6596	6761
Fighter	15551	19954	20543	21131	17753	22155	18776	27139	19946	20381	24907	21528
Observation	4804	4965	653	9608	983	9938	5786	5947	6109	6270	6431	6593
Photographic	6068	2438	6360	2730	2805	6727	5018	7087	5378	5520	5910	3855
Transport	10365	15278	11040	6668	20730	7343	12120	17438	13065	8423	22470	9773
Service	66154	51405	58193	59636	61080	51593	69153	59749	66536	62475	63758	54034
Air Depot	45908	33008	33833	41726	35689	36514	44408	38370	46263	40226	41051	34808
TOTAL SHIP TONS	212344	178155	184035	193268	190673	170280	217669	199676	218370	196083	219405	184106

INITIAL HYPOTHESIS TOTAL 2,364,064

ALTERNATE HYPOTHESIS (To be moved in some time during 1943 assuming average operations of all these units for six months.)

Heavy Bomb.	103774												
Light Bomb.	22185												
Fighter	47025												
Observation	36851												
Dive Bomb.	21930												
Transport	42547												
TOTAL BY MONTHS	23000	23000	23000	23000	23000	23000	23000	23000	23000	23000	23000	23000	
GRAND TOTAL BY MONTHS	235344	201155	207035	216268	213673	193280	240669	222676	241370	219083	242405	207106	

TOTAL ADDITIONAL -ALTERNATE HYPOTHESIS 274,312

GRAND TOTAL 2,538,376

* 3.75 Ship Tons / man

15% monthly attrition, Flight Personnel

3% monthly attrition, Ground Personnel

Heavy, Medium and Transport initial and replacement crews flown.

2 Service, 1 Air Depot Group to every 4 Tactical Groups.

SHIP TONS-AIRCRAFT *

INITIAL HYPOTHESIS

TYPE	% SHIPPED	SHIP TONS PER PLANE	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
Light	50	140 (Crated)	15120	2100	23520	18900	19040	19600	34160	15540	15680	9240	9240	9240
Dive	50	91 (Crated)	8372	9555	3276	16198	4368	5278	4368	11557	10920	12649	6370	13559
Fighter	75	105 (Crated)	37485	81900	87045	93345	86625	104370	96495	127155	108990	113820	130305	149625
Observation	75	105	7140	15540	7245	25515	8925	27090	20160	20475	21840	22155	23520	24150
Photographic	75	105	7455	4620	10710	5985	6510	12075	11025	8505	11865	12810	7770	10710
TOTAL			75572	113715	131796	159943	125468	168413	166208	183232	169295	170674	177205	207284

TOTAL (INITIAL HYPOTHESIS) 1,848,805

ALTERNATE HYPOTHESIS (To be moved in sometime during 1943 assuming average operations of all units for six months)

Light	50	140	39340											
Dive	50	91	4186											
Fighter	75	105	173250											
Observation	75	105	102060											
TOTAL BY MONTHS			26570	26570	26570	26570	26570	26570	26570	26570	26570	26570	26570	26570
GRAND TOTAL BY MONTHS			102142	140285	158366	186513	152038	194983	192778	209802	195865	197244	203775	233854

TOTAL ADDITIONAL ALTERNATE HYPOTHESIS 318,836

GRAND TOTAL 2,167,641

* All Heavy and Medium Bombardment and Transport planes flown.

[redacted]

[redacted]

TACTICAL AVIATION GAS AND OIL WITH SUPPLY ON HAND JANUARY 1944 FOR SIX MONTHS' OPERATION AT STRENGTH

INITIAL HYPOTHESIS

	1943												1944	(SUPPLY FOR FIVE MONTHS' OPERATION AT STRENGTH.		NOTE:
Heavy Bomb.	JANUARY Gallons	FEBRUARY Gallons	MARCH Gallons	APRIL Gallons	MAY Gallons	JUNE Gallons	JULY Gallons	AUGUST Gallons	SEPTEMBER Gallons	OCTOBER Gallons	NOVEMBER Gallons	DECEMBER Gallons	JANUARY Gallons	Gallons	Ship Tons	
14,500 gals. a mo. per plane	12,500,000	16,676,000	19,460,000	22,940,000	25,724,000	29,900,000	31,988,000	35,428,000	91,040,000	95,216,000	98,696,000	102,176,000	105,656,000	264,140,000*	880,500*	*Proportionate amt.added Sept.thru Jan.
Medium Bomb.																
8,300 gals. a mo. per plane	6,905,000	8,498,000	10,091,000	34,519,000	35,581,000	37,174,000	38,767,000	40,891,000	18,587,000	20,180,000	21,773,000	22,835,000	22,835,000	114,175,000*	380,600*	*Proportionate amt.added April thru Aug.
Light Bomb.																
4,500 gals. a mo. per plane	6,720,000	7,584,000	7,584,000	1,782,000	2,304,000	2,592,000	2,592,000	3,456,000	3,744,000	4,032,000	4,032,000	4,032,000	4,032,000	20,160,000*	67,200*	*Proportionate amt.added Jan.1943 thru March.
Fighter																
3,000 gals. a mo. per plane	5,625,000	6,300,000	7,200,000	8,100,000	9,000,000	9,675,000	10,575,000	11,250,000	28,125,000	28,800,000	29,475,000	30,375,000	31,500,000	78,750,000*	262,500*	*Proportionate amt.added Sept. thru Jan.
Observation.																
4,500 gals. a mo. per plane	675,000	1,013,000	1,351,000	6,080,000	6,755,000	6,755,000	7,430,000	7,768,000	3,377,000	3,715,000	4,053,000	4,391,000	4,729,000	23,645,000*	78,815*	*Proportionate amt.added April thru August.
Dive Bomb.																
3,000 gals. a mo. per plane	6,624,000	7,200,000	7,488,000	1,728,000	2,304,000	2,304,000	2,304,000	2,304,000	2,592,000	2,880,000	3,168,000	3,168,000	3,456,000	17,280,000*	57,600*	*Proportionate amt.added Jan.1943 thru March.
Photo.																
4,500 gals. a mo. per plane	468,000	819,000	936,000	1,287,000	1,404,000	1,521,000	1,872,000	2,106,000	5,031,000	5,265,000	5,499,000	5,499,000	5,616,000	14,040,000*	46,800*	*Proportionate amt.added Sept. thru Jan.
Transport																
14,000 gals. a mo. per plane	16,128,000	17,556,000	19,740,000	21,196,000	21,924,000	24,836,000	25,564,000	27,020,000	29,204,000	30,660,000	31,388,000	34,307,000	35,035,000	123,655,000*	412,185*	*Proportionate amt.added Jan.1943 thru Jan.1944.
TOTAL GALLONS	55,645,000	65,646,000	73,850,000	97,578,000	104,996,000	114,757,000	121,092,000	130,223,000	181,700,000	190,208,000	198,084,000	206,783,000	212,859,000	655,845,000		
TOTAL SHIP TONS	183,836	218,835	246,215	325,332	350,265	382,595	403,675	434,110	613,729	635,890	660,329	689,306	709,559	2,186,200		
GRAND TOTAL GALLONS	1,753,421,000															
GRAND TOTAL SHIP TONS	5,853,676															

ALTERNATE														Five Mos. Supply *		
Heavy Bomb.	12,956,000	12,956,000	12,956,000	12,956,000	12,956,000	12,956,000	12,956,000	12,956,000	12,956,000	12,956,000	12,956,000	12,956,000	12,956,000	76,560,000	255,200	*Proportionate amt.added Jan.1943 thru Jan.1944.
Light Bomb.	975,000	975,000	975,000	975,000	975,000	975,000	975,000	975,000	975,000	975,000	975,000	975,000	975,000	5,760,000	19,200	
Fighter	2,540,000	2,540,000	2,540,000	2,540,000	2,540,000	2,540,000	2,540,000	2,540,000	2,540,000	2,540,000	2,540,000	2,540,000	2,540,000	15,000,000	50,000	
Observation	2,240,000	2,240,000	2,240,000	2,240,000	2,240,000	2,240,000	2,240,000	2,240,000	2,240,000	2,240,000	2,240,000	2,240,000	2,240,000	13,230,000	44,100	
Dive Bomb.	975,000	975,000	975,000	975,000	975,000	975,000	975,000	975,000	975,000	975,000	975,000	975,000	975,000	5,760,000	19,200	
Transport	5,000,000	5,000,000	5,000,000	5,000,000	5,000,000	5,000,000	5,000,000	5,000,000	5,000,000	5,000,000	5,000,000	5,000,000	5,000,000	29,120,000	97,070	
TOTAL GALLONS	24,686,000	24,686,000	24,686,000	24,686,000	24,686,000	24,686,000	24,686,000	24,686,000	24,686,000	24,686,000	24,686,000	24,686,000	24,686,000	145,430,000		
TOTAL SHIP TONS	82,653	82,653	82,653	82,653	82,653	82,653	82,653	82,653	82,653	82,653	82,653	82,653	82,653	484,770		
GRAND TOTAL GALLONS	80,331,000	90,332,000	98,536,000	122,264,000	129,682,000	139,443,000	145,778,000	154,909,000	206,386,000	214,894,000	222,770,000	231,469,000	237,545,000	801,275,000		
GRAND TOTAL SHIP TONS	266,489	301,488	328,868	407,985	432,918	465,248	486,328	516,763	696,382	718,543	743,192	771,959	792,212	2,670,970		
SUM OF GRAND TOTALS GALLONS (BOTH INITIAL AND ALTERNATE)	2,074,339,000															
SUM OF GRAND TOTALS SHIP TONS (BOTH INITIAL AND ALTERNATE)	6,928,395															

[redacted]

TACTICAL, TRAINING AND FERRYING AVIATION GASOLINE AND OIL REQUIREMENT IN GALLONS

INITIAL HYPOTHESIS	1943 JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	1944 JANUARY
Training	163,960,000	163,960,000	163,960,000	163,960,000	163,960,000	163,960,000	163,960,000	163,960,000	163,960,000	163,960,000	163,960,000	163,960,000	
Ferrying	89,000,000	89,000,000	89,000,000	89,000,000	89,000,000	89,000,000	89,000,000	89,000,000	89,000,000	89,000,000	89,000,000	89,000,000	
Tactical	55,645,000	65,646,000	73,850,000	97,578,000	104,996,000	114,757,000	121,092,000	130,223,000	181,700,000	190,206,000	198,084,000	206,783,000	212,859,000
TOTAL TRAINING	1,967,520,000 Gallons												
TOTAL FERRYING	1,068,000,000 Gallons												
TOTAL TACTICAL	1,753,421,000 Gallons												
TOTAL GALLONS	4,888,941,000 Gallons												

INITIAL AND ALTERNATE													
Training	185,820,000	185,820,000	185,820,000	185,820,000	185,820,000	185,820,000	185,820,000	185,820,000	185,820,000	185,820,000	185,820,000	185,820,000	
Ferrying	89,000,000	89,000,000	89,000,000	89,000,000	89,000,000	89,000,000	89,000,000	89,000,000	89,000,000	89,000,000	89,000,000	89,000,000	
Tactical	80,331,000	90,332,000	98,536,000	122,264,000	129,682,000	139,443,000	145,778,000	154,909,000	206,386,000	214,894,000	222,770,000	231,469,000	237,545,000
TOTAL TRAINING	2,229,840,000												
TOTAL FERRYING	1,068,000,000												
TOTAL TACTICAL	2,074,339,000												
TOTAL GALLONS	5,372,179,000												

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SHIP TONNAGE FOR 275 (331) COMBAT GROUPS, JANUARY 1943 to JANUARY 1944 INCLUSIVE

(CLASS I - IV SUPPLIES)

MONTH	1943 JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	1944 JAN
							275 Group Basis						
CLASS I, TONS	118,000	53,200	54,600	71,700	72,900	92,500	89,000	113,300	107,200	134,100	120,400	152,600	159,600
CLASS II & IV	51,000	23,000	23,600	31,000	31,500	40,000	38,500	49,000	46,400	58,000	54,300	66,000	69,000
CLASS III	23,500	10,600	10,900	14,300	14,500	18,500	20,300	22,100	24,500	26,300	24,600	27,300	31,900
TOTALS(Tons)	192,500	86,800	89,100	117,000	118,900	151,000	147,800	184,400	178,100	218,400	199,300	245,900	260,400
SHIP TONS*	77,000	34,700	35,600	46,800	47,560	60,400	59,120	73,760	71,240	87,360	79,720	98,360	104,160

TOTAL '875,840 Ship Tons

331 Group Basis

Add 20%	92,400	41,640	42,720	56,160	57,072	72,480	70,944	88,512	85,488	104,832	95,664	118,032	124,992

GRAND TOTAL 1,050,936

* Conversion factor 2.5

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SHIP TONNAGE REQUIRED FOR INITIAL MOVEMENT OF ORGANIZATIONAL EQUIPMENT AND TABLES II, III, IV AND V

1943

INITIAL HYPOTHESIS	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
Heavy Bomb.	45,882	30,588	38,235	30,588	45,882	22,941	38,235	30,588	45,882	38,235	38,235	38,235
Medium Bomb.	22,065	22,065	22,065	14,710	22,065	22,065	29,420	7,355	22,065	22,065	14,710	
Light Bomb.	18,909		18,909	12,606	6,303		18,909	6,303	6,303			
Fighter	15,045	20,060	20,060	20,060	15,045	20,060	15,045	25,075	15,054	15,054	20,060	25,075
Observation	6,450	6,450	12,900	12,900	12,900	12,900	12,900	6,450	6,450	6,450	6,450	6,450
Dive Bomber	12,606	6,303		12,606				6,303	6,303	6,303		6,303
Photo.	9,070	3,023	9,070	3,023	3,023	9,070	6,047	3,023	6,047	6,047		3,023
Transport	17,888	26,832	17,888	8,944	35,776	8,944	17,888	26,832	17,888	8,944	35,776	8,944
Service	50,886	37,008	41,634	41,634	41,634	32,382	46,260	37,008	41,634	37,008	37,008	27,765
Air Depot	77,106	51,404	51,404	64,255	51,404	51,404	64,255	51,404	64,255	51,404	51,404	38,553
TOTAL	275,907	203,733	232,165	221,326	234,032	179,766	248,959	200,341	231,872	191,501	203,643	154,348
ALTERNATE												
Heavy Bomb.	12,355	12,355	12,355	12,355	12,355	12,355	12,355	12,355	12,355	12,355	12,355	12,355
Light Bomb.	2,101	2,101	2,101	2,101	2,101	2,101	2,101	2,101	2,101	2,101	2,101	2,101
Fighter	4,180	4,180	4,180	4,180	4,180	4,180	4,180	4,180	4,180	4,180	4,180	4,180
Observation	3,800	3,800	3,800	3,800	3,800	3,800	3,800	3,800	3,800	3,800	3,800	3,800
Dive Bomb.	2,101	2,101	2,101	2,101	2,101	2,101	2,101	2,101	2,101	2,101	2,101	2,101
Transport	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000
TOTAL	30,537	30,537	30,537	30,537	30,537	30,537	30,537	30,537	30,537	30,537	30,537	30,537
GRAND TOTAL	306,444	234,270	262,702	251,863	264,569	210,303	279,496	230,878	262,409	222,038	234,180	184,885

Tab M

Aircraft Production

TAB M

AIRCRAFT PRODUCTION REQUIRED

The following chart is indicative of the number of aircraft that must be produced by type and by month in order to meet the program of the Army Air Forces, U. S. Navy, and the requirements of other countries. This chart is schematic and useful for planning purposes only. It is not a valid basis for commitment of forces or aircraft to theaters. The chart was based upon a straight line production rate between January 1, 1943 and January 1, 1944, and the activation of combat units is predicated upon that assumption. It is well known that this condition will not actually exist. The aircraft production rate is parabolic. However, since the exact nature of this parabolic curve is dependent upon many technical production factors and could not be predicted with accuracy, this plan is based upon a straight line rate of increase. If this plan is put into operation, it will be necessary to adjust the rate of commitment of combat units and aircraft to the actual rate of production of aircraft.

RATE OF COMMITMENTS OF TACTICAL GROUPS

FOR PLANNING PURPOSES ONLY

- ALL THEATRES -

PROGRAM "A"

	1943												1944
	Jan. 1	Feb. 1	Mar. 1	Apr. 1	May 1	June 1	July 1	Aug. 1	Sept. 1	Oct. 1	Nov. 1	Dec. 1	Jan. 1
Heavy Bomb	21	22	23	27	32	38	44	50	56	62	68	74	76
Medium Bomb	17	17	19	19	23	25	28	31	34	36	39	42	43
Light Level Bomb	2	3	3	6	8	9	9	12	13	14	14	14	14
Dive Bomb	3	5	6	6	8	8	8	8	9	10	11	12	12
Fighter	36	39	42	44	47	50	53	55	58	61	64	67	70
Observation	8	10	11	12	13	14	15	16	17	18	19	20	20
Photographic	3	3	4	5	6	6	8	8	9	10	11	12	12
Troop Carrier	10	12	14	16	18	20	22	24	26	28	30	32	34
TOTAL GROUPS	100	111	122	135	155	170	187	204	222	239	256	272	281

PROGRAM "B"

	1943												1944
	Jan. 1	Feb. 1	Mar. 1	Apr. 1	May 1	June 1	July 1	Aug. 1	Sept. 1	Oct. 1	Nov. 1	Dec. 1	Jan. 1
Heavy Bomb	21	21	21	24	30	37	45	54	63	72	81	90	98
Medium Bomb	17	17	19	19	23	25	28	31	34	36	39	41	43
Light Level Bomb	2	3	4	6	11	13	13	16	17	18	18	18	18
Dive Bomb	3	5	7	8	11	12	12	12	13	14	15	16	16
Fighter	36	39	42	45	49	53	57	60	64	68	72	76	80
Observation	9	11	13	14	16	17	19	20	22	23	25	27	27
Photographic	3	3	4	5	6	6	8	8	9	10	11	12	12
Troop Carrier	10	12	14	17	20	22	25	28	30	33	36	39	42
TOTAL GROUPS	101	111	124	140	166	185	207	229	252	274	297	319	336

AAF - Management Control

Office, Director Statistical Control
September 9, 1942

MONTHLY FLOW OF TACTICAL AND TRAINING TYPE AIRPLANES REQUIRED FOR ARMY AIR FORCES AND ALL OTHERS*

PROGRAM "A"

(During Calendar Year 1943)

Types of Airplanes	JANUARY			FEBRUARY			MARCH			APRIL			MAY			JUNE			JULY		
	AAF	Other	Total	AAF	Other	Total	AAF	Other	Total	AAF	Other	Total	AAF	Other	Total	AAF	Other	Total	AAF	Other	Total
Heavy Bombers, Land	420	47	467	562	47	609	718	47	765	849	47	896	880	47	927	971	47	1,018	992	47	1,039
Heavy Patrol Bombers, Boat		50	50		50	50		50	50		50	50		50	50		50	50		50	50
Medium Patrol Bombers, Boat		125	125		125	125		125	125		125	125		125	125		125	125		125	125
Medium Bombers, Land	495	164	659	691	163	854	555	163	718	813	163	976	599	163	762	736	163	899	745	163	908
Subtotal	915	386	1,301	1,253	385	1,638	1,273	385	1,658	1,662	385	2,047	1,479	385	1,864	1,707	385	2,092	1,737	385	2,122
Light Bombers, Land, 2 Eng.	386	435	801	237	415	652	519	414	933	463	414	877	469	414	883	310	414	724	589	414	1,003
Light Bombers, Land, 1 Eng.	403	249	652	299	249	548	178	249	427	448	249	697	204	249	453	323	249	572	208	249	457
Light Bombers, Land, 1 Eng. (Carrier)		834	834		834	834		834	834		834	834		833	833		833	833		833	833
Subtotal	789	1,498	2,287	536	1,498	2,034	697	1,497	2,194	911	1,497	2,408	673	1,496	2,169	633	1,496	2,129	797	1,496	2,293
Fighters, 2 Eng., Night	(	17	(	(	17	(	(	17	(	(	17	(	(	17	(	(	17	(	(	17	(
Fighters, 2 Eng., Day	(1,959		(2,708	(2,023		(2,772	(1,815		(2,564	(2,083		(2,832	(2,134		(2,883	(1,913		(2,662	(1,828		(2,577
Fighters, 1 Eng.	(	732	(	(	732	(	(	732	(	(	732	(	(	732	(	(	732	(	(	732	(
Fighters, 1 Eng. (Carrier)		834	834		834	834		834	834		834	834		833	833		833	833		833	833
Subtotal	1,959	1,583	3,542	2,023	1,583	3,606	1,815	1,583	3,398	2,083	1,583	3,666	2,134	1,582	3,716	1,913	1,582	3,495	1,828	1,582	3,410
Transports, 4 Eng., Boat		21	21		21	21		21	21		21	21		21	21		21	21		21	21
Transports, 4 Eng., Land	(940	5	(1,053	(820	5	(933	(844	4	(955	(619	4	(730	(640	4	(751	(648	4	(759	(666	4	(777
Transports, 2 Eng., Land	(	108	(	(	108	(	(	107	(	(	107	(	(	107	(	(	107	(	(	107	(
Subtotal	940	134	1,074	820	134	954	844	132	976	619	132	751	640	132	772	648	132	780	666	132	798
Scouts - Observation - Photo	33	100	133	99	100	199	101	100	201	108	100	208	51	100	151	254	100	354	62	100	162
Total Tactical	4,636	3,701	8,337	4,731	3,700	8,431	4,730	3,697	8,427	5,383	3,697	9,080	4,977	3,695	8,672	5,155	3,695	8,850	5,090	3,695	8,785
Trainers	2,148	825	2,973	2,059	825	2,884	1,582	825	2,407	1,302	825	2,127	885	825	1,710	746	825	1,571	585	825	1,410
Command & Liaison	10	105	115	10	105	115	10	104	114	10	104	114	10	104	114	10	104	114	10	104	114
Total Airplanes	6,794	4,631	11,425	6,800	4,630	11,430	6,322	4,626	10,948	6,695	4,626	11,321	5,872	4,624	10,496	5,911	4,624	10,535	5,685	4,624	10,309
Gliders	788		788	540		540	561		581	591		591	633		633	644		644	686		686

Types of Airplanes	AUGUST			SEPTEMBER			OCTOBER			NOVEMBER			DECEMBER			TOTAL		
	AAF	Other	Total	AAF	Other	Total	AAF	Other	Total	AAF	Other	Total	AAF	Other	Total	AAF	Other	Total
Heavy Bombers, Land	1,022	47	1,069	1,181	47	1,228	1,181	47	1,228	1,255	47	1,302	1,008	46	1,054	11,039	563	11,602
Heavy Patrol Bombers, Boat		50	50		50	50		50	50		50	50		50	50		600	600
Medium Patrol Bombers, Boat		125	125		125	125		125	125		125	125		125	125		1,500	1,500
Medium Bombers, Land	689	163	852	716	163	879	908	163	1,071	867	163	1,030	794	163	957	8,608	1,957	10,565
Subtotal	1,711	385	2,096	1,897	385	2,282	2,089	385	2,474	2,122	385	2,507	1,802	384	2,186	19,647	4,620	24,267
Light Bombers, Land, 2 Eng.	433	414	847	526	414	940	362	414	776	361	414	775	332	414	746	4,987	4,970	9,957
Light Bombers, Land, 1 Eng.	248	249	597	367	249	616	387	248	635	393	248	641	272	248	520	3,830	2,985	6,815
Light Bombers, Land, 1 Eng. (Carrier)		833	833		833	833		833	833		833	833		833	833		10,000	10,000
Subtotal	781	1,496	2,277	893	1,496	2,389	749	1,495	2,244	754	1,495	2,249	604	1,495	2,099	8,817	17,955	26,772
Fighters, 2 Eng., Night	(	17	(	(	16	(	(	16	(	(	16	(	(	16	(	(	200	(
Fighters, 2 Eng., Day	(2,013		(2,761	(2,074		(2,821	(2,136		(2,883	(2,197		(2,944	(2,228		(2,975	(24,403		(33,382
Fighters, 1 Eng.	(	731	(	(	731	(	(	731	(	(	731	(	(	731	(	(	8,779	(
Fighters, 1 Eng. (Carrier)		833	833		833	833		833	833		833	833		833	833		10,000	10,000
Subtotal	2,013	1,581	3,594	2,074	1,580	3,654	2,136	1,580	3,716	2,197	1,580	3,777	2,228	1,580	3,808	24,403	18,979	43,382
Transports, 4 Eng., Boat		21	21		21	21		21	21		20	20		20	20		250	250
Transports, 4 Eng., Land	(674	4	(785	(692	4	(803	(702	4	(813	(728	4	(839	(750	4	(861	(8,723	50	(10,059
Transports, 2 Eng., Land	(	107	(	(	107	(	(	107	(	(	107	(	(	107	(	(	1,286	(
Subtotal	674	132	806	692	132	824	702	132	834	728	131	859	750	131	881	8,723	1,586	10,309
Scouts - Observation - Photo	126	100	226	134	100	234	140	100	240	277	100	377	93	100	193	1,478	1,200	2,678
Total Tactical	5,305	3,694	8,999	5,690	3,693	9,383	5,816	3,692	9,508	6,078	3,691	9,769	5,477	3,690	9,167	63,068	44,340	107,408
Trainers	585	825	1,410	585	825	1,410	585	825	1,410	585	825	1,410	585	825	1,410	12,232	9,900	22,132
Command & Liaison	10	104	114	9	104	113	9	104	113	9	104	113	9	104	113	116	1,250	1,366
Total Airplanes	5,900	4,623	10,523	6,284	4,622	10,906	6,410	4,621	11,031	6,672	4,620	11,292	6,071	4,619	10,690	75,416	55,490	130,906
Gliders	696		696	736		736	749		749	807		807	833		833	8,284		8,284

* "Others" included are the following: U.S.N.; U.K.; Dominions; USSR; NEI; China; Brazil; Mexico; Other So. America.

AAF - Management Control

Office, Director Statistical Control
September 10, 1942

Tab N

Potential Capacity To Exert Air Power

Tab N

POTENTIAL CAPACITY TO PRODUCE AND SUSTAIN AIR POWER

Productive Capacity for Implements of War.

United States

United States productive capacity is today probably ahead of any other source of air power. Current production of combat types for the month of June 1942 is as follows:

United States	2,081
Germany and Italy	1,900
England	1,404
Japan	400 - 500

Thus the Axis productive capacity in Europe and Asia totals 2,300 as compared with 3,485 for England and the United States. It is quite possible that the German aircraft production has been underestimated. It may be as high as 2,300 or 2,400 combat airplanes per month; however, the United States is rapidly accelerating its aircraft production rate and has not yet really got into its stride. The margin of superiority in aircraft production, which is practically the only important factor in which we enjoy a superiority, may be expected to accelerate and become more pronounced. Obviously it is an advantage upon which we should capitalize.

Facilities for Logistic Support.

1. General.

The United States is the most important and powerful source of air power in the world today. Considering productive capacity and air base facilities, the United States is easily in number one position. The second most important seat of air power is Germany. The third most important, and fairly close to Germany, is England. If the transportation lines, both air and sea, between the United States as a production source and England as a base and production source can be kept open, the United States and Great Britain can create a vast superiority in air power in the British Isles, provided of course that the British Isles can be retained as a base. Likewise, the United States can establish a marked superiority in air power over Japan, provided air and sea routes can be kept open, and provided further that large air bases and air base facilities can be created in the Far East. The present base facilities in the Far East available to the United Nations are inadequate to support powerful air forces.

2. Bases in outlying theaters.

(a) There are certain areas of the world in which air forces can be supported with the assistance of repair facilities deliberately created for that purpose. Examples of these areas in which limited air forces can be established and maintained are as follows:

(1) The Middle East, where there are repair facilities at Cairo and at Gura.

(2) India, which has very limited production facilities, but has American depot facilities at Karachi.

(3) Persia, where a large depot and assembly plant has been created at Basra.

(4) The Caribbean, where there are large repair facilities in Panama and in Porto Rico.

(5) Central Pacific, where there are extensive repair facilities in Hawaii.

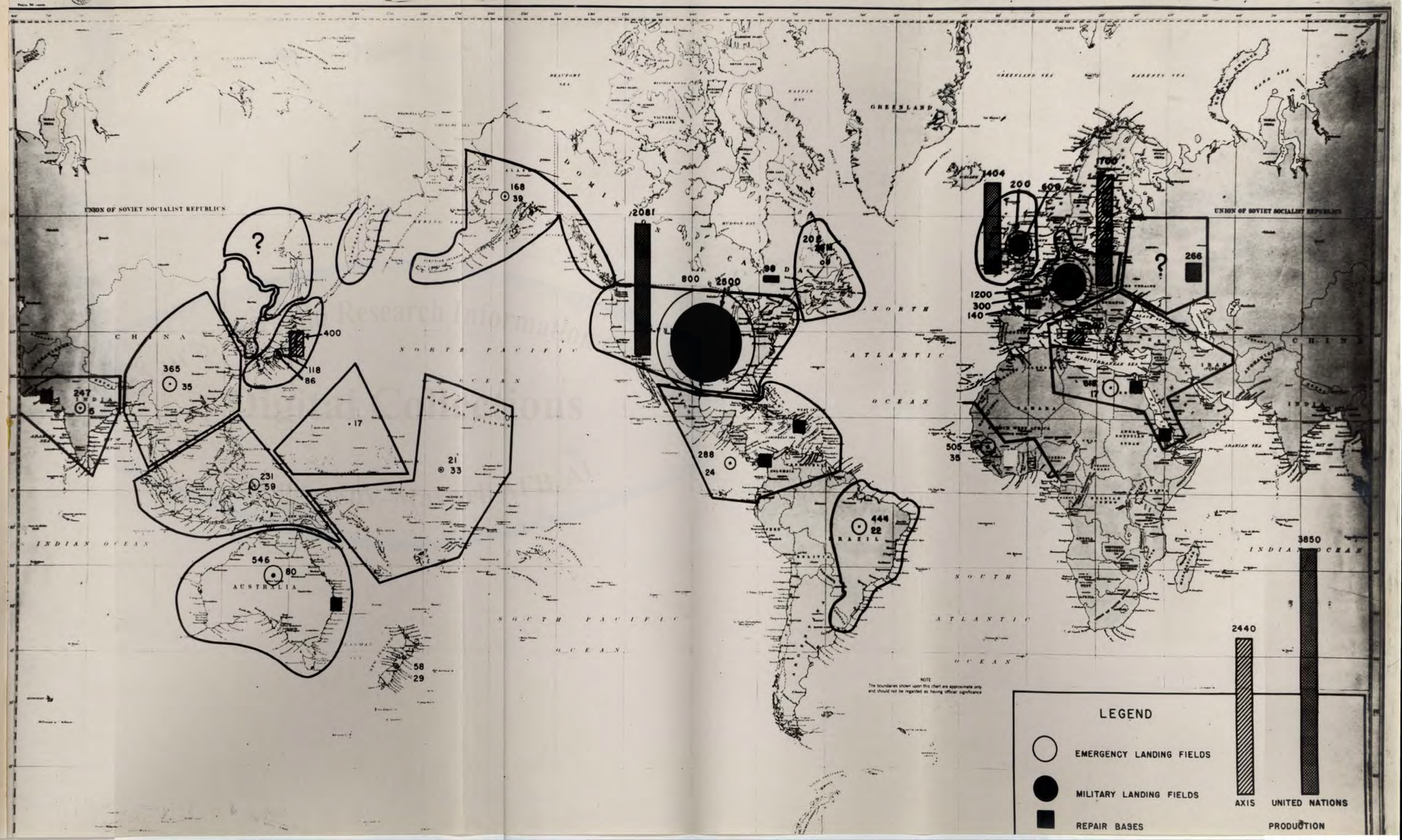
(6) Australia, where facilities are being created.

(b) The importance of logistical establishments for the maintenance of large air forces is becoming increasingly apparent. The 10th Air Force in India has been practically immobilized for lack of repair facilities for engines or new engines. The United Nations suffer from a very considerable difficulty in supplying their air forces. The production facilities are concentrated in two places only -- the United States and Great Britain. The fighting fronts, on the other hand, are spread many thousands of miles from those production centers. Until adequate repair facilities, often very elaborate, can be created in outlying theaters, it will be necessary to maintain our air forces by transporting parts, assemblies, and munitions to the fighting theaters. Mobile air depots can alleviate the logistical difficulty of operating air units in remote places. However, the capacity of these mobile air depots is limited both in scope and in quantity, and they cannot be relied upon to sustain real air power, measured in thousands of airplanes, for any considerable period of time. Great Britain is itself, of course, the best base for operations from the point of view of air base logistical facilities, since it is close to the enemy and well stocked with repair facilities. For the other theaters, especially Australia, the Middle East, and India, it is necessary to rely upon transportation from the United States and the United Kingdom.

[redacted]

CAPACITY OF VARIOUS THEATERS TO PRODUCE AND SUSTAIN AIR POWER

[redacted]



Tab O

Requirements of Allies

The following tabulation indicates the proposed allocations of aircraft by type produced in the United States in 1943 to meet our commitments to other nations:

R E C A P I T U L A T I O N

1943 Aircraft Requirements, exclusive of U.S. Army Air Forces

Source	U.S.N. (1)	U.K. (2)	Dominions (3)	USSR (4)	NEI (5)	China (6)	Brazil (7)	Mexico (8)	Other So.Amer. (9)	Total
Heavy Bombers, Land		248		300		15				563
Heavy Patrol Bombers, Boat	600									600
Medium Patrol Bombers, Boat	1,500									1,500
Medium Bombers, Land		860		900	100		64	18	15	1,957
Subtotal			696							4,620
Light Bombers, Land, 2-Eng.		1,800	~~230~~	2,100	148	300	32			4,610
Light Bombers, Land, 1-Eng.		1,800	240				132	118	115	2,405
Light Bombers, Land, 1-Eng. (Carrier)	10,000									10,000
Subtotal										17,015
Fighters, 2-Eng., Night *	200									200
Fighters, 2-Eng., Day										
Fighters, 1-Eng.		2,800	460	2,800	244	1,000	300	25	130	7,759
Fighters, 1-Eng., (Carrier)	10,000									10,000
Subtotal										17,959
Transports, 4-Eng., Boat	250									250
Transports, 4-Eng., Land *	50									50
Transports, 2-Eng., Land *	1,000		20		18	150	30	10	18	1,246
Subtotal										1,546
Scouts - Observation	1,200									1,200
Command & Liaison	250						500	200	300	1,250
Subtotal										2,450
Total Tactical	25,050	7,508	950	6,100	510	1,465	1,058	371	578	43,590
Trainers	8,000	1,500			100		300			9,900

* Army for Navy

Sources of Above Estimates:

(1) U.S. Navy: Letter from Admirals Towers and King to the President.
1250 army type land based bombers have been deducted from the Navy's estimates of its requirements.
The tactical function required will be carried out by the Army Air Forces, in order to avoid duplication of procurement, training, base facilities, and supply.
8000 trainers have been added to meet the Navy's training requirements.

(2) U.K. (exclusive of Dominions): Extension of the Arnold-Towers-Portal Agreement at the same rate throughout 1943, plus 200 heavy bombers, 500 medium bombers, 1,000 SE fighters, and 1,500 trainers.

(3) British Dominions: Estimate based on C.C.S. 91, multiplied by three.

(4) USSR: Letter from Mr. Belayev to Gen. Arnold, 8/20/42, plus 300 medium bombers and 1000 SE fighters.

(5) NEI: Letter from Lt. Gen. Von Oyen to Gen. Arnold, 6/5/42, plus requisitions from NEI, Purchasing Commission, plus 100 dive bombers, 100 fighters, and 100 trainers.

(6) China: Joint Aircraft Committee Case No. 1305, approved October 13, 1941.

(7) Brazil: Strategic Appraisal of Latin American Requests submitted by Joint Advisory Board on Latin American Republics, plus 100 dive bombers, 200 fighters, 300 trainers, and 500 liaison planes.

(8) Mexico and (9) S.A. Republics: Strategic Appraisal of Latin American requests submitted by Joint Advisory Board on Latin American Republics, plus 200 dive bombers, 200 fighters, 500 liaison planes, and 300 trainers.

Tab P

Aircraft Required for Ground-Air Support

SUPPORT AVIATION

I. Discussion

1. Requirements are based on the minimum necessary to:

   a. Support the air offensive, including such ground action as required to seize and hold base areas.

   b. Training with Army Ground and Naval Forces, to include reasonable provision for Hemisphere Defense.

   c. Support combined operations in final phases.

2. Light and Dive Bombardment requirements total 35 Groups, or one Group per three Divisions for the 108 Division AGF plan. The proportion of dive bombers is larger in the Japanese theatre because of relative weakness of fighter opposition and the preponderance of naval targets. Proportions are subject to change due to present low production of level types, but this is counterbalanced by use of Medium Bombardment Groups for similar tactical functions.

3. Observation requirements are based on one squadron per Division for the 108 Division program. By retaining a smaller proportion in Hemisphere Defense and training, additional squadrons are available in theatres for Corps and Army use.

4. Troop Carrier requirements are based on minimum Troop Carrier needs in each theatre, and on intra-theatre air-borne supply. It has been assumed all inter-theatre airline supply will be furnished by ATC cargo aircraft. There is thus no requirement for Transport Groups as distinguished from Troop Carrier Groups in any theatre. The Japanese theatre requirement is based on one wing in Burma, one in China, two for Australia and the island area north and east thereof, and envisages a rather large requirement for air-borne supply and movement of units.

Assuming two round trips per day, 300 mile radius of action, 75% planes in commission, and the C-47 towing one glider, one group equals 216,000 ton miles per day. One Wing carries one-half airborne division per trip or one division per day. Thus the four Wings in the Japanese Theatre could move four air-borne divisions or 6,480 tons of supplies 300 miles per day.

5. Photo requirements appear high, but the efficiency of the air offensive is tremendously enhanced by intelligence photographs before and after bombardment missions.

II. SUPPORT AVIATION REQUIREMENTS

Phase	Light Level Bombers				Dive Bombers				Observation*				Troop Carrier							Photographic			
	Gp	Ap	Res	Att	Gp	Ap	Res	Att	Gp	Ap	Res	Att	Gp	Ap	Res	Att	Glid-ers	Res	Att	Gp	Ap	Res	Att
1. Air Offensive against Germa ny - U. K.	1	64	32	13					1	84	13	4								4	208	104	42
2. Air Offensive against Germa ny - North Africa	2	128	64	26					2	168	84	34	4	208	104	31	416	208	62	½	26	13	5
3. Air Offensive against Germany - Middle East	4	256	128	52									4	208	104	31	416	208	62	½	26	13	5
4. Air Operations Supporting limited offensive Japanese Theatre	2	128	64	26	7	672	336	134	5	420	210	84	16	832	416	124	1664	832	248	4	208	104	42
5. Air Operations on Hemisphere Defense and Joint Training	5	320	48	16	5	480	72	24	12	1008	150	50	10	520	78	16	1040	520	31	3	156	23	8
6. Air Offensive against Japan	Same as Item 4																						
7. Support of combined Air-Ground Offensive against Germany. (Groups in Phase 1 will also be used in this phase)	4	256	128	51	4	384	192	77	7	588	294	118	8	416	208	62	832	416	124				
TOTALS	18	1152	464	184	16	1536	600	235	27	2268*	751	290	42	2184	910	264	4368	2184	527	12	624	257	102

NOTES:

Gp - Groups
Ap - Airplanes
Res - Reserve (50% active theatre, 15% other)
Att - Attrition (20% active, 5% other), Troop Carrier 15% and 3%)

*(Observation airplanes required in the ratio of 2 light bombers -- 2 fighters -- 1 liaison type)

Tab Q

Enemy Order of Battle for Aircraft

Tab Q. Enemy Order of Battle for Aircraft

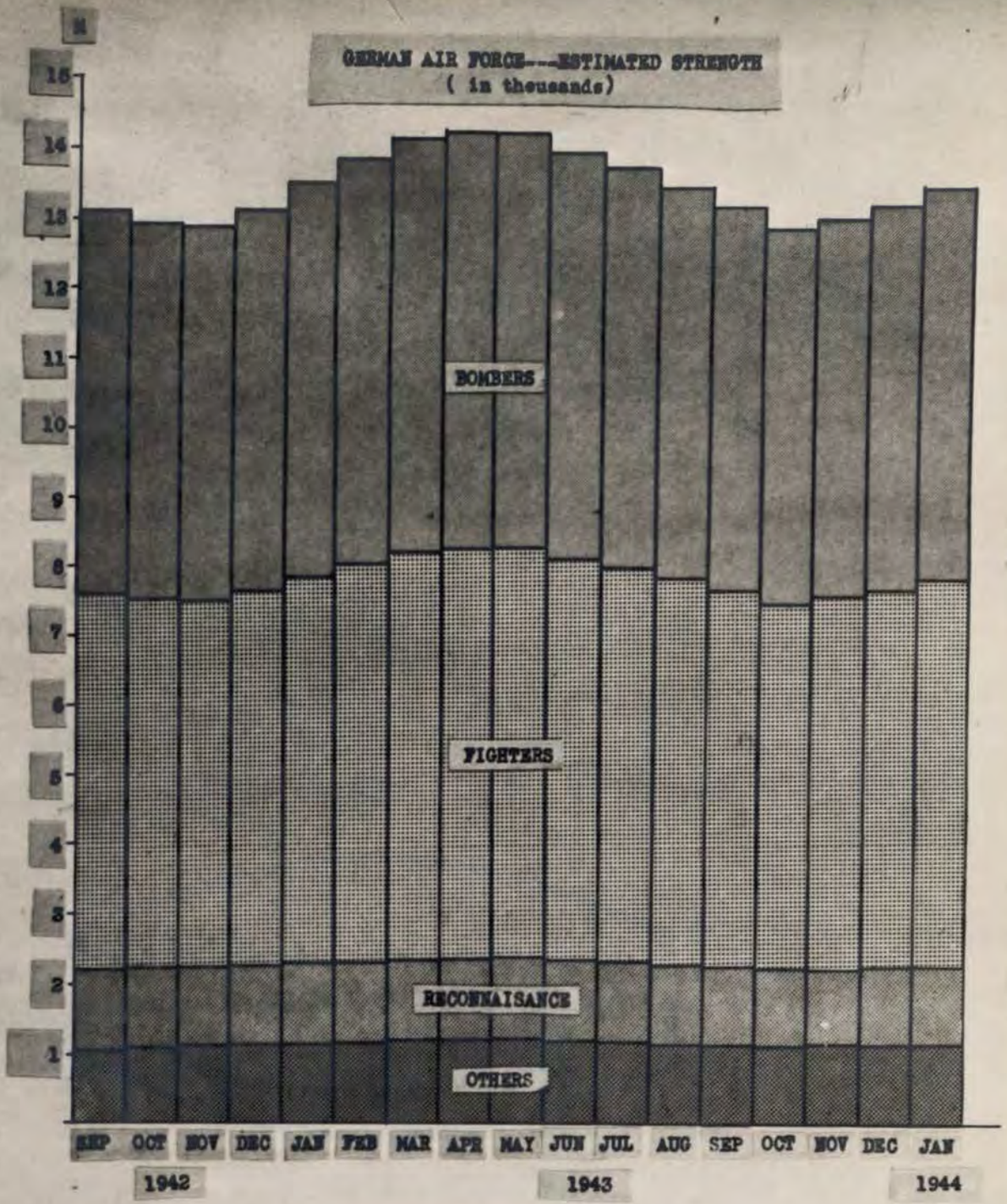
DISPOSITION OF G.A.F. OPERATIONAL AIRCRAFT

1. As estimated as of August 22, 1942:

Area	Fighters S.E.	Fighters T.E.	Long Range Bombers	Bomber Rcn.	Dive Bombers	Army Co-op.	Coas-tal	Total	Trans. (JU-52)
Western Front	375	282	318	102	18	0	96	1191	150
Russian Front	531	207	750	204	321	378	21	2412	450
Mediterranean	210	30	243	72	90	9	36	690	250
Total Operational	1116	519	1311	378	429	387	153	4293	850
Total Unoperational	64	61	149	32	21	43	37	407	550

II. Possible Disposition if 75% were removed from Russian Front:

Area	Fighters S.E.	Fighters T.E.	Long Range Bombers	Bomber Rcn.	Dive Bombers	Army Co-Op.	Coas-tal	Total	Trans. (JU-52)
Western Front	773	437	880	255	258	283	111	2997	487
Russian Front	133	52	188	51	81	95	6	606	113
Mediterranean	210	30	243	72	90	9	36	690	250
Total Operational	1116	519	1311	378	429	387	153	4293	850
Total Unoperational	64	61	149	32	21	43	37	407	550



TABULATION

Types	Sept. 1, 1942	Jan. 1, 1944
Bombers	5,501	5,669
Fighters	5,384	5,592
Reconnaissance	1,181	1,139
Others	1,090	1,172
Total	13,156 *	13,572

* Of this number 6241 airplanes are estimated as Initial Equipment plus Immediate Reserve.

Notes:

1. The basis for estimating the strength of the German Air Force projected to January 1944 is the estimate as of September 1, 1942.

2. Combat losses were projected by taking the German losses by type during each month for the last three years.

3. Operational losses were estimated on a monthly basis by using an 8% factor applied to all combat planes assigned to units, either combat or training.

4. Production was projected on figures as estimated by the Air Ministry and G-2 for the periods over the last three years and have been applied to types as of the present percentages estimated for production during the coming month.

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JAPANESE AIR FORCE - ESTIMATED STRENGTH

Sept. 1, 1942.

Bombers	1359
Fighters	1600
Reconnaissance	204
Flying Boats	431
Float Planes	94
Total	3688

All reserves, planes in depots, in transit, and in process of shipment are included.

Jan. 1, 1944.

During the past nine months, losses in combat and operations are estimated to equal production. Unless unforeseen developments occur, the strength on January 1, 1944, will approximate that of September 1, 1942, shown above.

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