Data from the various national institutes and national associations not under the jurisdiction of the Ministry for Economics furnished the basis for the execution of the missions described.

The Armaments Office was required to insure that the armaments and wartime economy was fully operable so far as personnel and materials requirements were concerned, and was responsible chiefly in the following fields:

- labor allocations
- labor conditions and regulations
- electricity and fuels supplies
- industrial security
- counterintelligence (industrial)
- relocation of factories and contracts
- Transportation and communications problems
- measures taken under the Law Concerning General Requisitioning for Defense Purposes
- supervision of operations and contract execution
- official armament agencies and control thereof
- exploitation of armament manufacturing facilities outside of Germany
- examination and reporting of foreign currency requirements by the military establishment and auxiliary users
- ministerial reporting relating to reporting done by the Central Branch.

The Technical Office participated in execution of the routine or supporting missions and had the specific mission of improving the performances of all commodities and armament items produced. This involved development and designing activities.
examination and processing of inventions and recommended improvements patents.
Whenever necessary the Technical Office was also to carry out special projects, give guidance to the corps area executive, and wherever required institute conversion to substitute materials.

Other functions in the general category of routine and supporting activities were handled by the Armaments Deliveries Office and included

planning
adjustment of manufacturing materials allocations and control of same
control of contrasts in iron and steel
basic problems concerning the use of small artisans' workshops for armaments production
measures to develop industrial self-responsibility control of chief and foreman personnel in the armament industries
control of electr-engineer personnel.

The Central Economics and Finance Sub-Section handled all budget and similar affairs, namely
representation of the Minister for Armaments and Wartime production in all matters of foreign trade
factory economy problems
tax matters
prices and price control
compensations and damages
financing
budgeting
special problems and special procurements in the economic field.
The Central Press and Propaganda Branch (Zentralabteilung Kultur) censored all publications concerning the fields of activities of the Ministry for Armaments and Wartime Production included under the headings

- propaganda
- press
- libraries
- photographic shops
- matters of protocol
- social and similar affairs
- cultural requirements of personnel
- technological documentation.

Coordination of efforts was the mission of the Central Office. This included

- political indoctrination
- organization and administration
- legal affairs, etc.
- liaison with top level government authorities and top level agencies of the National Socialist Party
- special problems of rail, road, and inland waterways traffic.

During his tenure of office as Reich Minister for Armaments and Munitions Dr. Todt had appointed Corps Area Executives in the various corps areas, and the new Ministry for Armaments and Wartime Production continued to use these as its field agencies. Under Dr. Todt their mission initially had been to secure an accelerated procurement of munitions by avoiding bureaucratic channels. Consonant with the expanded
mission of the new Ministry their authority and their missions also expanded.

The previously mentioned decree issued by the Minister for Armaments and Wartime Production dated 29 October 1943 redefined the missions of the Corps Area Executives. According to the new mission assignment they were responsible for the execution of the main-effort program of the Technical Office of the Ministry at the intermediate levels, and for the proper application of technological methods within the Armament Inspectorates. For the execution of their mission they were allowed to use the Regional Offices for Technology of the National Socialist Party ("Ressort fuer die haupt der NSDAP"). They were also required to cooperate with the industrial chiefs and foremen to insure uninterrupted progress in the manufacture of armaments.

Other agencies at intermediate levels which the Ministry for Armaments and Wartime Production made use of in the execution of its missions were the Armaments Commissions. These were bodies formed by consolidating the participating official agencies and representatives from the industrial organs operating on their own responsibility, the various industrial committees and rings, cartels, trusts, etc.

Each such Armaments Commission included as members the following:
the corps area executive
the armaments inspector
the regional industrial consultant
the Chief of the Agricultural Office
the President of the Regional Chamber of Economics
the President of the Regional Labor Office
the Plenipotentiary General for Building Construction
the Chief or foreman of industrial labor (armaments)
the "regional Missions coordinator (Bezirkslastvertreter)."

Each commission thus comprised one representative from
each of the following:

the Regional Office for Technology
the military establishment
the National Socialist Party
plus representatives from the various industrial organs operating on their own responsibility.

In each case the mission of the commission was to step up industrial output to the maximum; in particular the President was to bring about a clearly defined system of responsibility for the individual factories and was to give uniform guidance and control to the intermediate level agencies involved in armament production missions.

To enable him to execute his mission, the President of each such commission was authorized to make final decisions.

Other agencies available to the Ministry for Armaments and Wartime Production were the Armaments Inspectorates and Armament Detachments, assigned under the Armaments Office.

The authority of these agencies has been defined previous-
previously, in Section II, above, in greater detail.

With the removal of the industrial organizations, which were of great importance for the armament industry, from the jurisdiction of the Ministry for Economics, the responsibility for and control over all armament manufacturing activities, except for the Air Force, passed to the Ministry for Armaments and Wartime Production. Armaments production for the Air Force only became a responsibility of that Ministry in August 1944.

Pursuant to a decree issued by Hitler, the supply and distribution of consumer commodities for the civilian population had been placed under the national agencies. These were to compute current requirements and endeavor to balance requirements with the appropriate raw materials available.

These national agencies were also required to coordinate, with assistance from the Planning Office under the Plenipotentiary for Armaments, the demand for commodities required by both the civilian population and the military forces.

The final authority in deciding on the extent to which requirements in consumer goods were to be met was at all times the Minister for Armaments and Wartime Production, who had to balance these requirements with requirements for the rest of the wartime production.

In cases of doubt when allocations for the fields under the Reich Minister for Economics were reduced, the Minister for
Economics could request a revision from the Central Planning Committee (Zentrale Planung).

1. The Central Planning Committee. The purpose for which the Central Planning Committee was established pursuant to a decree by Hitler dated 2 September 1942 and connected with the decrees issued by Goering on 29 April 1942 and 4 September 1943 was to establish a uniform pattern for the entire wartime economy. The Central Planning Committee thus must be regarded as being superior to all other offices and departments and as the highest authority in the field of wartime economy. On the basis of data compiled by the Planning Office of the Ministry for Armaments and Wartime Production, the committee decided on the allocation of basic raw materials to the various users, measures to increase and distribute the output of the entire wartime industry, the allocation of manpower to the various branches of the economy (industry, communications, etc.), and the establishment of priorities.

Consonant with the high importance the committee included as members representatives from the highest authorities in all fields involved in the military economy, plus the command- ers in chief of the three military branches.

m. The Military Economy Incorporated. For the conduct of warfare under modern conditions, the geographical position...
and economic situation of any belligerent country a the deciding factors. Upon these factors will hinge the objectives aimed at and the planned duration of the war. import possibilities, and the reserve supplies of raw materials and foods will determine the extent to which the entire economy of the nation can be used to serve the purposes of the war.

Germany's unfavorable tactical position and her economic dependence on imports necessitated stringent industrial and economic mobilization preparations in the event of war, and the failure to make such preparations had resulted in defeat in World War I.

The military economy authorities determined the measures to be introduced in the field of economy and industry to safeguard the conduct of war, including the conversion of industries not essential for the war effort to military purposes, and measures to insure increased output in the event of mobilization by the firms already engaged in armament production during peacetime. The military economy authorities thus were responsible in the field of armaments production, whereas the civilian requirements during war were a responsibility of the Plenipotentiary for Wartime Economy. Accordingly, the Military Economy Inspectorates were responsible for all measures required to insure that, so far as personnel and material requirements were concerned and in fields beyond the
control of the firms themselves, the various industrial
firms were ready to go into full operation in the event of
mobilization.¹

In the personnel field this included measures to insure
the availability of management, technical, and skilled per-
sonnel as well as unskilled labor, and to be taken in coop-
eration with the local labor offices and the local military
recruiting offices to have the necessary personnel declared
indispensable.

In the event of mobilization the local labor offices
were to provide the labor, organized in groups, taken from
installations that were to cease operations during war.

To insure secrecy concerning peacetime armaments pro-
duction and preparations for mobilization, factory personnel,
and this applied particularly to the management and other men
in key positions, were to be screened carefully to insure
their reliability, counterintelligence agents were to be ap-
pointed in each factory and given training, and in certain
cases factory personnel were to be sworn to secrecy. The
inspectors were obligated to support factory managements
in the organization of their factory defense and security
services.

A matter requiring very special study was that of
1. See "Aus der 10. Sitzung des Arbeitsausschusses des "eich-
vertäfelungsrates vom 26.6.33 (pp. 417-425)," compiled from
"Nuernberger Dokamente Band XXXVI, 405-BC, and sworn
the transportation and communications problems which would arise during mobilization. Here it was of high importance to arrange with the rail and other transportation services for the movement of personnel to and from work and for the movement of materials to and of finished products from the factories.

To insure the smooth operation of factories it was necessary to clarify in cooperation with the management of electricity, gas, and waterworks, the availability of electricity, gas, and water for the armament factories. If extensions in this field appeared necessary, appropriate recommendations had to be submitted to the proper authorities.

In cooperation with the construction inspectors or supervisors it was necessary at the factories turning out the final article to insure that all installations already in operation or intended for operation in the armament production program were fully exploited. Here, particular importance attached to the whole sub-contracting system, to insure that too heavy a burden would not be placed on the transportation services. Efforts were to be made to insure that the final factory would only employ sub-contracting factories in the close vicinity.

Each factory was required to enter all measures intended in the event of mobilization in a mobilization schedule, which were open for inspection by the Armament Inspectorate.

Footnote 1, p. 177—Continued: affidavit by Field Marshal Weitzen, 29 March 1946 (See Nuremberg Dokumente, Band xxx, p. 370-375).
When the Military Economy Inspectorates placed direct contracts, the execution had to be checked to insure proper adherence to the contract specifications and time schedules, and to arrange for new contracts to follow these in process.

Each Military Economy Inspectorate compiled fact sheets giving all pertinent information on the manufacturing firms within its area of jurisdiction. These fact sheets served the Military Economy Office and/or the branches of the military forces as planning data. The sheets contained information on such items as available manufacturing capacities, available skilled labor, semi-trained and unskilled labor, the manufacturing program of the firm concerned in the event of mobilization, its raw materials, electricity supplies, coal, and water requirements. Each inspectorate had a special Hollerith (punched card filing system) Branch to tabulate all this information.

In the event of war the inspectorates had the responsibility of supervising the immediate commencement of manufacturing programs in accordance with the mobilization plans and to remedy any complications which might arise. Whereas supervision of the manufacturing processes as such was a responsibility of the construction supervisors or inspectors, the inspectorates concentrated chiefly on the delivery of materials, and the availability of labor and transportation.
For the execution of its missions, as just described, each Military Economy Inspectorate, later known as the Armaments Inspectorates, was organized in five branches, namely, a Central Branch, an Army, a Navy, and an Air Force Branch and an Administration Branch.

The three branches for the Army, the Navy and the Air Force were subject to dual controls, namely, by the chief of the Military Economy Inspectorate and by the military service channels concerned. The military authorities concerned had direct command authority over their respective staff branches in the Military Economy Inspectorates. Accordingly the three military staff branches were required to represent the interests of their separate service branches within the Military Economy Inspectorates and to implement the functional instructions they received.

These dual controls and the rivalry between the three military services in the field of armaments led to frequent controversies. This was caused in particular by the fact that during the initial stages of rearmament industrial capabilities were not commensurate with modern standards owing to the preceding period of economic depression.

The chief mission of the Central Branch was therefore to serve as a coordinating factor between the military and civilian authorities of the Ministry for Economy in the matter
the assignment of work to factories and was to submit appropriate recommendations on this subject to the chief of the inspectorate. This coordinating function of the Central Branch was to extend to all other activities of the inspectorate.

Another mission of the Central Branch was to insure the implementation of uniform passive air defense and factory air defense measures and all other measures in line with directives from the corps area commander. The latter category of measures involved such matters as the securing of standard trade items for use in the initial equipment of troops, industrial evacuation and salvage operations, and cooperation in planning for construction.

In dense industrial areas the Military Economy Inspectorates were unable to cope with the profusion of missions. Armament Detachments were therefore created to support them. The mission of these detachments was to execute the missions enumerated above within their assigned sectors of the area under the jurisdiction of the Military Economy Inspectorate. The staff organization and distribution of functions within the armament detachments corresponded to the arrangement within the Armaments Inspectorates, from which they received their instructions.

The mounting importance of the Military Economy Staff of the Joint Military High Command had resulted in creation of the Military Economy and Armaments Office and a corresponding
150 redesignation of the Military Economy Inspectories as Military Economy and Armaments Inspectories.

151 Following establishment of the Armaments and Wartime Production Ministry under Minister Speer and the assumption by the new ministry of sole responsibility for all Army and Navy armaments production activities, armament production responsibilities were taken out of the Military Economy and Armaments Office of the Joint Military High Command in 1942 and assigned to the Armaments Office within the new Ministry, under General Waeger. At the same time the Military Economy and Armaments Inspectories were redesignated Armaments Inspectories and transferred to control by the Armaments Office of the Ministry for Armaments and Wartime Economy.

In practice the responsibilities of the Military Economy Office within the Joint Military High Command from then on extended almost exclusively to the occupied territories.

Finally, the Ministry for Armaments and Wartime Production in March 1943 ordered a reorganization of the armaments inspectories. Each inspectorate received a new branch designated the XXXX Staff Technical Branch (XXX Staff Technical Branch).

The engineer heading this new branch served as the technical consultant and advisor to the chief of the inspectorate, and represented him in dealings with the innumerable other agencies.

1 Appendix 14.
which had been newly created and were involved in the armament industry, such as the corps area executive, the regional headquarters of the National Socialist Party, the representatives of the Air Force, the industrial organs operating under their own responsibility, and so forth.

The branches representing the Army, the Navy, and the Air Force were reduced in size, and each inspectorate was from now on assigned only one field grade officer for weapons technology; on the other hand each inspectorate received a new Final Product Branch and an Industrial Deliveries Section.

It is safe to assume that this reorganization was due to the steadily deteriorating armament situation and the consequent necessity for improvisations. This necessitated a shift in the mission of the armament inspectorates from that of a directing body within an existing organization to the mission of devising improvised measures necessitated by the constantly changing situation.

n. The Reich Defense Commissars. Pursuant to a decree dated 11 September 1939 Reich Defense Commissars were appointed to act as field agencies for the Ministerial Council. The mission of a Defense Commissar was to insure uniform direction of civilian defense activities within his area of responsibility, and to coordinate within a uniform pattern the measures taken by civilian authorities. Since the civilian authorities
themselves were required to coordinate their measures in adherence to a uniform pattern, the Commissar only needed to intervene in cases where uniformity within his area was jeopardized, or when difficulties developed among the various civilian authorities or between the civilian and military authorities concerned.

Furthermore the Commissars were required to enforce the implementation of special orders or detailed instructions received from the Ministerial Council, the Plenipotentiary for the Four Years Plan or the appropriate industrial authorities, the Chief of the Joint Military High Command, or the highest governmental levels.

The functions of the Commissar thus had nothing to do with current administration activities but were exclusively of a coordinating and supervisory nature. The Commissar had no office staff specifically for these purposes.

Since civilian interests had to be subordinated to military considerations, the area of responsibility of a Commissar corresponded to the delimitation of a corps area, for which reason the Commissar was stationed at the locality of the corps area headquarters.

In consonance with the then current principle of unity of State and Party (the National Socialist Party), the Commissar had to be a Party official. Because of the high importance
of the missions assigned, the post was usually filled by a Regional "leader (Gauleiter) of the National Socialist Party.

Within the areas of his responsibility, the Reichs Leiter was authorized to issue directives to all authorities within his region of jurisdiction; furthermore the civilian authorities within the corps are channeled their reports to the highest national and Prussian provincial authorities on basic through him, matters of national defense, while the corps area commander had to channel his recommendations and requests to the civilian authorities also through him. Within his area, the individual Commissar thus held a key position which was exceedingly effective.

During the first years of the war the activities of the Reich Commissars for "defense was hardly noticeable to the superficial observer. It was only after the commencement of the air offensives against "German territory that they were in some cases able to give valuable assistance, for example, in pressing through measures which had to be taken immediately.

As difficulties mounted in the field of economics and industry during the last two years of the war, however, the Commissars tended to take steps which would insure the use of the still available machinery and men power in the interest of their own specific areas without regard for higher requirements.
Such action in a number of cases had a hampering effect on the production of military equipment, since some of the Reich Defense Commissars refused to permit the movement of reeling machines and man power from bomb-damaged factories for relocation in premises outside of their areas. In other cases they attempted to organize manufacturing operations without regard for the overall programs, producing items which could not be used because other parts existed were lacking.

For the above reasons the activities of the Reich Defense Commissars had a hampering rather than a beneficial effect during the final stages of the war.

o. Industrial Organization. The industry was organized regionally and by function. The functional organization was subdivided into unions or chambers of industry, commerce, and trades, arranged in sub-groups, specific trades groups, industrial groups, central industrial groups and, at the highest level the National Boards of Industry, Commerce, Banks, etc, headed finally by the Reich Chamber of Economics.

The mission of the local groups was to furnish instructions and guidance to their members, namely information concerning the introduction of new technical methods, new industrial materials, and technological progress in allied fields; furthermore, members were posted on all important economical problems of their particular branch of industry, measures
to reduce production expenditures, industrial finances, taxation and other general economic problems.

The regional organization was arranged in local chambers of industry, commerce, and trades, through chambers of economy (Wirtschaftskamern) to the Board of Industry and Commerce (or federated Chambers of Industry and Commerce) and the highest level of the Board of economy within the Reich Ministry for Economy, where it acted as an advisory body.

As organs of the self-administered industries and commerce, the local chambers of industry and commerce represented the interests of their members within the scope of the overall economic system and maintained a balance between the various branches within their specific districts. As a service to the State they were required to support the local authorities with information and expert opinions and to assist in the fields of raw materials supplies, foreign currency control, price control, and professional training.

They were combined under district chambers at the district level. The head of the district chamber was the district chief executive for industry and commerce. These district chief executives formed the advisory board for industry and at the same time were members of the Advisory Board [placeholder] of the Chambers of Industry and Commerce (Dienst der Industrie- und Handelskammer). The mission of
the district chief executive was to represent the justifiable interests of their groups of the economy at the chambers.

The whole organization functioned in accordance with the principles of self-administration, and the only prerogative exercised by the Government was that the Reich Minister for Economy appointed the persons to head the organizations at the top levels, namely, the Chief of the Reich Board of Economy, the Chiefs of the Federated Chambers of Industry and Commerce, their deputies, and the Chiefs of the Reich and Central Industrial Groups (Reichs Unternehmer und Hauptverbände der Industrie).

In many cases the delimitation of the areas of the district chambers of industry and commerce coincided with the regional and corps areas. In order to have the whole organization coincide with that of the regional subdivisions, regional chambers were established in 1943, in which the existing district chambers were consolidated.

At the same time the self-administered industrial agencies (committees and rings—Ausschüsse und Ringe) established by the Ministry for Armaments and Wartime Economy were integrated with the chambers of industry and commerce in order to coordinate overlapping activities for the benefit of the various factories and other concerns.

Planned economy and the complete isolation of Germany from international markets during the war gave rise later
to the establishment of national committees to control raw materials and manufactured commodities, such as the National Textile, Rubber, Metals, and Pata Control Committees. In addition to their controlling functions, these committees were to relieve the burden on the Ministry for Economy.

Finally, raw materials shortages compelled industry to make a steadily increasing use of artificial substitutes. The federations at the national level assumed responsibility for the procurement of these substitutes. These federations represented a vertical combination of the various special and general chambers of industry and commerce and the Reich industrial groups for various categories of commodities, such as the Reich Federation for Iron, the Reich Federation for Wool.

The organizational system of the industry functioned between the industrial concerns and the Government, and its salient feature was that all problems of mutual interest to all members were discussed and the justifiable interests of all concerned were represented in relations with the State.

In addition to the organizational setup just described, over which the Reich Minister for Economy exercised Governmental supervision, an organization of committees and rings developed as a self-administered system during the war, from 1943 on, under supervision by the Ministry for Armaments and Wartime Economy.
Both of the above forms of organization, which existed side by side, had the same objective, that of promoting the interests of the economy, with the organizational setup supervised by the Minister for Economy gradually becoming less influential.

All important firms participating in the air armament program were combined in the Committee for Aviation Industries (Wirtschaftskommission Flugzeugindustrie) where they were subdivided into special groupings for aircraft fuselage, aircraft engine, and aircraft equipment manufacture. These special groups again were subdivided into sub-groups. In line with the previously stated general mission, the Committee for Aviation Industries handled all matters of common interest to the aviation industry, promoted marketing—in particular export sales, conducted statistical reviews, made preparations for participation by firms in fairs and shows, and assisted in patent problems, and the establishment of standardized sizes and qualities in the aviation industry.

One of the most important functions here was to maintain contact with the “eich Air Ministry, particularly with the Technical Office of the Ministry, and to represent the interests of the industry at this level. The detailed statistics

prepared by the committee in many cases served as important data for the work done by the Technical Office or by the Chief of Air Force Special Supply and Procurement Service.

The capacities of the aviation industry in Germany in 1933 were by no means adequate to cope with the missions the industry was assigned. The industry alone was not able to create the essential conditions for execution of these missions because the firms involved could not provide sufficient funds or sufficient trained personnel because of the economic crisis which had just passed.

This made it necessary for the Technical Office to systematically develop the industry, on the one hand to avoid investments which would not serve the production programs, on the other hand because Germany’s unfavorable tactical position made it imperative that the appropriate offices should exercise an influence on the selection of localities for the more important factories to be established.

The firms forming the Committee for Aviation Industries were all directed and controlled exclusively by the Air Ministry. The Ministry for Economy exercised no influence whatever over them. The structural setup of the firms manufacturing aircraft fuselages and engines differed completely from that of firms in the general industries; furthermore a firm control over these firms was essential for an accelerated
rearmament program. For these reasons it was not possible for industries to participate in the execution of the program. Furthermore, the need for secrecy made it necessary to confine within the narrowest possible limits the number of governmental agencies involved in armament projects.

From the organizational viewpoint the industry was subdivided basically into firms handling development and firms manufacturing under licence the models thus developed. Initially the firms in the two categories were completely independent one from the other, each executing its part of the program on its own responsibility.

However, the difficulties encountered in manufacturing under licence fuselages, engines, and items of equipment not yet completely out of the development stages, and the complications arising from changes and corrections made to the construction data during manufacturing processes finally made closer links between the developing firms and the manufacturing firms unavoidable. Initially, engineer personnel detached for the purpose served to insure cooperation.

One disadvantage in the separate categories system was the principle of commercial competition. The firms handling development feared that by turning over all their experience to the manufacturing firms, they were supporting post-war
competitors. This caused numerous difficulties in the manufacturing part of the program due to the reluctant and incomplete turnover of data by the developing to the manufacturing firms.

Apart from the considerably increased funds required for the system of factories manufacturing under licence the fuselages, engines, and items of equipment developed by other firms it was anticipated that the system would cause difficulties in the supply and resupply services to troops, because the units would be equipped aircraft of differing manufacture.

To avoid this disadvantage, which would have had very serious consequences for the troops, a Patents Pool (Патентный фонд) including all member firms of the Committee for Aviation Industries and manufacturing rings or cartels were established at the instance of the Technical office. A legal basis for the Patents Pool was provided by the licensing contract, which contained clauses protecting the rights of the patentee, established the obligations of the licensee towards the patentee, and determined the uses of the articles manufactured under licence and the duration of the contract under patents involved which the РИОМ could be used.

Another condition for smooth collaboration between the developing and manufacturing firms was created by means of a licensed manufacturing contract stipulating the quantities
to be manufactured under the contract and deadlines for the manufacturing contracts involved, the extent to which use of the constructional and manufacturing data furnished was authorized, and the obligations of the contracting parties towards each other. The existence of these contracts made the establishment of manufacturing "rings" or cartels possible, in which the firms manufacturing a specific item were organized.

Rings of this kind were organized for the first time in 1933 and involved the firms manufacturing fuselages and engines under instructions from the Chief of Air Force Special Supply and Procurement Service dated 15 August 1941, issued pursuant to recommendations from the Industrial Council, the system was extended to the entire aviation industry.

The direction of these rings was assigned to the developing firms, which were required to furnish in good time all working data, blueprints, installations, etc., required for orientation of the personnel of the manufacturing firm. The development firms were also responsible for the timely transmission of all experience, particulars on modifications, for measures insuring rational manufacturing processes, and finally for the uninterrupted manufacture, in line with deadlines, of the items involved within the ring concerned.

In the case of firms using only certain departments of their factories on manufacturing contracts for the Air Force,
only these departments became members of the appropriate ring, and the ring authorities had no right to interfere with the other manufacturing activities of the firm concerned.

When the development of an item was completed so that it could go into production, control over the ring was transferred to the most reliable of the firms manufacturing the item under licence.

Approximately 100 such rings existed at the time.

From the commencement of rearmament activities the Technical Office had adhered to the principle of giving only guidance, and this was why the responsibility for the manufacture of Air Force equipment within the rings was assigned to the developing firm and later to the most reliable manufacturing firm. The idea was to refrain from interfering in the affairs of the individual firms and to promote the feeling of self-responsibility.

Another reason for the extension of the ring system to all firms engaged in armament development and production work for the Air Force was the heavy increase in the problems the Technical Office with its existing organization had to handle. The demands of the individual firms for factory expansions, semi-finished products, tooling machines, manpower, and metals in short supply had assumed such proportions that it was impossible for a central
It was impossible for a central agency, such as the Technical Office, to verify their justification. It was to be assumed that various firms, with an eye to the peacetime economy of the future, would endeavor to create as favorable a position for themselves as possible by expanding their factories, rationalizing operations through the installation of tooling machines, and by stockpiling construction materials. If some centralized authority was required to verify the various claims it would have had to be built up to a size which would have hampered progress. Therefore, the various heads of rings, as independently operating organs of the industry, were assigned responsibility for insuring a rational use of existing capacities, tooling machines, man power, and for an economic use of metals in short supply. In each case the most efficient engineer in the leading firm of a ring took over the post as chief of his ring, and his firm made the necessary supporting personnel available to him.

The idea of industrial self-responsibility thus fostered by the Air Force Technical Office was adopted later by Dr. Todt, after creation of the Ministry for Munitions, and expanded to the industries supporting the Army and the Navy. For this purpose, the chiefs of the appropriate branches of the Technical Office addressed a meeting of representatives from the industries supporting the Army on the processes
of procurement, construction supervision, and acceptance. The meeting was under the chairmanship of Dr. Todt personally. However, Dr. Todt was killed in an air accident in 1941 and his death prevented implementation of the appropriate measures planned by him.

Under his successor, Reich Minister Speer, the Ministry was redesignated as the Ministry for Armaments and Wartime Production and its responsibilities extended gradually to include the entire Army and Navy armaments programs. The whole system of planning and executing projects then underwent fundamental changes.

The deteriorating military situation in 1942 called for a firmer consolidation of the entire armaments industry. For organizational and functional reasons it was not possible to make use of the Army and Navy Ordnance Offices for the purpose, so that the missions involved could only be accomplished with participation by the existing organizations of the armaments industries.¹ These were arranged in two categories: committees and rings (or cartels). The firms represented on the committees were those who were manufacturing final products; those organized in rings were the firms who supplied semi-processed materials and semi-finished articles.

The committees were organized in Main Committees, Special Committees, and Working Committees. A number of committees
engaged on one and the same manufacturing project formed a Special Committee, and all other committees of the same category formed a Main Committee, as in the case of aircraft. The same arrangements applied to the rings.

Acting as self-responsible organs of the industry, the committee and ring chiefs insured that the capacities of the various firms were fully used, and that the whole process of production, including the preparatory work and the proper exchange of all experience in all production problems, functioned smoothly. Control of the committees and rings was in the hands of the leading engineers in the category involved.

In this system of self-responsible organization of the industry the main committees and rings were authorized to maintain their own district representatives, one to each area served by an armament inspectorate. These men served as advisors to and representatives of the factories within their district, which were members of their main committee or ring.

Another factor in this self-responsible organization was the Armaments Chief (ArmsLügnerMann), an industrialist usually selected from among the district representatives. He The Armaments Chief represented industry on the Armaments Commission and it was his responsibility to remove differences.

Footnote 1, p. 197: Appendix 20.
between planning and the man power available. As a rule, the
Armaments Chief also headed the Industry Branch of the Cham-
ber of Industry and Commerce.

This network of district representatives and industrial
chiefs represented the final consolidated representation of
the industrial concerns in relations with the various official
agencies and the Central Planning Office, all of which furnish-
ed their own, and frequently conflicting, directives to the
industry. A decree dated 29 October 1943 regulated the attach-
ment of the Main Committees and Rings, in functional respects,
to the appropriate Offices of the Ministry for Armaments and
Wartime Production.¹ The decree mentions twelve Main
Rings and fourteen Main Committees.¹

Responsibility for the following categories was consoli-
dated in the Main Committees:

- Gunpowder and other explosives (three Main Committees)
- Electro-technology
- Fine Mechanics and optical instruments
- Steel and iron construction
- Armament equipment items
- Sheet iron and other metal (eight Main Committees)
- Machinery construction (14 Main Committees)
- Weapons
- (23 " " )
- Ammunition
- (13 " " )
- Tanks and tractors
- (8 " " )
- Other motor vehicles
- (16 " " )
- Rail vehicles
- (3 " " )
- Shipbuilding
- (7 " " )
Building construction
Aircraft fuselages (21 Special Committees)
Aircraft engines (17"
"
Aircraft equipment items (19"
"
The following subjects were consolidated in Main Rings:
Iron production (16 Special Rings)
Iron processing (5"
"
Metals (7"
"
Manufacturing installations and machinery parts (15"
"
Electrical appliances (11"
"
The Main Committees for fuselages, aircraft engines, and other aircraft equipment only came into being after de-
activation of the Office of the Chief of Air Force Special
Supply and Procurement Service, when the responsibility for
Air Force armaments was taken over by the Ministry for Arma-
ments and Wartime Production in August 1944.

By far the greater part of the entire German economy came
under control by the Minister for Armaments and Wartime Produc-
tion, since the previously mentioned decree attacked all cat-
tegories represented by the main committees and rings, as well
as the councils (Wirtschaftsgruppen) for the textile industry,
clothing, the leather industry, wood processing, paper man-
ufacturing, printing, glass, ceramics, footwear, tobacco,
building construction, the Reich Representative for Wooden
Footnote 1, p. 199: Appendix 21.
Building construction, electricity, gas, and water supplies to the appropriate Offices of the Ministry

p. Personnel. At the beginning of 1933 the entire aviation industry employed only approximately 3,500 to 3,800 persons, the majority of them of advanced age, and some of them carried over from World War I.

A younger generation of employees in the industry was non-existent, since the profession held out no prospects for young people. Therefore, no personnel had received regular training for the industry for years past, although measures to promote aviation sports had successfully maintained interest in both glider and powered aviation.

Apart from the adverse factors just described, the economic depression had compelled most of the firms to discharge some of their experienced cadre personnel, and in some cases their entire staff, particularly in the 1930-32 period, which resulted in a serious loss of valuable experience gained during World War I.

The situation in regard to engineering personnel was similar. In spite of the successes achieved by the glider groups formed at the technical colleges, and in spite of the indubitably keen interest shown by the students, there was no incentive for them to choose this as a main subject in
their professional studies and training. On an average only one student per college and semester completed his studies in aircraft designing and construction.

Consequently, the Industrial Expansion and Procurement Programs drafted in 1935 by the Technical Office pursuant to the plans of the General Staff, and the execution of which was to be completed as the first phase of the rearmament, encountered serious difficulties in the personnel field. Exceptional measures had to be introduced to at least partially overcome these difficulties.

To meet planning requirements, personnel in the aviation industry had to be increased from approximately 3,900 to 70,000 within two years, 1933-1935. It seemed impossible to introduce such a large number of new personnel into the industry and have them oriented by the available cadre personnel without incurring serious manufacturing difficulties, serious reverses, and considerable losses in materials and time, thereby jeopardizing the completion of programs by the established deadlines.

The necessary measures had to be devised to meet the requirements not only for brief courses of retraining for skilled personnel coming from other industrial branches, but also of training for completely untrained workers, of factory apprentices, and later of directing personnel, in particular of
master craftsmen. Finally, the already available personnel had to be given refresher training to bring them up to the raised standards resulting from progressing developments. A program of speedy and nevertheless thorough training was of particular importance because initially no plans existed or could be expected for introduction of synchronized work or production belt methods, which increased the number of skilled and semi-skilled personnel required.

To have transferred responsibility for this training mission to the aircraft factories would have exceeded the capabilities of the fuselage and engine manufacturing firms, who would have had to use some of their already completely inadequate number of cadre personnel for the purpose, and they were unable to dispense with these since they needed them for preparatory work and for execution of their parts of the procurement programs.

Furthermore, the executive personnel were occupied with measures to insure execution of the programs, namely with planning, the establishment of new or expansion of existing factories, the organizational steps necessary for production, the construction, designing and production of the manufacturing and accepting devices and installations, the creation of the operational organization necessitated by the transition from individual to serial construction, and so forth.
The manufacturing firms therefore could not possibly make suitably trained personnel available for training purposes.

The size of the missions to be executed simultaneously therefore in 1934 necessitated the establishment of a special agency, the Industrial Labor Bureau. This bureau received the mission of carrying out all necessary measures in the training field as a basic condition for the procurement of adequate personnel for the program. Since the most practical and speedy way to execute this mission was in close cooperation with the industry, the bureau was placed under the Chief of the Technical Office.

The good results achieved by the bureau in the next few years resulted in the responsibility for the training of military pupils at the preparatory air technical schools being also assigned to it. These were the personnel who were to become members of the air technical NCO corps, and they also received their training without any necessity to use cadre personnel from the factories for the purpose. Then the bureau assumed responsibility also for the training of apprentices for assignment to air bases.

Unfortunately, the assignment to the Bureau of troop training activities led to controversy between the Chief of Air Force Special Supply and Procurement Service on the one hand and the Chief of Training on the other, with the outcome
that the Industrial Training Bureau was transferred from the Chief of Air Force Special Supply and Procurement Service to the Chief of Training, probably in 1942. This change unfortunately had a detrimental impact on training standards achieved, since it interrupted the existing close contact with the industry and excluded the beneficial influence of the Chief of Special Supply and Procurement Service.

The first practical step taken by the Industrial Labor Bureau was the establishment of training workshops in the more important industrial concerns participating in the air armament program.

The whole program was greatly facilitated by the use of the unemployed, of whom there were more than six million at the beginning of 1933. The measures instituted by the new Government (the National Socialist Party—Note by Translator) to create employment were not yet making themselves felt to any great extent, and Army and Navy expansion had hardly started, so that the Bureau was able to procure adequate numbers of skilled personnel from branches closely related to the aircraft fuselage and engine manufacturing industry for retraining.

Also the measures taken by the Bureau coincided with the efforts of the new Government to reduce the number of unemployed as speedily as possible.
For the above reasons the Bureau received very full support from all official sources, particularly from the industrial executives appointed by the Technical Office at the more important manufacturing firms, and later from the Armament Inspectorates.

In view of the progressive employment program instituted by the Government, however, it was to be assumed that within a relatively short time no skilled personnel from other branches of industry would be available, so that the training program then would have to rely on unskilled personnel.

Originally intended for only short duration, all retraining measures were extended time and again because of the steadily mounting size of the armament programs and because of the personnel shortages which became more and more evident from 1939 on, so that the retraining program continued right until the end of the war and finally was extended also to foreign civilian personnel.

The normal retraining course lasted six weeks, and was only extended under exceptional circumstances. Using experience accumulated in this field by the firm of Junkers a method was used founded on a working-educational system consisting of a planned and methodical orientation. The training data compiled by the Training Aids Center of the Reich Air Ministry Footnote 1, p. 204: See "Gericke von Dr. Ing. E. h. a. Junkers Flugzeugbau, Ausbildung in der Luftfahrtindustrie."
at Dessau proved a valuable support. These consisted of a series of specific handicraft exercises to be practiced methodically in a concentrated form from the very first day on. The short term courses included all subjects of fuselage and engine construction, free-machining, smithy work, tempering, and welding.

The use of modern training methods and aids produced exceptionally good results, and the number of personnel trained in this way is estimated at several hundred thousand, of whom approximately 70,000 were accounted for by the firm of Junkers alone in its factories within Germany and in foreign countries.

The Technical Office paid the firms two Marks daily per trainee to support their efforts. This support was discontinued when a stage was reached at which the firms could conduct retraining programs in their own interests.

As previously mentioned the need arose, besides the retraining courses, for the training of future qualified personnel. This was a long-range program and was to insure later availability of leasing personnel. For this purpose the Bureau established special training systems at the more important factories to give training to apprentices and refresher training to qualified personnel in order to keep them abreast of current developments. One necessary condition here was the creation of two entirely new and separate crafts in the field
of engine construction.

The training course here followed the principles in use
in most large concerns today, but lasted three-and-one-half
years instead of the customary three years. 1

The other missions of the Bureau, those of training for
instructors and for master craftsmen to serve as shop foremen,
and that of giving advanced training and education to employ-
ees in general assumed high importance for the fulfillment
of the qualitative and quantitative requirements of the pro-
duction programs when the majority of skilled craftsmen were
called up for military service during the war, necessitating
the employment of unskilled labor and foreigners.

The training and retraining activities of the Bureau
provided a basis for an available personnel for the speedy
build-up of the aircraft industry and thus for execution of
the unit activation plans prepared by the General Staff.
Their importance from this viewpoint increased still further
during the war, which lasted longer than anticipated, when
the drafting of personnel employed in the armament industries
for military service necessitated the training of foreign
labor.

Close cooperation with the Technical Office and with
the Chief of Air Force Special Supply and Procurement Service
combined with the uniform control of the aircraft industry enabled the Bureau to engage in long-view planning in the training field. That the labor situation became exceedingly acute later in the war was not due to any inadequacies in the training program but exclusively to the fact that the available labor potential was completely over-exploited and that the highest authorities failed to realize the limits of what was possible.

From the sources available it has not been possible to compile reliable figures on personnel movements in the aircraft industry. The figures given are in some cases very contradictory, obviously because their computation was based on varying viewpoints. The compilation contained in the 1933 Industrial Plan included only the personnel employed at productive tasks on the fuselage and engine types involved, since the ratio of productive to nonproductive labor hinged largely upon the organization of manufacturing operations at the various factories.

The newly introduced labor training program and preparatory work for serial production caused only a relatively small increase in the number of personnel employed up to the end of 1933. In the following years, however, the gradual introduction of the newly trained personnel caused a steady rise in the numbers employed up to 1937. Although the totals given
from case to case up to 1935 contain all male and female personnel, and thus include both productive and unproductive labor, employed in the manufacture of fuselages and engines, 

they were not consonant with actual conditions, since they did not contain the proper percentage of personnel employed in armament factories which, besides aircraft, also manufactured other items of equipment, such as the firms manufacturing standard equipment for aircraft, navigational and radio equipment, weapons, bombs, and other items.

The failure to include these figures was obviously due to the fact that these firms were not yet members of the National Association of German Aircraft Industries (Reichs-...)

which furnished the data from which the figures were taken.

1. See IC III, 5 b, 15 June 1935.

Footnote 1, p. 209: Appendix.... Remark: For a survey of what impact personnel policies would have had on the Air Force armament activities if the program had been given a more favorable priority, a reliable overall survey of the total manpower available on the given dates. Since this information is not available only a general picture of personnel movements in the aircraft industry can be given.

Footnote 2, p. 209: On the basis of the present author's personal experience.

Footnote 1, p. 207: See "Report by Dr. Ing. Krause on Training in the Aircraft Industry (Ausbildung in der Luftfahrta-

Industrie)."

Footnote 1, p. 206: Appendix....
Furthermore, with few exceptions at the beginning of rearmament activities, the volume of work for aviation purposes in these factories was relatively small in comparison with the rest of their manufacturing activities.

The total achieved by 1935 was 70,000 persons employed in aircraft factories.\(^1\)

Although records on the subject are lacking, it can be assumed that numbers increased at the same rate in 1936 and 1937, until this development was interrupted by the reduced defense budget of 1937. The planned total of personnel employed at fuselage and engine factories, plus a few general armaments factories was 105,000 in 1937.

The actual figure for 1937 must have been far higher.

Quite apart from the personnel not recorded who were employed in general armament factories, the fuselage and engine factories found themselves compelled, particularly during the early stages, to sub-contract with other firms to carry out a large part of their work. This they were forced to do because the expansion of their factories could not keep pace with the expansion of the production programs. This assumption is confirmed by the figure of 57,850 employees given for 1 June 1935, a total which did not include the number of personnel employed in factories manufacturing

1. See RM IC III, 19 August 1935.
such aircraft fuselage and engine parts as radiators, compressors, aircraft propellers, crankshafts, cogwheels, and pumps, all of which were manufactured by firms specializing in such items.

The curve showing personnel movements as based on a reconstruction of aircraft deliveries thus gives a truer picture of actual circumstances. Here the totals are based on the man-power hours calculated by the aircraft manufacturing firms on the basis of the numbers of aircraft delivered. The man-power distribution at aircraft factories was subdivided into categories on the basis of experience factors, as follows:

- Employed at productive and unproductive repair tasks: 15 percent
- Employed on construction of new aircraft: 10 percent
- Employed on construction of pilot models: 10 percent
- Employed at productive and unproductive tasks for stockpiling and spare parts: 15 percent
- Employed at productive and unproductive tasks in serial production processes: 50 percent

(The ratio of productive to unproductive labor estimated here at 67:33).

To determine the overall total of personnel employed in the air armament industries, the figures thus obtained must be increased by 60 percent for 1935 increasing up to 100 percent for 1942.

This increasing percentage reflects the steady
increasing expenditures for aircraft equipment, namely navigational and radar equipment, weapons, and particularly the extra equipment needed for multipurpose planes.

There can be no doubt that the figures computed by the method just described reflect more accurately personnel movements in the aircraft industry, excluding special items, such as V-1 weapons, special type weapons, ground equipment, torpedoes, and the bombs, ammunition, radar instruments and antiaircraft weapons procured by the other branches for the Air Force. The same applies in the case of extra expenditures during transition to new models, during reorganization of factories, etc.

As long as the man power requirements for the armaments program were not without difficulty, the expenditure of man-power for items of equipment and ammunition procured for the Air Force by the other military branches was not recorded by the 2e Haicel Office. These figures are therefore unknown for the period up to 1939 and are therefore not included in the presentations.

After the outbreak of the war, and above all after the introduction of controlled man power allocation, such personnel were included in the allocation for the Air Force.

Footnote 1, p. 212: See "Gegenuberstellung von 'extem und Hofzusammen" 6 June 1934 (634)
This explains the exceedingly big discrepancy between the figures computed and those contained in the records.

It is probable that the manpower figures of 1,010,000-1,027,000 for the end of 1941 are fairly accurate and contain personnel employed on armaments production for the Army, Navy, and Air Force, but excluding the Anti-Aircraft Artillery. Since manpower expenditures for Anti-Aircraft Artillery supplies are given as 300,000 it can be assumed that the maximum figure for personnel employed at armaments production was achieved in mid-1943, namely, 1,800,000-1,900,000.

The preferential treatment given to other armament items, serious fluctuations in the man power potential, and territorial losses later in the war had an adverse impact on personnel developments and caused a corresponding decrease.

The figure of 2,100,000 given by the Minister for Armaments and War-Time Production for mid-1944 appears too high. Obviously this figure was compiled from statistics prepared by Flentpotentary General Seukel, which did not correspond to actual circumstances.

The placement of fighter production in the highest priority and the consequent step up in fighter production had no appreciable influence on the overall picture of personnel movements in the aircraft manufacturing industry, since the efforts were made to meet the increased requirements for
fighter production by curtailing or halting the production of other aircraft. In spite of this, it was also not possible to meet manpower requirements during this period.

As previously mentioned, the introduction of the required personnel to factories of the aircraft industry after they had been retrained presented no serious problems up to 1937, since adequate manpower reserves were available. This process was interrupted by a sudden decrease in the defense budget in 1937. This automatically halted the procurement of additional manpower for the aircraft industry. Studies conducted by the Technical Office concerning the impact of these measures on the progress of rearmament reflect a planned reduction of manpower in the aircraft industry of 10,000.1

Although this number can be considered relatively small when compared with the total figures involved, it nevertheless represented an incisive loss, since it included special skilled personnel who had been trained at a considerable expenditure in funds and effort, when it was found impossible to replace later within the required short time. To what extent the planned retractions actually took place cannot be determined from the available records. However, the cessation of new employment of personnel and of training activities automatically had an adverse effect on all armament activities of 1. See LO III, 1, 3 June 1937 (345).
the Air Force, particularly on industrial expansion and the
the preparatory measures for aircraft and equipment manufacture.

The consequences became apparent when the necessity for a
further increase in armament activities developed in 1938 be-
cause of the hazardous political situation.

Meanwhile, the man power reserves which had been avail-
able in 1937 had been taken up by the extensive program of
public construction work and were no longer available for
a further increase in armament activities. What further com-
plicated matters was Hitler’s decision in approximately 1938
to give the Army and the Navy priority over the Air Force in
armament requirements.

The difficulties encountered in efforts to provide addi-
tional man power for the aircraft industry increased markedly
after the outbreak of the war and finally resulted in a con-
tinuing gap between the requirements stated by the General
Staff and what was actually available.

The favorable opportunities for employment offered by
the aircraft industry owing to the increased armaments pro-
fusion activities resulting from reestablishment of the Air
Force, plus the enthusiasm of the younger generation for
aviation had admittedly caused a strong influx of young
people into the industry. This undoubtedly gave strong im-
petus to the rapid build-up of the industry. However,
these very factors produced circumstances which had a seriously adverse impact on the execution of the increased production programs. Although the more important specialist personnel were declared indispensable, the factories suffered heavy losses through the induction of young men for military service, many of whom already had received military training.

After the victorious conclusion of the campaigns in Poland and France in 1939 and 1940, plans provided for deactivation of 35 divisions in order to relieve the strained manpower situation in the armament industries. In actual fact, however, the personnel of only 15 divisions were given only temporary leave for assignment to the industry, the reason being the possibility of military action against Britain. It has not been possible to determine to what extent personnel from these fifteen divisions were allocated for employment in the air armament industries. In view of the priorities awarded to Army and Navy armaments, however, allocations for air armament industries presumably did not represent an appreciable support of the air armament programs. In any case, it is an established fact that labor situation in the aircraft manufacturing industry shows no improvement whatever.

Initial successes in the Russian campaign and the exceptionally large numbers of prisoners taken there raised hopes. 1 See Excerpts from Halder Diary.
that the procurement of labor would be eased considerably, and
there can be no doubt that the requirements of the armaments
industries could to a great extent have been met by the employ-
ment of prisoners of war after a relatively short period of
training.

Requests for the allocation of prisoners of war were re-
jected, however, since their training was to be prevented. This
decision was probably motivated by the fear of espionage and
sabotage activities. In view of the extraordinarily serious
difficulties encountered in efforts to fulfill the armaments
production programs, and in view of the increases production
which could have been achieved with additional labor, the ad-
vantages resulting from employment of the Russian prisoners
would have far outweighed these disadvantages, and this is ac-
ccentuated by the fact that later events in the war proved these
fears unfounded.

Another obvious reason for this decision of such dire
consequence for the armament industries was the faulty apprais-
el of the Russian military potential. It was assumed that
the Russian campaign could be brought to a speedy and success-
ful conclusion, that 50 divisions could then be deactivated,
and that this would cover industrial man power requirements.
The reverses suffered on the Russian front in the winter of
1942-42 prevented implementation of these measures.
The outcome was that the armament industry now had neither the man power from the 50 divisions nor the Russian prisoners. The only remaining solution in these circumstances was to use the Russian prisoners in spite of all misgivings. However, this decision could not produce results before mid-1942, since the Russians had meanwhile been allocated for employment in the agriculture and had to be recovered from there and then prepared for industrial employment by means of training courses.

What further increased the adverse effects of this late release of prisoners to the aircraft industry was the long duration of the war, which the Supreme Command had not anticipated, and the exceedingly heavy combat losses and the consequent induction of personnel from the armament industries for military service.

In March 1942 almost 50 percent of the personnel in categories which were important for serial production were awaiting their induction orders, although the Joint Military High Command had provided that "the majority" of specialized personnel were to remain in the industry and that key personnel were to be excluded from military induction.  

These heavy losses in personnel with special skills

2. Ibix 24 March 1942.
made the introduction of incisive measures in the personal
field a categoric necessity to insure execution of the produc-
tion programs. The most important of these measures included
the recruitment of foreign labor, particularly from occupied
territories, and the increased use of prisoners of war from
all nations for employment in the armament industries.

In order to secure uniform planning and uniform control
for the overall requirements of the armaments industries, a
Plenipotentiary General was appointed, whose mission was out-
lined in a decree issued by Hitler on 22 March 1942 as follows:

The secure provision of the necessary man power for
the entire wartime economy, in particular for the armaments
industries, necessitates a uniformly directed control, con-
sonant with the requirements of military preparedness, of
the use of all available labor, including the recruited
foreigners and prisoners of war, and the mobilization of
all still unexploited labor within the Reich, including
the Protectorate (Reichsgau Sudetenland, Czechoslovakia—Note
below Translator), the Generalgouvernement (Reichsgau Poland—Note
below Translator), and the occupied territories.

Aichinger, Gauleiter and Gauleiter (National Governor and
Regional Party Leader) Sauckel was assigned responsibility
for the execution of this mission.

I. Haushofer, Dokumente 1668183 (p.432), Band XVI.
In the 1942-45 period the excessive exploitation of the man-power potential became increasingly evident. In every case the authorities responsible for armament production resisted draft measures taken by the Joint Military High Command. Occasionally they succeeded in having personnel excluded from the military draft because of the urgent requirements of the armament industries, but the indispensability status thus granted was only for a limited period because of the heavy losses suffered at the fronts.

As previously mentioned, approximately 50 percent of the personnel employed at armament production were called up for military service in March 1942. Out of the 435,000 personnel with special skills formerly declared indispensable 60,000 were called up in February 1943. These were followed by 220,000 from the 1894-1900 age-classes in March 1943, 8 the 1897-1922 age-classes a little later, the 1914 and younger age-classes in September 1943, further drafts in September 71,000 in October, 50,000 in December 1943, and finally by indefinite indefinite drafting for service in the Volkssturm (National Levee) and for entrenchment work in October 1944. 8

Strikingly by the fact that the key personnel who were

1. See "ST-Besprechung, 29 Oct 43.
2. Ild, 12 Mar 43.
3. Ild, 17 Aug 43.
4. Ild, 19 May 43. 5. Ild, 18 Sep 43.
6. Ild, 29 Oct 43. 7. Ild, 1 Dec 43.
8. See "Besprechung Rüstungsverwalt.," 30 Oct 44.
absolutely indispensable for proper operations of the armament industries were also called up for military service in spite of the guarantee given four months previously by the Joint Military High Command that they would not be drafted for military service.

In a few cases armament authorities succeeded in obtaining from Hitler personally an order overriding orders from the Joint Military High Command, but in each such case the serious situation at the fronts made it imperative to rescind or circumvent such orders.

In considering Hitler's decisions in the matter of drafting for military service it can be presumed that his personal position as Commander in Chief of the Army made an unbiased appraisal of the demands made by the Navy and Air Force and the armament industries impossible and thus resulted in faulty decisions.

All possible avenues were exploited in measures to cover the losses and fill the vacancies caused by the call up for military service, and this applied particularly to skilled personnel. Thus, the training period for apprentices was reduced by one year, which released 25,000 skilled personnel.

30,000 troops were released on leave for allocation to the

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2. Ibid. 17 Feb 42
3. Ibid. 24 Mar 43
industry, a measure which had to be cancelled after a short
time to meet needs for activation of the XII Air Corps; and
another 85,000 recruits were released, but had to be recalled
to military service shortly because of the complete destruc-
tion of the Air Force ground organization. Then, efforts were
made to meet labor needs by inducting women up to the age of
45 for assignment to the armament industries; 2 by closing
down all installations not considered absolutely essential; 3
by the employment of 75,000 women who volunteered for ser-
vice; 4 whose immediate use in industrial employment was pre-
vented initially by certain difficulties; by increases use
of small independent workshops, a measure introduced after
Speer, as Minister for Production and Wartime Economy, had
taken over full control of all production; 5 by the temporary
release of 22,000 men drafted for the Air Force under an
agreement with the Air Force General Staff valid up to 1
March 1943; 6 and by introduction of the 72-hour working week. 7

At an earlier stage Goering has endeavored to obtain
an "aviation population" status for personnel employed in
the aircraft industry, similar to the "seafaring population"
status awarded for the Navy, so as to be able to protect
such personnel against being drafted by the Army or Navy.

1. See "Er-Deutschung" 26 Aug 43; 2. Ibid 16 Feb 43;
3. Ibid 23 Aug 43; 4. Ibid 2 Mar 43;
7. See "Er-Deutschung", 25 Mar 43.
Under the pressure of events at the front, however, this measure did not prove very effective.

In spite of all measures taken, however, it proved impossible to any appreciable extent to satisfy the needs of the armament industries. The only remaining possibility was to make use of foreign labor, namely, foreign civilians, prisoners-of-war, personnel from related industries in foreign countries, particularly France, Czechoslovakia, Hungary, and in some cases Russia.

Even prior to Sauckel’s appointment, foreign personnel had been brought in from abroad under working contracts, but since the numbers thus procured proved inadequate, Sauckel found himself compelled to resort to the compulsory transport of men and women from the occupied territories to Germany. This method was in direct contrast with the efforts of the Chief of Air Force Special Supply and Procurement Service to make use of foreign labor by employing them in factories resuming operations in their own countries. However, the measure of compulsory transportation of foreigners to Germany was finally put into effect, evidently on Goering’s recommendation, because only 500,000 came voluntarily in 1942, a number completely disproportionate with the needs of the

1. See “Bесрерrчung Goering mit Sauckel, (date illegible)
German armament industries.

Although the labor employed in the armament industries in 1941 was doubled in 1942, the increased output was entirely disproportionate to the numerical increase of employees. This was due to a number of factors, among them the separation of families, the difficulty of providing enough suitable quarters, and the difficulty of providing sufficient food and other amenities, all of which contributed to reduce radically the individual performances of employees.

For the Air Force the measures taken by Sauckel produced particularly grave results, since the labor impressed for service in Germany included personnel employed in the French factories reopened by the Chief of Air Force Special Supply and Procurement Service to support the two air fleets stationed in the west. Others employed in these French factories no longer came to work, obviously because they were afraid. Furthermore, the personnel thus taken from the French factories, most of them skilled in fuselage, engine, and aircraft weapons construction were not employed at appropriate tasks but at entirely different specialized work in Germany. Such personnel were allocated strictly in accordance with current priorities, which gave the Army and Navy preference over the Air Force.

1. See "Oi-Besprechung," 9 Feb 42.
2. See "Besprechung Hitler: Speer, 14 and 15 Apr 42 ueber Arbeitseinsatz."
Pursuant to a decision by Hitler, the plan was to bring
to Germany 200,000 of the 900,000 craftsmen available in
France. To what extent this target was achieved cannot be
determined from the records available at time of writing.

Other plans by Sauckel aimed at bringing in Italian and
Croatian labor, while the measure changing the status of
French prisoners of war to the status of contracted employees
aimed at achieving increased work performances.

In spite of all efforts, Sauckel failed in his efforts
to provide sufficient labor. The exceptionally difficult
labor situation is characterized strikingly by Milch, who
states that the overall increase in employees in the aircraft
industry in 1942 over 1941 was far less than 100,000, and
that the numerical strength of labor in the industries in
1944 was not appreciably higher than it had been in 1941.

With the progressive deterioration of the military si-
tuation resistance by foreign workers to the conclusion of
working contracts increased. Furthermore, some personnel
employed in Germany overstayed their home leave, other failed
to return at all. These among other factors produced such
fluctuations in the labor supply situation within Germany
that it is impossible to obtain an accurate picture of cir-
cumstances as they actually existed.

1. See "Gespräch Goering-Milch, 28 Oct 42."
The statistics prepared by Snooks in the labor supplied to the industries therefore in no way reflect the true circumstances, since they merely record the numbers brought in but disregard the numbers lost through fluctuation and other causes. Personnel returning from home leave or other absences appear again and again in the statistics as newly supplied labor and were allotted to the Army, Navy, and Air Force. There can be no doubt that these statistics created false impressions in the supreme command concerning the actual supply of labor available, and this resulted in an appraisal of the industrial situation not commensurate with actual conditions.

When new and expanded programs were planned and initiated, the initiating authorities almost invariably undertook to furnish the increased supplies of man power and materials needed, but the labor they actually furnished was always far less than that promised. This failure to create the essential conditions automatically resulted in smaller industrial deliveries than required, which in turn led to the establishment of modified and reduced programs. Quite apart from the fact that this made long-range planning impossible, the perpetual fluctuations in the numbers of personnel available prevented maximum benefit from the labor actually available in the factories.

1. See "Besprechung Uerlin-Milch, 23. Okt. 44."
The fact that the labor provided was invariably less
than that required in time proceed conditions in which firms
requested larger numbers of personnel than provided for in
planning, the purpose being to secure larger allocations.
This automatically increased the confusion already existing
in the whole man power situation.

It is beyond doubt that the very serious shortage of
leading personnel in the industries contributes towards these
circumstances. The demand made by firms on their own per-
soneil distribution agencies mounted during the war to such
a volume that there was no possibility whatever to meet them
properly. Prisoners-of-war of various nationality had in
most factories turned the employees into a heterogeneous mass
made up of French working under voluntary contracts, male
and female Russians, Poles, Italians, Croats, Hollander,
Russian prisoners-of-war, and male and female Germans. In
the cooperative employment of these various groups due regard
had to be given to copious regulations governing such matters
as the guarding, billeting, feeding requirements, the type
of disciplinary action they were subject to, the nature of
penalties which could be inflicted, and the matter of pay
rates.1

1 See Diplomingenieur Schmit in the Swiss Journal "Flug-
wahr und Technik," February 1947. Also from personal ex-
perience of Author No. 2.
It was already an extraordinarily difficult undertaking to organize properly functioning work groups within a factory, but the handling of the legal, social, cultural and other problems involved created problems demanding exceptional organizational performances on the part of the firm's management, since due regard had to be given to the spheres of authority of the large number of administrative and party agencies concerned, such as

the regional leader of the National Socialist Party (the Gauleiter;

the National Labor Front (Arbeitsfront);

the National Trustee of Labor (Truhenwärter der Arbeit);

the Regional Labor Office (Landesarbeitsamt);

the Military District Recruiting Office (Wehrmachtzulassungs- und Abordnung);

the Armament Inspectorates (Armschaufsicht);

the Labor Utilization Bureau (Arbeitsinspektion);

the Ministry for Armaments;

the Plenipotentiary for Labor (or Man-Power) Utilization (der Generalbevollmächtigter für den Arbeits einsatz);

the SS.

Foreign civilian employees made up the following percentages of the labor in the armaments industries:

1942 36.5 percent, plus 6.5 percent prisoners-of-war;
1943 30 percent;
1944 40 percent.¹
In computing the above percentages, the entire complement of German employees has been included, meaning also the development and proving establishments, which were staffed exclusively with German specialized personnel. On the numbers employed alone in the serial production processes, foreign labor made up a far larger percentage, in some cases as much as 95 percent. In the serial production processes of the BMW-801 engine, which was of particular importance in German air armaments, the percentage of foreigners was 87.5 percent, in that of the Ju-52 aircraft, 85 percent.

1. See "De-Ferrocchung vom 28.8.42, 14.10.43;" see also Excerpt from "Der Krieg, 1942, Band IX" p. 128.
Q. The Russian aviation industry, and particularly the fuselage manufacturing firms, was in a financial position by no means commensurate with the requirements of a military armament program. The years of economic crisis, 1930-32, had so weakened them financially that they were no longer able with their own means to meet increased requirements above their current capacities.

Lack of funds made capital investments on any appreciable scale impossible without outside support, since no own reserves were available.

A way was sought out of this dilemma through the establishment of State-owned factories and the soliciting of private capital.

The anticipated clumsiness and inflexibility of such an arrangement plus the hampering effects of dependence on Government agencies contrasts with the requirement for a speedy build-up of the industries, and this led to the decision to exploit private initiative and to endeavor to create the necessary industrial conditions for a quick build-up of the Air Force on the basis of private economy.

One factor contributing to this decision was the desire to use budget funds exclusively for the development and procurement of the necessary aircraft and equipment, and the

1. See also Section I, C-D, above.
realization that the establishment of State-owned factories would take up a large share of the budget.

Funds to facilitate an accelerated initiation of the program and to make the initial investments possible were made available in the form of increases in advances payments on awarded contracts. This course was chosen because it made negotiations possible to bridge the time needed for the acquisition of private capital. However, it was a course which could not serve for only a limited period, since the expenditures for continued expansion of the industries could not be met by means of advances paid on awarded construction contracts.

Although a number of large industrial concerns declared their willingness to establish new factories with their own capital, it soon became obvious that these would not be able to cope alone with the constantly increasing demands made on the industries. Contrary to expectations, the fact that the aviation industry would depend almost exclusively on government contracts, plus the fact that private investments far exceeding the normal peacetime scope would be required, made private capital reluctant to invest to the necessary extent in installations of the aviation industry.

This necessitates a basic decision concerning the proc-
One factor of primary importance here was still the desire to avoid the use of budget funds and to facilitate the borrowing of capital against securities, and as far as possible to prevent government partnership participation. The problem was solved here by government guarantees covering amortization and the interest on borrowed capital, a measure designed to enable firms supporting the Air Force to repay borrowed capital even if their turnover decreased, provided this was not due to any fault of their own. The text of the guarantee was as follows:

Der Reichsminister der Luftfahrt und Oberbefehlshaber der Luftwaffe

Berlin (Date)

Firm: .......

Subject: Amortization und Capital Interest Guarantee.

In the event of the installations enumerated on List I falling into disuse or into smaller use than agreed upon because of reduced armaments requirements, I give you the following guarantee, valid until ....... and not to exceed a maximum amount of Reichsmark......

1. If you are not in the position to provide in your prices for the normal amortization amounts annually as set forth in List 2 I shall make you an annual payment to cover the missing sum after examination by my representative.

2. In addition I shall refund you the normal interest (currently about 2 percent above the Reichsbank rate of discount) on your own capital and on borrowed capital subject to the payment of interest invested in the said installations, but not to exceed the book value remaining after all factors included in your prices or accruing.
to you in some other form as well as the amounts used for additional amortization write-offs.

By Order
3/......

The obligation undertaken by the Government covered only the installations enumerated in the guarantee.

However, the amortization guarantee only enabled the industrial firms to cover their financial needs for a relatively short period. Since the amortization quotas were too small, so that it took approximately ten years to repay loans, and since the difference between the credit periods and the time required for amortization was too great, the banks were no longer in a position to meet the needs of the firms for investment capital. The reason given by the banks here was that the volume of capital involved in the aviation industry exceeds normal financing projects and has nothing in common with such, so that they were only authorized to give capital support within the scope of normal circumstances.

It was thus no longer possible to depend on the use of private capital, so that the Reich Air Ministry was compelled to make funds available from the budget. Loans from this source were free of interest and could be called up daily. The amounts were determined after examination by authorized inspectors, were contingent upon the progress made in con-
construction of the installations involved, and were paid out in instalments.

As rearmament progresses, however, the credits taken up by some manufacturing firms reached figures entirely disproportionate to their own finances. This was due primarily to the safety requirements stipulated by the Technical Office, since the wide spacing of individual buildings, the construction of air raid cellars and trenches required far greater expenditures than would have been the case normally for serial manufacture, namely, for the purchase of terrain, for road construction, and for transportation facilities.

In particular the extra expenditures for transportation and the resultant loss in time represented a burden which could not be carried under peacetime conditions, since decentralization was contrary to the principles of rational manufacturing methods. Funding of the costs thus arising from stipulated conditions therefore needed some special arrangement.

In the course of time the interim credits allowed by the Reich Air Ministry had reached a total of between 400 and 600 Million Reichsmark.1

The extent of the manufacturing installations made in such the meanwhile assumed proportions that the capital of some

1. See "Reichsbahn Ministerialrat Dr. Kühn" p. 9.
of the firms involved was totally inadequate. This made some form of consolidation imperative, the purpose being to bring own and borrowed capital into a tolerable relationship. 

The solution tried here was that of the proprietors to make of the firms a substantial contribution in order to increase firm-owned capital.

Additional efforts to bring in private capital from other sources in spite of all difficulties failed. The share of the Government in many firms of the aviation industry exceeded 50 percent, for which reason measures were to be taken to meet the desire of proprietors that they should retain a share majority. This purpose was served by allowing a 3 percent architects' fee on the costs of all approved installations.

Another measure designed to restore the firms to private ownership was that of option agreements, the value of the installations to be established at the time of acquisition by the firms. This measure was in line with the desires of the Reich Air Minister and the Chief of Air Force Special Supply and Procurement Service to support private initiative in order to secure maximum performances. In all firms thus partly owned by the Government, the Board of Directors included one member from the Technical Office and one from Industrial Economy Office, but these did little to support
the management. In other ways also, everything possible was
done to avoid hampering operations through the application
of official regulations or through interference in the ma-
agement, unless steps were taken which directly contravenes
the basic administrative regulations.

A further measure designed to assist firms in consolidat-
ing the capital matters took the form of support amounting
to the expenditures required for the air raid protection
measures stipulated by the "technical Office. This support was
known as the "Capital Average (Kapitalausfall)" and was calcul-

ated with assistance from the Price Central Board of the
Air Ministry. The figure arrived at was set off against in-
vestment loans received from the Government. The recipients
use

of such support were required to \text{WILLIAMXXX} the amounts thus
received for amortization of short-life installations and
air raid protection installations, the Air Ministry particip-
ating in the decisions made in this respect. The text of
the contract regulating this form of State support was as
follows:

\text{AGREEMENT}

Between the German Reich Treasury (Aviation), represented
by the Reich Minister for Aviation and Commander in Chief
of the Air Force, hereinafter called the Reich

and

the Firm.............

represented by the proprietor, hereinafter called the firm,
the following contract concerning the ....... factory
is agreed upon:

I

1. The Reich will award the firm a one-time support
from public funds in the amount of Reichsmark......

2. This support will be made available by being set
off against an appropriate claim of the Reich resulting
from interim credits in the amount of RM...... repayable
on daily notice, and free of interest, for the purpose of
expanding the .......factory.

3. The weak value of the installations is RM......
The firm is obligated to use the support amounts thus
special received for amortization of short-life installations and
air raid protection installations in agreement with the
Reich.

II

The firm is also obligated

1. To maintain the factory installations in operable
condition and, on demand by the Reich, to make these
available for the preferential execution of aviation con-
tract. The execution of other contracts in the factory
installations is subject to approval by the Reich, which
can be granted in general.

2. The sale of terrain and/or buildings, installations
and facilities serving the manufacture of aviation equip-
ment is subject to approval by the Reich.

3. The "Amortization Guarantee" given to the Firm
by the Reich with letter dated...... is cancelled.

4. The amounts to be finally written off will be
calculated on the basis of the acquirement value computed
after the Special Amortization Amounts have been written
off.
5. The Firm cede to the Reich and the Financial Controlling Court of the Reich (Reichswirtschaftsamt, RWA) the auditing rights prescribed in Paragraph 45, 2 of the National Budget Law (Reichsfinanzwirtschaftsverordnung) and agrees to submit to orice and economy examinations by the Air Ministry or its duly appointed representatives.

III

The costs and taxes due on this agreement will be borne by the Firm.

The Reich Minister for Aviation and Commander in Chief of the Air Force

8/.......

In cases where capital investments were needed for the execution of missions rendered necessary by the exigencies of war, the establishment of partial or complete factories had to be ordered by the Technical Office or the Chief of Air Force Special Supply and Procurement Service. The purchase of ground and the construction of buildings was permissible only under orders from this authority.

The establishment of partial factories took place in the case of firms hitherto manufacturing for civilian markets.

Note by Translator: The various contracts and agreements referred to by the author will be found at the end of this present section in the German original. They are not numbered, and to have numbered them in the translation would have caused considerable confusion. For this reason they have been included in the text in the translation.
When completely new factories were established they were let under contract to industrial firms. Such projects were financed exclusively by the firm of Luftanlagen G.m.b.H.

The capital investments rendered necessary for the requirements of war received further support by the allocation of financial support grants from the State known as Mobilization Credits (Mobilisierungskredite). These were granted on the basis of a plan worked out during peace by the Reich Ministry for Economy, which contained the principles, types, and methods under which support could be granted by the Government to concerns taking up the manufacture of military material or expanding their already available facilities for such purposes.

The plan extended to all areas of armament producing activities and served to standardize the financing methods of the Army, Navy, and Air Force, the old methods of which were to be replaced by the new plan.

For these purposes the Ministry for Economy had authorized the Deutsche Industrie-Kreditwark to make credits not to exceed 500-600 Million Marks available for investment in the armaments industries.

The method employed by the Aviation (Luftfahrt) Bank to implement the plan was to use funds accruing partly from repaid loans and partly from long-term deposits from
insurance companies. The method employed by the Industri-
bank to obtain the funds necessary for the credits to be
given was by means of the issue of obligations. If the firms
needing credits were unable to furnish proper securities to
meet bank regulations, so that implementation of the arm-
ments investments plan would have been jeopardized, the Go-

government agreed to assume partial or full responsibility for
the credits granted.

The granting of credits under this plan was only per-
missible if the firm involved could not be justifiably expect-
ed to make other financing arrangements by the use of its
own funds or credits. The basic condition here was that the
firm asking for support must first have applied to its bank
for the credits needed.

The plan worked out by the Reich Ministry for Economy
contained rules according to which the credits granted were
classified as Class A, B, or C credits. Class A credits
could be given on the risk of the applicant alone, without

collateral guarantees; for Class B credits part of the sum
requested had to be guaranteed by a third party; in the case
of Class C credits the entire amount had to be guaranteed by
a third party. Other rules in the plan concerned the respon-
sibility of the industrial groupings consolidated by the Ministry for 10
percent of any losses incurred, and the methods to secure funds by means of assessments to make up losses, resulting from the failure of any firm or firms.

Another financing possibility was found in the War Risks Clause (Kriegsrisiko-Klausel). The purpose here was to free firms hitherto manufacturing only for civilian markets from the burden of risks involved in initial investments or investments to expand existing factories to meet war requirements, whenever such investments could not be considered justifiable from the viewpoint of private economy. The wording of the clause was as follows:

**STANDARD CLAUSE**

If the .... installation can no longer be used profitably because no more or only reduced contracts are received, the installation having been constructed during the war at the instance of Government authorities, the bank will relieve the industrialist either by decreasing his debt to enable him to write off the necessary amounts or by other measures, if without such measures the industrialist would be caused losses which he cannot justifiably be expected to carry with due consideration to all circumstances and the interests of his concern.

The amount of such relief shall be determined, after consultation with the industrialist, by the “Reich, represented by the Reich Credit Council, when necessary with assistance from the Association of Chartered Accountants and Trustees (Deutsche Revisions- und Treuhänder-Akten-Gesellschaft)."
Another form used was the Object Clause and Special Clauses, the purpose of which was to ensure that the profitability of the industrial concern involved would not suffer at the end of the war if the armament factory established was closed down. The wording of the Object Clause (Objektklauß) was as follows:

**OBJECT CLAUSE**

If the installation, established during the war at the instance of Government authorities, can no longer be used profitably because new or only reduced contracts are received, the bank will relieve the industrialist either by increasing his debt to enable him to write off the necessary amounts or by other measures, if without such measures the industrialist would be caused losses which he cannot be justifiably expected to carry in view of the operational results produced and the future usability of the (special) installation concerned.

After consultation with the industrialist the amount of such relief shall be determined by the Reich, represented by the Reich Credit Council, when necessary assisted by the Association of Chartered Accountants and Trustees.

Investment financing by means of Mobilisation Credits and by means of the granting of War Losses Clauses were the financing methods most used throughout the war to promote investments in the armaments industries.

The work connected with implementation of the credits plans was of such a nature that it could not be handled by
a ministry of the Government. A completely Government controlled firm under the name of Luftfahrkosten Ltd A.G.
(Aviation Bureau Ltd.) was therefore established in 1935 with a capital of 20,000 Marks. This firm initially handled the administration of lands, buildings, factory installations, and participation on a share basis in the field of commercial aviation, and now was assigned responsibility for the bank processing and settlement of interest-free interim investment credits. The steadily increasing activities in this field, which were in the nature of the activities of a banking institute led to the decision to give the firm the status of a bank and increase its capital to 70 Million Marks. At the same time the new bank established a subsidiary firm, the Luftfahrtanlagen G.m.b.H. (Aviation Installations Ltd), with a capital of 5 Million Marks, to handle the administration of real estate.

Finally, what had formerly been the Luftfahrkenter G. m. b. H. in 1945 became the Bank der deutschen Luftfahrt A.G (Aerobank) with its capital increased to 150 Million Marks.

The function of the bank now was to act as a financing institute for investments in the aviation industry, to grant credits for current operational costs, etc., and to take up shares in factories of the aviation industry. The steps to establish a special bank to furnish credits to the German aviation
industry had been found necessary because other existing
banks had declared themselves unable to grant credits to the
industry on the required scale.

The book value of German Government investments in the
aviation industry on 31 March 1939 represented a total of
261 400 000 Marks, increasing to 848 000 000 by 31 March
1944. The funds made available by the Aerobank for Mobil-
ization Credits by 31 March 1944 reached the figure of
1 600 000 Marks, of which 1 400 000 was absorbed through
credits granted.

Government capital was invested in 65 firms. Fifty of
these were limited liability companies with a total capital of
1 094 800 000 Marks, 859 000 000 Marks of which was held by t
the bank. In 51 companies the bank held a majority, whereas
in the case of 32 companies, the bank owned more than 90
percent of the capital.

This Government participation extended to firms producing
basic raw materials; firms manufacturing weapons and ammun-
i
tion, equipment and appliances, fuselages, and engines, be-
sides firms engaging in commercial aviation.

In short, it remains to be said that the financing of
the aviation industry and of its factory installations made
special measures necessary because the scope and the speed
of the rearmament made it impossible to rely from year to
year on the funds provided in the annual budget. Such funds had to be requested anew each year and industrial planning had to extend years into the future. Reliance on the annual budget would have caused intolerable delays in the build up of the aviation industry.

Since the whole rearmament had to be carried out under wartime conditions or conditions closely approximating those of war, financial considerations frequently had to be disregarded in favor of technical requirements. Ensures were frequently planned for years ahead and completely independent of the budget provision of the year in which the planning was done, and this circumstance created conditions in which the current budget in many cases was exceeded on a scale which increased steadily as the rearmament program progressed.

Since ready funds were not available to cover these excess expenditures, the industrial firms had to take up credits, which were granted on the basis of future payments approved by the Reich Air Ministry.

A new type of financing document, the Hefe und Cofa Bank Draft (Hefepapiere mit Verpflichtung) was introduced to remove these difficulties. This document created the possibility for the Government to participate over a protracted period in the guarantee of payment.

Similar difficulties were encountered in meeting the
financial obligations incurred through execution of the development and procurement programs. In order to secure rational manufacturing processes and thereby insure the minimum expenditure of man-power hours, the firms involved in these programs had to plan their dispositions at least two years ahead of time. In the case of bomber aircraft two years was the bare minimum in view of the relatively long time required for the various processes involved.

Although itself restricted by a one-year budget, the Technical Office therefore had to assign the programs as firmly awarded contracts covering a period of two years and as planning data for a continued period so that the industrial firms could arrange for the required investments. In the interests of as direct as possible a movement of the procurement programs based on the requirements stated by the General Staff to the industry, it was essential to avoid delayed commencement of production which might have been caused by the formal methods of awarding contracts.

The procurement programs furnished by the Technical Office to the industrial firms, after incorporation of their comments, therefore were in the nature of advance contracts, on the basis of which the firms were obligated to immediately initiate all measures necessary for execution of the programs. Furthermore these advance contracts provided the
vouchers required in the requisitioning of funds from Reich
Air Ministry for advance payments.

In addition to the above, the XXXXX programs served the firms as a basis on which they could formulate their
formal tenders in line with administrative requirements, and
enabled the Department (Later Office) for Industrial Economy
under the Chief of Air Force Special Supply and Procurement
Service to process these tenders administratively. Before
the contracts were awarded in the final form to the firms,
they had to be inspected by the Technical Office to avoid
deviations from the specifications contained in the advance
contracts.

The tenders submitted contained only tentative prices
which were rectified in a later reexamination during the year.

The special advantage of the above procedure was that
it prevented conditions in which manufacturing activities
would become dependent upon the awarding of the formal con-
tract. This was particularly important, since the final con-
tract had to clarify various points, such as licensing de-
tails, the licensing fee, special expenditures by the firm
manufacturing under licence, price alignment between this
firm and the firm owning the patents, expenses for modifi-
cations, and so forth.
The Reich Air Ministry paid the licence fees directly to the licensing firm in order to avoid their inclusion in the prices charged by the manufacturing firm and to promote smooth cooperation between the licensor and the licensee.

The formal contracting procedures outlined above were modified during the war owing to the expansion of the arms program and to prevent excessive administrative work. Under the new procedures there was no longer any necessity to award an advance or tentative contract, to submit tenders, or to draw up a formal final contract. When the fuselage or engine manufacturing firm received information on the quantities required under the program this was considered as an awarded contract.

During the build-up of the aircraft fuselage and engine industries support was given in the form of lump sums consonant with the amounts required, these requirements being ascertained currently by the Office for Industrial Necessity. After the end of this initial period it was possible to return to the normal method of payment in the case of large projects, under which the contracting firm received 30 percent of the value of the contract upon signature as an advance payment, 50 percent upon completion, and the balance of 20 percent upon acceptance of the finished product.

After the necessity for advance or tentative contracts
followed by formal final contracts had been dispensed with, payment was made in instalments commensurate with the progress made in the manufacturing processes. The advance payments from the Reich Air Ministry were safeguarded by means of a general security contract concluded with the individual firms.

The desire to induce the personal initiative of the heads of contracting firms also during the financial procedures involved in the contracts causes the Industrial Economy Office at an early stage to establish standard prices, so that the profits of firms would be determined by their own performances. However, difficulties were often encountered here, since the internal administration of some firms had not kept pace with outward growth and their accounting services were often faulty.

The time pressure under which the industries had been built up and the factories had been equipped, combined with the measures introduced to secure rationalized manufacturing processes has created problems for the accounting services of the individual firms which they were, in most cases, unable to master.

For the price control agencies of the Office for Industrial Economy within the Reich Air Ministry it was an exceedingly difficult matter to determine the fund requirements of the firms and to check the actual financial expenditures
In order to establish a uniform system throughout the entire armament industries, the Reich Council for Business Management (Reichsausschuss für Betriebswirtschaft) established by the Reich Ministry for Economy in 1937 had published basic principles of bookkeeping. These contained details on the organization of bookkeeping illustrated by examples, and of cost accounting for factory establishments.

The establishment of standard prices was first applied successfully to the firms manufacturing items of equipment. It was easier here to gain the necessary insight because of the relatively small amount of labor involved in the manufacture of individual items of equipment. It was 1939 before standard prices could be established for aircraft.

What proved particularly complicated was the checking of subcontractors. Since they had only indirect contacts with the Technical Office and/or the Industrial Economy Office, it has only been possible to exercise control over them at a late stage. It was found in some cases that firms in this bracket were charging increased prices far above normal standards, and these discrepancies were corrected.
Aptitudes Required in Candidates for the Profession of Instructor in Metal Aircraft Construction

Educational Requirements

Essential: Elementary Public School (Volksschule)

Good knowledge of arithmetic, geometry, drawing, and German, requiring the ability to give oral and written reports on technical processes, particularly in view of possible later employment in the field, possible in foreign countries.

The metal aircraft constructor will constantly in his work require a knowledge of mathematical processes and gauging. A knowledge of geometry and drawing ability will be required, for example in the tracing and laying out of plans, etc.

Desired: Training in a wide variety of sports; this will further ability to work on scaffolding and in various body postures.

Disabling Factors: If the applicant has needed extra tuition, training for persons who have poor eyesight, are blind, hard of hearing, deaf and dumb, or have speech impediments.

Physical Requirements

Essential: At least medium-strong constitution.

The candidate will occasionally have to lift, raise and carry aircraft parts, such as wings, bodies, etc., will have to operate compressed-air riveting machinery.

What is needed is a person with an agile, flexible, wiry body, not easily exhausted.

The candidate will have to work in the most varied positions and postures, at times in almost inaccessible parts (for example in the
body of a plane, lying face down or face up, in a steeping position, kneeling, working upwards or downwards for protracted periods.

He will need strong arm and leg muscles and healthy feet:

His work will call for changing speeds, changes in the force applied, and constant application.

He will require good respiratory organs:

He will have to work in large sheds, exposed to the vagaries of weather, for example in sheds open for aircraft to enter and leave.

The applicant will need at least normal vision and the ability to distinguish between various shades of grey:

He must be able to recognize distinguishing colors of manufacturing materials, and so forth, such as the various shades of grey in light metals.

The candidate must have perfect hearing (should be able to hear with either ear a person whispering six meters away).

Desirable: Persons not requiring eyeglasses.

Disabling Factors:

Congenital obesity; tuberculosis; chronic bronchial catarh; asthma; chronic kidney troubles; organic nervous disorders, including epilepsy; chronic rheumatism in the joints with impeded agility; chronic ear troubles, including dis- turrances of equilibrium (the candidate will be exposed to weather conditions, will have to work on scaffolding); open gums (dust dangers); ruptures and susceptibility to ruptures (unless removable through surgery); Second and third degree spinal curvature; chronic inflammable...
flat feet, folding leg (Spreubenz), incomplete
flat feet (Knickfuss); varicose veins, particu-
larly if inflammable and recurring; suscept-
ibility to inflammable skin troubles; seriously
sweaty hands.

Mental Requirements

Essential: Very keen sense of responsibility:

Very great demands will be made on the can-
didates carefulness, conscientiousness, and pow-
ers of concentration. Even when performing
monotonous tasks, tiredness must under no cir-
cumstances result in relaxed reliability. A
case of very slight carelessness in making or
putting together individual parts, or the fail-
ure to report flaws detected, such as a barely
perceptible crack in material subjected to
severe strains during operations could serious-
ly endanger and possible lead to the loss of
human lives and the aircraft concerned.

Mental and practical flexibility far above the
average: the candidate will be required to
perform widely varying work processes (rapidly
changing conditions of metal aircraft structure
require easy adaptability).

Highly developed sense of geometrical propor-
tions: the candidate will have to read blue-
prints, a difficult matter in metal aircraft
construction because of the close proximity of
the thin lines used in metal plate structures).
The metal aircraft constructor must be able to
identify parts, tools, and appliances by their
shapes and must be able to decide where they
are to be used (innumerable shapes of sheet
metal are used) or how they belong together.
The candidate must have a steady hand, steady aim, and well coordinated use of both hands: for example when measuring or doing tracing work.

The candidate must have an instinct for force impulses, and a keen sense for forming; he will be required to form sheet metal, for example to do crimping or flange, and fold work, to hammer out, and curve metals, and so forth.

Desirable: Capability for teamwork: the candidate must have an understanding for the way various jobs go together.

Disabling factors: Unreliability.

Hasty, slipshod, type of worker.

Slowwitted workers.
SUMMARY

After its transfer from the Army Ordnance Office in 1933 the Air Force Technical Office adhered to its traditional pattern of subdivision into development and procurement branches but in the execution of its missions gave due consideration to the changed conditions resulting from technological progress.

In the realization of the hazards that serious difficulties and interferences might result from intervention in the internal management of the firms concerned, the basic principle was followed of avoiding as far as possible any and all measures which might influence the areas of responsibility of the private industry. The Technical Office therefore recognized only one person, or one agency, in industry as responsible for the execution of contracts, and that was the manufacturer of the final product.

Consequently, the activities of the Technical Office extended primarily to planning, guiding, and support of the industrial economy, with every effort being made to avoid interference in its internal structure. When this proved unavoidable, the interference was due to difficulties which the firms themselves were powerless to remedy, or to special circumstances during the war.
The unfavorable industrial conditions created by the economic crisis prior to 1933 in Germany, the scope of the planned armament missions, to cope with which the German industry was not equipped to cope, neither in financial respects nor in respect to the requirements of wartime operations, called for a guided development and guided investments aiming at obtaining maximum performances and complete exploitation of all facilities at any time available.

Furthermore, Germany's unfavorable tactical position made it necessary to exercise a decisive influence in the selection of sites for factories to be newly established or expanded.

One serious disadvantage resulting from these circumstances which had to be accepted as unavoidable was that contracts would have to be awarded without exploitation of the competitive spirit among firms.

The contracting firms were solely responsible for the execution of their contract missions.

The uninterrupted and systematic development of the organizations of the Technical Office under General Wimmer from 1933 on had an exceptionally favorable impact on the execution of the missions that Office was assigned for the Air Force and for the industries and produced maximum performances both within the Office itself and in the industry.
These favorable conditions remained very much unchanged after Wimmer's replacement by Udct in 1936 for a period of about two years, until 1938. It was during this period, and particularly during the first years, under Wimmer, that the aircraft, engines, and equipment came into being which the field units had in service during the war.

With the reorganization of the Technical Office in 1938, however, a period of repeated organizational changes set in, which had an unfavorable impact on the execution of missions.

The reorganization of 1938 was followed already in 1939 by establishment of the post of a Chief of Air Force Special Supply and Procurement Service. Only two and one-half years later, under Field Marshal Milch at the time, this service underwent a complete reorganization, in which its specialized departments were deactivated and, in basic points, the former organization was restored, with the subdivision into agencies for research, development, proving, and procurement.

Again two and one-half years later the most important part of the program for the conduct of air warfare, namely, fighter aircraft production, was taken away and placed under the newly established Fighter Production Staff, an agency of the Ministry for Armaments and Wartime Production.

This was part of measures deactivating the Office of
Chief of Air Force Special Supply and Procurement Service and establishing a Technical Air Armaments Office (Techni- 
ical Armaments) to handle the functions left to the Air 
Force.

These fundamental organizational changes at such short 
intervals naturally resulted automatically in the reorganiza-
tion of controlled agencies and widespread personnel changes, 
and these caused frequent interferences and interruptions of 
work.

The reasons for the changed circumstances just described 
were to be sought largely in the personal views of those con-
cerned on their field of activities.

The period of logical and consistent development of the 
C-Office under Wimmer had been too short to give the office 
the firmness of structure which would have been necessary 
to encounter difficulties and changes of personnel. Further-
more those in the higher levels of command at no time sought 
the causes for difficulties in faulty planning or guidance, 
but always in the existing form of organization beneath their level and in the personnel in control there. 
This explains their tendency to seek a remedy to each diffi-
culty in reorganization and personnel transfers.

The organization as such thus was not employed to serve 
its true purpose as a firm foundation for the positive and
interrupted flow of working processes. Instead, it was used at least in part for the achievement of personal objectives. The principle generally valid in the economy of never changing the organizational pattern to suit a person, but rather to select suitable personnel for an organizational pattern proved sound by experience was disregarded in the most important control authorities.

Here, the creation of the Fighter Production Staff can be taken as a special example. The creation of the agency was indisputedly due exclusively to the personal ambition of the office Party chief Saur to gain control over the armaments programs for all three branches of the military forces and to his dislike of the military.

Initially, the Fighter Production Staff was intended as an agency controlled mutually by the Ministry for Armaments and Maritime Production and the Chief of Air Force Special Supply and Procurement Service. However, Saur forcibly prevents any influence by the latter and squeezed Field Marshal Milch out of control.

The cause given for the assumption of responsibility for fighter production was the heavy air attacks against the fighter aircraft factories at Augsburg, Regensburg, and Wiener “sustat on 26-27 February 1944, and the fact that the Chief of Air Force Special Supply and Procurement Service could
not with the means available under his organization repair the damage done.

Another contributing factor here was that Saur, with the authority vested in him as Special Plenipotentiary for Tank production, was empowered to withdraw, for his purposes, factory spaces, labor, and tooling machines from other programs; since the industrial programs in support of the Air Force did not fall within the provinces of the Ministry for Armaments and Wartime Production. Measures of this nature taken by Saur produced serious repercussions, and the Chief of Air Force Special Supply and Procurement Service found himself practically powerless with the small means finally left available to him.

Once the Office of the Chief of Air Force Special Supply and Procurement Service lost control of fighter production, the handling of its other production missions soon encountered difficulties. Very soon it became evident that it was not possible to take out of an integrated complex of work the most important part, and continue with the rest alone.

This was why the Ministry for Armaments and Wartime Production already took over the rest of the production program for the Air Force in August 1944. The main point here was that Saur never had finally achieved his old target of uniting all armament production activities for all three military
branches under his direction.

On principle, the combination of all armament production under one head would have been sound if it had been brought about already during peace. The Military Economy Staff within the Joint Military High Command could have assumed responsibility for the direction of armament production for all three branches in consonance with uniform principles. However, the Staff was not furnished the powers it would have required for these purposes. What prevented any such measure was the concern of the three Commanders-in-Chief, and particularly of Goering, for the dignity of their personal positions.

As early as in 1935 the Military Economy Staff had endeavored to coordinate the production programs planned by the three military branches against the event of a mobilization. However, systematic preparations in this direction were complicated by the independent status of the three military branches, and finally had to be abandoned at the beginning of the war because no industrial mobilization was declared.

For the anti-military leaders of the National Socialist Party it was therefore not very difficult to inject themselves into the armament production mission when the flaws of the existing organization became evident.

The main weaknesses of the existing organization were that, in view of the overruling influence armament production
would have on the entire national economy in the event of a mobilization; it would be too small and inadequately staffed to make the necessary momentous and speedy decisions which would become necessary because disruptions had to be expected in spite of all preparations for mobilization.

The failure to establish a uniform control and uniform guidance for the armaments industries became evident in the diverging opinions concerning the division of responsibilities between the Plenipotentiary for Wartime Economy on the one hand and the Military Economy Staff on the other. The position here had not even been clarified by the time war broke out. In addition, the agency under the Plenipotentiary General was neither organizationally nor in point of personnel equipped to handle its missions, for which reasons it was deactivated at the beginning of the war.

The difficulties encountered finally resulted in attachment of the large majority of the existing free organs of the industrial economy, such as the national industrial associations, the economic groups, etc., under the Ministry for Economy or the Plenipotentiary for Wartime Economy, as well as the newly established self-responsible organs of the armament industries, to the Ministry for Armaments and Wartime Production.

This admittedly created a uniform control of the
entire wartime economy, but the system lacked an inherently firm organization. The personnel in the system could not be considered as an homogeneous community accustomed to mutual endeavors. The members of this controlling body included leading industrialists, personnel from the National Socialist Party Reich Office for Technology, and representatives from the Army, Navy, Luftwaffe, and from the various administrative departments of the Reich. Experience proves that an apparatus of this large size needs years of close cooperation before it can be expected to function smoothly.

In actual fact, Saur repeatedly during conferences of the Armaments Staff severely criticized the other offices of the Armaments and Wartime Production Ministry.

A decree issued by the Minister for Armaments and Wartime Production and Plenipotentiary for Armament Functions on 29 October 1943 concerning the division of activities in the wartime economy admittedly regulated the distribution of fields of activities, defined authority, and assigned the various industrial organs to the various offices of the Ministry, but in many cases it proved impossible to implement the measures in practice.

Mounting difficulties in the whole field of wartime economy and the frequent changes in assigned missions created the necessity for improvisations and plenipotentiaries were
appointed for such purposes with growing frequency. The number of such authorities consequently increased concomitantly with the increasing difficulties, and in many cases their powers and responsibilities overlapped. Matters were very much the same at the intermediate levels of control.

The corps area executives functioned parallel with the military economy inspectorates, later known as the armaments inspectorates. Both had practically the same mission to execute, so that cooperation between them was largely a matter of personality factors. Exceptionally serious controversies rules in many cases. In an effort to remedy the difficulties existing in the field of military economy within the corps area and the corresponding area of responsibility of the armament inspectorate, armament commissions were constituted, which at the same time were to serve to coordinate the work of the various agencies. These commissions included as members the heads of the various ministerial offices and Party officials at intermediate levels participating in armament activities, besides representatives from the industry, factory managers, and so forth. Given good cooperation this arrangement could have averted many contradictory measures. But here again exceptionally serious controversies repeatedly became evident which hampered the execution of the assigned missions.
The position at the end of the war was thus that the entire field of armament production was subdivided into a plurality of small entities, managed and controlled by independent individuals working in complete isolation one from the other. In this way it was impossible to achieve a uniform direction.

The self-responsibility of the industry as it developed under the Ministry for Armaments and "wartime" production exceeded by far the acceptable bounds. Without question the industry endeavored to justify the confidence it enjoyed, but the transfer of governmental authority to various concerns was contradictory to the structure of the firms, which was of a private economy nature.

In an address to representatives of the Rhine-Westphalian industries on 9 June 1944, Minister Speer stated as follows on this subject:

If I had had ten years time to prepare and put into operation an organization of the armament industries at my leisure, I possibly would have chosen different courses. 1

The impossibility for a newly created ministry to understand and control the complicated processes of a wartime economy without participation by the industries led to a widespread transfer of trusteeship authority to the industries.

In conclusion it can be stated that as an indispensable
condition and as a foundation for an armament industry there
must be a smoothly functioning organization which, parti-

cularly during a war, should be subject to fundamental
changes only in compelling circumstances.

In the interests of a uniform direction of the armas-
ment industries of a nation, there should be only one orga-

nization responsible for handling the armament activities
of all three branches of the military establishment.

The complicated processes of an economy and the technical
results which technical measures will produce,

and which a person lacking the proper training and expe-

erience cannot possibly predict, require that this control

should be exercised only by experienced authorities fully

familiar with the principles of military command.

To obtain maximum results, the firms involved should

be brought into competitive action on the fullest possible
scope during times of peace. In the event of war, the

highest level of military command, which should be kept as

small as possible, should be supported by an advisory body

of experienced industrial leaders.
AIR FORCE AGENCIES IN 1923
(Integration with the Reichshehr)

Chief
Army High Command

Army Ordnance Office
Army Personnel Office
Army Troops Office
Army Defense Office

Branch T-1
Opns

Branch T-2
Org

Branch T-3
Intel

Branch T-4
Tag

Branch
WaPw 6 F
(Air)

Branch
T-2 V (L)
(Air)

Sec I
Org.
Tec

Sec II
Para

Sec III
Techn

Sec IV
Econ-
omy

Sec V
Org.
Budget

Sec VI
Intel

Sec VII
Civ Air
Def

Sec VIII
Air Pi-
lot Tag

Special
Air

Sub-sec
Centre

Corps
Lipetsk

Areas

Advising
Squadron

Observer

School

Braun-
schweig

1. Later became Army General Staff
2. Later became Defense Ministry
3. Later became Inspectorate I.
AIR FORCE AGENCIES IN 1921-23
(Integration with the Reichsheer)

Defendant:

Fuhr
Chief Inspt Waffen und Verw.

Stab
Lt. W. Erw. Nesten
Lt. W. B. Sech.

Truppen
W. Prw.-Gr
Hptm. Student
W. B. Gr
Hptm. Volkmann

Büro der Hauptsache
Wille
Adjutant
V. Dornburg
Sech. Gerate
Seldner

Referate
Flugzeuge
Buere Nicolai
Motoren
Buere Lorenz
Bord-Ausr.
Buere Genthe
Waffen
Schulz u. Co.

Office Status
Chief, Weapons and Equipment Inspectorate (Army)

Office Department Status
Chief, Developing and Proving (Army)
Chief, Procurement (Army)

Section Status (Air)
Tank & Met Equip Sec (Air)
Chief: Capt. Student
Procurement Section (Air)
Chief: Capt. Volkmann
Budget Section (Air)
Chief: Wille
Adjutant (Personnel Sec) (Air)
Chief: von Meyern-Hohenberg
Equipment Procurement (Air)
Chief: Seldner

Sub-Section Status (Air)
Aircraft
Firma of Nicolai
Engines
Firma of Lorenz
Aircraft Equipment
Firma of Genthe
Weapons
Schulz & Co.
| Referate | Flugzeugetat
| --- | --- |
| Bomber | Bomber Aircraft
| Gellg. | Firm of Gella |
| KAKKH XIX XX XX XX PT | Radio Equipment |
| Suere Schwartz | Firm of Schwartz |
| Wa Prw 7 | (Controlled by Army Signal Branch) |
| Bildgeräte | Photographic Equipment |
| Suere Spieweck | Firm of Spieweck |
| DVL | (Controlled by Institute for Aviation Research) |
| Flugzeuge | Aircraft |
| Boehne | Firm of Boehme |
| ZAAMK Motoren | Engines |
| Bullinger | Firm of Bullinger |
| ZAAMK Ausrüstg | Equipment |
| Gresch | Firm of Gresch |
| Bauaufs. | Construction Supervision |
| ZAAMK Schwarz | Firm of Schwarz |
| ZAAMK Wehrwirtsch. | Military Economy |
| Wegner | Wegner |

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<th>Feldbezirke</th>
<th>Field Agencies</th>
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<tr>
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<td>Vtbg. M. DVL</td>
<td>(Controlled by Powered Aircraft Branch, Institute for Aviation Research)</td>
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<td>1 Nov 25-31 Oct 28</td>
<td>Crop Dusting &amp; Pest Destruction</td>
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<td>Manufacturing</td>
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<td>Fertigung</td>
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</table>

1. DVL—Abbreviation of Deutsche Versuchsanstalt fuer Luftfahrt.
AIR FORCE AGENCIES IN 1928-29
(Integration with the Reichswehr)

Dezernent:

Amt
Chef Heereswaffennamt

Austellung
Leiter Wa L
Hauptm. Volkmann

Gruppen
Entwicklung
Hptm. Jeschennek

Beschaffung
Hptm. Seldner

Wirtschaft, Rüstung
EKIXX Wagner

Referate
Flugzeuge
Motoren
Bord Ausrüstung
Waffen
Bombe
Bildgeräte
F.T. Geräte
Flugzeuge
Motoren
Geräte
Baunaufsicht

Stellvertreter Stellv. (Air)
Chief, Army Ordnance Office

Chief, Captain Volkmann

Chief, Captain Jeschennek

Chief, Captain Seldner

Chief: Wagner

Ent-Sern Stellv. (Air)

Air Branch

Development

Procurement

Industrial Mobilization

Aircraft

Engines

Aircraft Equipment

Weapons

Bombs

Photographic Equipment

Radio Equipment

Aircraft

Engines

Aircraft Equipment

Construction Supervision
<table>
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<th>Aussonstellen</th>
<th>Field Branches (Air)</th>
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<tbody>
<tr>
<td>Erprobung Rechlin</td>
<td>Rechlin Proving Station</td>
</tr>
<tr>
<td>Erprobung Alstros</td>
<td>Alstros Proving Station</td>
</tr>
<tr>
<td>Fertigung</td>
<td>Manufacturing</td>
</tr>
</tbody>
</table>
Legend:

AIR FORCE AGENCIES IN 1929-33
(Integrated with Reichswehr)

Amtsgruppe

Heereswaffenamt
Ltr Wa Prw (Fruenefsen)  

Abteilung

Wa Prw 8
Major Wimmer  

Gruppen

Gruppe I
Entwicklung Flugzeuge
Hptm. Riesch
Hptm. Konrad  

Gruppe II
Entwicklung Ausruestung
Hptm. Flech  

Gruppe III
Erprob. Stellen
R. d. L. 5
v. Massenbach

Department Status

Within Army Ordnance Office:
Chief: Proving Department (Air)

Branch Status (Air)

Within Branch Wa Prw 8 (Army)  
Major Wimmer controlled Air Force activities

Budget
Wille
Staff Engineer
Nicolaus

Adjutant I (Russia)
Adjutant II (Personnel)
v. Meyern

Section Status (Air)

Section I
Aircraft Development
Captains Riesch & Conrad  

Section II
Development of Aircraft Equipment
Captain Flech

Section III
Proving Stations of the Youth Aviation Society
von Massenbach

1. The Army Ordnance Office itself had Office Status.
2. Branch Wa Prw 8 was the Army branch handling optical instruments, surveying, weather services, fire control equipment, and map printing equipment. Within this branch Major Wimmer controlled the branch Air Division.
3. All within Branch Wa Prw 8 (Army), but handling air matters.
4. Under an agreement with Russia, Germany was allowed to test military equipment in Russia. The agreement was voided by Hitler after his accession to power in January 1933.
5. Abbreviation of Reichskund der Luftfahrende Jugend.

Remark: Footnotes by Translator.
<table>
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<th>Appendix 1—Continued</th>
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**Section 4**
Procurement
Captain Selzner

**Section 5**
Military Economy and Armaments
Wegner

### Referate

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<tr>
<th>1a</th>
<th>Flugzeuge</th>
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<tbody>
<tr>
<td></td>
<td>Nicolaus, Lucht, Hertel (until 1931)</td>
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<table>
<thead>
<tr>
<th>1b</th>
<th>Motoren</th>
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<tr>
<td></td>
<td>Sachse &amp; Mahnke</td>
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<tr>
<th>1c</th>
<th>Bordausmusterung</th>
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<tbody>
<tr>
<td></td>
<td>Genthe, Reichner, Repenthien</td>
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<thead>
<tr>
<th>2a</th>
<th>Waffen</th>
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<tr>
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<td>Thuy, Mix</td>
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<tr>
<th>2b</th>
<th>Bomber</th>
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<tr>
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<td>Marquard, Hoehn</td>
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<tr>
<th>2c</th>
<th>Chem. Kampfstoffe</th>
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<tr>
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<td>Veeker</td>
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<tr>
<th>2d</th>
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<tbody>
<tr>
<td></td>
<td>Spieweck</td>
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</table>

<table>
<thead>
<tr>
<th>2e</th>
<th>FT</th>
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<tbody>
<tr>
<td></td>
<td>Navigation</td>
</tr>
<tr>
<td></td>
<td>Schwarz</td>
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<table>
<thead>
<tr>
<th>2f</th>
<th>Sonder Munition, Schutz</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Vierack</td>
</tr>
</tbody>
</table>

### Sub-Section Status (Air)

#### 1a
Aircraft
Nicolaus, Lucht, Hertel (until 1931)

#### 1b
Engines
Sachse & Mahnke

#### 1c
Aircraft Equipment
Genthe, Reichner, Repenthien

#### 2a
Weapons
Thuy, Mix

#### 2b
Bomber Aircraft
Marquard, Hoehn

#### 2c
Chemical Weapons
Veeker

#### 2d
Photographic Equipment
Spieweck

#### 2e
Radio & Navigational Equipment
Schwarz

#### 2f
Sonder Munition Protection
Vierack
4a
KLEINKRÜGER Flugzeug
Boehme (bis 1931)
Hertel (vom 1932)

4b
Motoren
Bullinger

4c
Ausrüstung
Grosch

4d
Bauführung
Schwarz

4e
Bestände-Verwaltung
Grosch (ab 1932 bei Wall)

Field Agencies
Rechlin Proving Station
Albatros Proving Station
Staaken Proving Station
1.1.1929-Pruchahr 1929
d.I.d.Lf.J.
Fertigung

Aircraft
Boehme (until 1931)
Hertel (from 1932)

Engines
Bullinger

Aircraft Equipment
Grosch

Construction Supervision
Schwarz

Administration of Stores
Grosch (to Signal Equipment Branch in 1932)
### ASSEMBLIES AND SUB-ASSEMBLIES USED IN AIRCRAFT CONSTRUCTION

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<th>Sub-Assemblies (Examples)</th>
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<td><strong>Air Frame</strong></td>
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<td></td>
</tr>
<tr>
<td>Fuselage</td>
<td>Single-piece fuselage</td>
<td>10-19</td>
</tr>
<tr>
<td></td>
<td>Nose part</td>
<td>100-199</td>
</tr>
<tr>
<td></td>
<td>Center piece</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4-ear part</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Shell</td>
<td></td>
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<tr>
<td></td>
<td>Installations</td>
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<tr>
<td></td>
<td>etc.</td>
<td></td>
</tr>
<tr>
<td>Undercarriage</td>
<td>Undercarriage</td>
<td>20-29</td>
</tr>
<tr>
<td></td>
<td>Tail skid or wheel</td>
<td>200-299</td>
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<tr>
<td></td>
<td>Brake Assembly</td>
<td></td>
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<tr>
<td></td>
<td>Floats</td>
<td></td>
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<tr>
<td></td>
<td>Float frame</td>
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<tr>
<td></td>
<td>etc.</td>
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<tr>
<td>Controlling Surfaces</td>
<td>Horizontal stabilizer</td>
<td>30-39</td>
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<tr>
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<td>Elevator</td>
<td>300-399</td>
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<td></td>
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<td></td>
<td>etc.</td>
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<tr>
<td>Control System</td>
<td>Control system in air frame</td>
<td>40-49</td>
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<tr>
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<td>&quot; &quot; &quot; wings</td>
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<td>Side trimming system</td>
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<td>OIL pressure system for</td>
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<td>steering</td>
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<tr>
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<td>Upper wings</td>
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<td>Construction Assembly Group</td>
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<td><strong>Power Unit</strong></td>
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<td>Aircraft engine</td>
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<td></td>
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<tr>
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<tr>
<td></td>
<td>etc.</td>
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</tr>
<tr>
<td><strong>Equipment</strong></td>
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<tr>
<td>Permanent &amp; Supplementary Equipment</td>
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<td></td>
<td>Operating equipment items</td>
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<td>Electr. installations in air frame</td>
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<td>Crank Case</td>
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<td>(Pump)</td>
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<td>Transmission</td>
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<td>Cylinders</td>
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<td>Right cylinder</td>
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<td>Valve cam, right</td>
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<td>Auxiliary Drives</td>
<td>For Ignition magnet</td>
<td>500-599</td>
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<td>&quot; Fuel injection pump</td>
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<td>&quot; Revolution gage</td>
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<td>&quot; Generator</td>
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<td>Lubricating system</td>
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<td>Starter system</td>
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<td>etc</td>
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</tr>
<tr>
<td>Supplementary Items (not included with engine as delivered from factory)</td>
<td>Engine mountings</td>
<td>800-899</td>
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<td>Cowlings</td>
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<td>Exhaust system</td>
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<td></td>
<td>Electrical installations</td>
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<td>Controls</td>
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<tr>
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<td>Cooling system</td>
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<td>Special Operating Equipment, According to Engine Type</td>
<td>Special Tools</td>
<td>900-999</td>
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<td>Tool containers</td>
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<td>Spare parts containers</td>
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<td>Protective parts for shipping</td>
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<td>Aircraft engines and accessories</td>
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<td>10</td>
<td>Rescue and safety equipment items</td>
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<tr>
<td>11</td>
<td>Nautical aircraft equipment</td>
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</tr>
<tr>
<td>13</td>
<td>Ammunition, including equipment and containers (Developed by Army Ordnance office, see also 111)</td>
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</tr>
<tr>
<td>19</td>
<td>Bomb release equipment</td>
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</tr>
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<td>19</td>
<td>Multi-purpose electricity supply equipment on aircraft</td>
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<tr>
<td>102</td>
<td>Machine guns, mounts, traverses, and appliances</td>
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<tr>
<td>106</td>
<td>Aircraft-type cannon and equipment</td>
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<td>108</td>
<td>Gliders</td>
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<td>Special type power units</td>
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<td>112</td>
<td>Water surface craft</td>
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<td>113</td>
<td>Ammunition (developed by Reich Air Ministry), cartridges, bombs, drop containers, multi-bomb containers, detonators (see also 13)</td>
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<tr>
<td>121</td>
<td>Surface motor vehicles</td>
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<td>124</td>
<td>Telephone, radio, and flash signal equipment</td>
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<td>125</td>
<td>Searchlight equipment</td>
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<td>126</td>
<td>Aircraft lighting equipment, electrical installations, excluding radio equipment</td>
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<td>Engineer items of equipment</td>
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<td>132</td>
<td>Camouflage equipment and materials</td>
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<td>Firefighting equipment</td>
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<td>Items of ordnance equipment</td>
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<tr>
<td>140</td>
<td>Workshop and artisan's tools and equipment, power plants and working machinery</td>
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Individual standard-commercial items are numbered in
accordance with details stated in the equipment catalog (Geräte-
mappe. The Materials Categories Numbers given are currently
taken with XXX approval of the Army Ordnance Office from the
Materials Categories List of the Army, and are applied to the
materials categories stated. Status October 1942.
### German Air Force Organization Chart 1933-1936

#### Hauptamt

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<td>Beck until 1934 then Lucht</td>
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<td>Lucht ab 1934</td>
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#### Halleitung

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<td>Research</td>
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#### Gruppen

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<tr>
<td>Erproewung Traveumaende</td>
<td>Explained below</td>
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</table>
| Bf.I (Suero fuer Industrie-Arbeiter (ab 1936 B.f.I)) | Section C II, 4 
Radio Equipment 
Schwartz |
| Bauen | Waffen |
| C II, 5 | Waffen Marquard |
| Aertigung | C II, 6 |
| Bau-Aufsicht | C III, 4 |
| Wirtschaftsinspektion | C III, 5 |
| Flakverbindungstelle | Aderholt |

### Erproewung Rechlin

- **Erproewung Rechlin**: Section C II, 5 
- **Bauen**: Bauen, Weapons Marquard 
- **Aertigung**: Aertigung 
- **C II, 6**: Manufacturing Bau 

### Erproewung Stacken

- **Erproewung Stacken**: Section C III, 2 
- **Bauen**: Bauen Bullinger 
- **Ausgestaltung**: Ausgestaltung 
- **C III, 3**: Maasshoft 
- **Bau-Aufsicht**: Bau-Aufsicht 
- **C III, 4**: Schwar 
- **Wirtschaftsinspektion**: Wirtschaftsinspektion 
- **C III, 5**: Witting 
- **Flakverbindungstelle**: Flakverbindungstelle 
- **Aderholt**: Aderholt 

### Erproewung Traveumaende

- **Erproewung Traveumaende**: Section C III, 6 
- **Bauen**: Manufacturing 
- **Ausgestaltung**: Ausgestaltung 
- **C III, 6**: Maasshoft 

### Research Institute for Aviation

- **Research Institute for Aviation**: Section C III, 1 
- **Bauen**: Aircraft Beltr 
- **Ausgestaltung**: Ausgestaltung 
- **C III, 2**: Engine Bullinger 
- **Bau-Aufsicht**: Bau-Aufsicht 
- **C III, 3**: Maasshoft 
- **Wirtschaftsinspektion**: Wirtschaftsinspektion 
- **C III, 4**: Construction Supervision Schwar 
- **Wirtschaftsinspektion**: Wirtschaftsinspektion 
- **C III, 5**: Equipment Maasshoft 
- **Aderholt**: Aderholt 

### Field Agencies

- **DVL**: Research Institute for Aviation (Deutsche Versuchsanstalt fuer Luftfahrt), Braunschweig 
- **Adlerhof**: Rechlin Proving Station 
- **Bauen**: Stacken Proving Station 
- **Ausgestaltung**: Traveumaende Proving Station 
- **Bau-Aufsicht**: Rechlin Proving Station 
- **Wirtschaftsinspektion**: Stacken Proving Station 
- **Flakverbindungstelle**: until 31 Mar 33 industry-owned 
- **Aderholt**: proving stations 
- **Bf.I (Sueo fuer Industrie-Arbeiter (ab 1936 B.f.I))**: Office for Industrial Laser until 1936, then Office for Aviation-Industry Laser. 

---

**Note:**

- Rechlin Proving Station 1
- Stacken Proving Station 1
- Traveumaende Proving Station 1
GERMAN AIR FORCE
ORGANIZATION CHART
1936-1938

Legend:

**Abteilungen**

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**Gruppen**

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Bord-Ausrüstung
C II, 3

P.T
C II, 4

Waffen
Bomben
C II, 5

Fertigung
C II, 6

Flugzeuge
C III, 1

Motoren
C III, 2

Ausrüstung
C III, 3

Bau-Aufsicht
C III, 4

Wirtschaft. Insp.
C III, 5

FELDLAGER
Aussendienst

Erprobung Rechlin

Erprobung Travemuende

E.F.I.P. (Bevollmächtigter fuer Industrie Personal ab 1936)

Section C II, 3
Aircraft Equipment

Section C II, 4
Radio Equipment

Section C II, 5
Bombs and Weapons

Manufacturing
Section C II, 6

Section III, 1
Aircraft

Section C III, 2
Engines

Section C III, 3
Equipment

Section C III, 4
Construction Supervision

Section C III, 5
Economy Inspection

Field Agencies

Rechlin Proving Station

Travemuende Proving Station

Flenipotenten for Industrial Man Power, from 1936
GERMAN AIR FORCE
ORGANIZATION CHART
1933-1939

Legend:
Amt
C-Amt
Udet
Chef d.Staates
Adjutant
Haushalt
Chef Ing.
Chef-Ing.P
Ing.Personal

Office Status
C-Office
Udet
Chief of Staff
Adjutant...
Budget
Chief Staff Engineer
Engineer Personnel Section

Abteilungen
Planung
LO 1
Wahrschaitaft
LO 2
Fertigung
LO 3
Prufung
Bauaufsicht
LO 4
Forschung
LO 5
Sicherheit
LO 6
Flugzeuge
LO 7
Motoren
LO 8
Navigation
LO 9

Branch Status
Branch LO 1
Planning
Branch LO 2
Military Economy
Branch LO 3
Manufacturing
Section LO 4
Inspection, Construction
Supervision
Branch LO 5
Research
Branch LO 6
Security
Branch LO 7
Aircraft
Branch LO 8
Engines
Branch LO 9
Navigational Instruments
Allg. Ausrüstung
LC 10
Waffen, Munition
LC 11
Bombe Abwurfwaffen
LC 12
Boden-Gerät
LC 13

Aussenstellen
Rechlin
Flugzeuge
Motoren
Allg. Ausrüstung &
Navigation
Waffen
Bombe
Boden-Gerät

Travemuende
(Same as Rechlin)

Section LC 10
General Equipment

Section LC 11
Weapons, Ammunition

Section LC 12
Bombs and Bombing Equipment

Section LC 13
Ground Equipment

Rechlin Proving Station
Sections for Aircraft,
Engines, General Equipment and
Navigational Equipment, Weapons,
Bombs, Ground Equipment

Travemuende Proving Station
(Same sections as Rechlin)
German Air Force
Organization Chart
1939-1941

Besoldung:

Generalluftzeugmeister
Udet

Chief of Special Supply & Procurement
Service: General Udet

Chef d. Stabs

Chief of Staff

Adjutant

Adjutant

Lt. Chef Ing.

Directing Chief Staff Engineer

Chef-Ing P

Engineer Personnel Section

Pers.Ing

Technisches Amt
Udet

Technical Office
General Udet

IRMMXX

XXX

Nachschub. Amt
GL/8

Supply Office

Amtsgruppe Industriewirtschaft

Department for Industrial Economy

ERFAEXLXXI

Planung
GL 1

Branch GL 1
Planning

Wehrwirtschaft
GL 2

Branch GL 2
Military Economy

Fertigung
GL 3

Branch GL 3
Manufacturing

Prüfung
GL 4

Branch GL 4
Testing

Mineraloel
GL 5

Branch GL 5
Mineral Oils

Sicherheit
GL 6

Branch GL 6
Security
Verbindungs-Ing. zu
Mun. W. im
GL V Ing.

Bf. S. Sender-Aufgaben

B-SA
Abwehr

Perschungsführung
GL C 1

Flugzeuge
GL C 2

Motoren, Triebwerke
C 3

Nachrichten
Navigation
C 4

Allg. Ausrüstung
C 5

Schusswaffen
Munition
C 6

Abwurf.
Bombe
C 7

Bedarfsgut
C 8

Reparaturen
C 9

Aufträge, Export
GL P 1

Betriebswirtschaft
Preisprüfung
F 2

Appendix 13—Continued

Branch GL V Ing
Engineer Liaison Branch for
Munitions Section for Liaison
with Industry for Munitions

Special Projects Branch

Counterintelligence

Branch GL C 1
Direction of Research

Branch GL C 2
Aircraft

Branch C 3
Engines, other Power Units

Signal & Navigational Equipment
Branch (Branch C 4)

Branch C 5
General Equipment

XIII Branch C 6
Shooting Weapons, Ammunition

Branch C 7
Bombs and other Drop Ammunition

Branch C 8
Ground Equipment

Branch C 9
Repair Services

Branch GL P 1
Contracts, Experts

Branch # 2
Industrial Operations, Price
Central
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<td>Kommandeur Erprobungsstellen, erst ab 1941</td>
<td>Commander of Proving Stations, (Post established in 1941)</td>
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<td>Rechlin Proving Station</td>
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<td>Tarnowitz</td>
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<tr>
<td>Peenemünde</td>
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<tr>
<td>Udetfeld</td>
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Legend:

Generalluftzeugmeister (LL)  
Chief of Special Supply and Procurement Service: Field Marshal Milch

Industrierat  
Industrial Council

Adjudantur  
Adjudants Office

Forschungsfuehrung  
Direction of Research

C-Amt  
C-Office

Technisches Amt  
Technical Office

GL/C  

Industrie-Wirtschafts-Amt  
Industrial Economy Office

GL/P  

Planungs Amt  
Planning Office

GL/A  

Amtgruppe Flakentwicklung  
Department for AAA Development

GL/Flak E (ab 1942)  
(from 1942 on)

Amtgruppe Gerate- und  
Department for Equipment and Industrial Planning

Industrie-Planung  

GL/A-P1  

Amtgruppe Wehrwirtschaft  
Department for Military Economy

GL/A-W Wi  

Amtgruppe Entwicklung von  
Department for Development of Air Equipment

Fl./Gerät  

GL/J-B  

Amtgruppe Beschaffung  
Department for Procurement of Air Force Equipment

v. Flieg.-Gerät  

GL/C-B  

Ballistik  

FL/Flak El  

Flieg  
Branch GL/Flak El  

Ballistics, AAA
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<td>Technical and General</td>
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<td>E 3</td>
<td>Aircraft</td>
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<td>E 4</td>
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<td>E 5</td>
<td>Signal and Navigational Equipment</td>
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<td>E 6</td>
<td>General Equipment</td>
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<td>E 7</td>
<td>Ammunition</td>
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<td>E 8</td>
<td>Drop Weapons</td>
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<td>E 9</td>
<td>Air Torpedoes (Guided Missiles)</td>
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<td>E 10</td>
<td>Repair Services</td>
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<td>E 10</td>
<td>Chief of Signals</td>
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<td>E 10</td>
<td>Manufacturing</td>
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<td>E 10</td>
<td>Construction Supervision</td>
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<tr>
<td>C-Rue</td>
<td>Branch C-Rue</td>
</tr>
<tr>
<td>E 1</td>
<td>Foreign Armaments</td>
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<tr>
<td>F 1</td>
<td>Contracts, Experts</td>
</tr>
<tr>
<td>F 2</td>
<td>Industrial Operations, Price Control</td>
</tr>
<tr>
<td>Branch F 3</td>
<td>Industrial Economy</td>
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<td>Inspection F 3</td>
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<td>Patent Section</td>
<td>Section F 4</td>
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<tr>
<td>Commander of Proving Stations</td>
<td>Proving Stations</td>
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<td>Travenicke</td>
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<td>Tarnowitz (Waffen)</td>
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<td>Udetfeld</td>
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<td>Peeneauende (V 1)</td>
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<td>Getehafen</td>
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<td>Werneuchen</td>
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<tr>
<td>Muenster-Nord</td>
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<tr>
<td>Kraftfahr-Verfuegungs-Krupps</td>
<td>Motor Pools</td>
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</tr>
</tbody>
</table>
GERMAN AIR FORCE ORGANIZATION CHART
1944-1945

Regent:
Chief T L R
Adjutantur
Registratur/Adj III
Genst. C.
Programa
Lw. Bergung
Pflege-Pflegung
K. d. E
Technische Akademie
Amtgruppen
AERMACHNEN
Fl. Entwicklung
Mineraloel
[Machinenfabrik]
Flak-Entwicklung
Abwicklungs-Stelle
In- u. Ausland-Rueckung
Plak-Rueckung/End of Departments

Chief Technical Air Armaments
Adjutants Office
Records and Adjutant III
General Staff Officer
Program
AF Rescue and Salvage Services
Direction of Research
Commander of Experimental Units
Technical Academy
Departments

AERMACHNEN
Fl. Entwicklung
Mineraloel
[Machinenfabrik]
Flak-Entwicklung
Abwicklungs-Stelle
In- u. Ausland-Rueckung
Plak-Rueckung/End of Departments

Chef Atmg
Statistik, Berichte
Senders-Aufgaben
Flugzeuge
E 2
Triebwerke
E 3
Nachrichten, Navigation
E 4
Policy Branch
Statistics, Reporting,
Special Missions
Branch E 2
Aircraft
Branch E 3
Engines
Branch E 4
Signal & Navigational Equipment
<table>
<thead>
<tr>
<th>Branch</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>E 5</td>
<td>Equipment</td>
</tr>
<tr>
<td>E 6</td>
<td>Shooting Weapons</td>
</tr>
<tr>
<td>E 7</td>
<td>Bombs, Air Mines, etc.</td>
</tr>
<tr>
<td>E 8</td>
<td>Ground Equipment</td>
</tr>
<tr>
<td>E 9</td>
<td>Air Torpedoes, Special Equipment</td>
</tr>
<tr>
<td>E 10</td>
<td>Manufacturing Materials</td>
</tr>
<tr>
<td>E 11</td>
<td>Planning Branch</td>
</tr>
<tr>
<td>E 12</td>
<td>Development Branch</td>
</tr>
<tr>
<td>B 1</td>
<td>Operations Branch, Chief, Repair Services</td>
</tr>
<tr>
<td>E 2</td>
<td>Fuselages</td>
</tr>
<tr>
<td>E 3</td>
<td>Engines</td>
</tr>
<tr>
<td>E 4</td>
<td>Signal &amp; Navigational Equipment</td>
</tr>
<tr>
<td>B 5</td>
<td>Equipment</td>
</tr>
<tr>
<td>B 6</td>
<td>Shooting Weapons</td>
</tr>
<tr>
<td>B 7</td>
<td>Bombs, Air Mines, etc.</td>
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**Appendix 16—Continued**
Appendix 16—Continued

<table>
<thead>
<tr>
<th>Category</th>
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<tbody>
<tr>
<td>Branch B 3</td>
<td>Ground Equipment</td>
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<tr>
<td>Branch B 9</td>
<td>Air Torpedoes, Special Equipment</td>
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<tr>
<td>Branch B 10</td>
<td>Chief, Air Signal Repair Services</td>
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<tr>
<td>Foreign Equipment Branch</td>
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<td>Foreign Armaments Branch</td>
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<td>Special Commissioner, Japan</td>
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<tr>
<td>Branch Flak B 1</td>
<td>Ballistics (AAA)</td>
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<tr>
<td>Branch Flak B 2</td>
<td>Equipment (AAA)</td>
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<tr>
<td>Branch Flak B 3</td>
<td>Production Preparations (AAA)</td>
</tr>
<tr>
<td>Branch Flak B 4</td>
<td>Guns (AAA)</td>
</tr>
<tr>
<td>Branch XXIX Flak B 5</td>
<td>Special Ammunition Administration</td>
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<tr>
<td>Branch GL/A</td>
<td>Chief, AAA Repair Services</td>
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<tr>
<td>Accounting</td>
<td></td>
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<tr>
<td>Reheating</td>
<td>Raw Materials</td>
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<td>Plug Plants</td>
<td>Airfields</td>
</tr>
<tr>
<td>Administration</td>
<td>Photographic Station</td>
</tr>
<tr>
<td>Security (CI)</td>
<td></td>
</tr>
<tr>
<td>Photographic Station</td>
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</tr>
</tbody>
</table>
ECONOMIC AND INDUSTRIAL GROUPS, ASSOCIATIONS, AND RINGS ATTACHED TO OFFICES OF THE MINISTRY FOR ARMAMENTS AND WARTIME ECONOMY

1. Attached by the Raw Materials Office.

National Association of Coal Producers and Handlers
- " " Chemical Fibres Producers and Handlers
- " " Natural Fibres Producers and Handlers

National Wool Combine
Main Cartel (Ring) Metals
Industrial Group for Wood Pulp, Paper, and Cardboard
Industrial Group for Chemical Products
Industrial Group for Fuel Producers

2. Attached by the Armaments Deliveries Office.

National Association of Iron (RHELMKALM) Industries
Main Cartel for Iron Reduction
- " " Blast Furnace Production, Armaments Trading
- " " Cast Iron and other Metal Products
- " " Forged Metal Products
Manufacturing Materials
- " " Machinery Parts Producers
- " " Welding and Forging Techniques
- " " Moulding, Plastics, and other Synthetic Materials
- " " Stones and Earths
- " " Technical Glass and Ceramics

Main Committee for Gunpowder, other Explosives, and Chemical Warfare Agents, and Auxiliary Products Contained in Special List
- " " for Electrotechnics
- " " Fine Mechanics and Optical Instruments
- " " Steel and Iron Construction
- " " Armament Equipment
- " " Iron, Sheet, and other Metal Products
Main Committee for "mechanical Engineering"

3. Attached to Production Office
Textile Industries Group
Clothing Industries Group
Leatherware
Footwear Industries Association
Woodworking Industries Group
Paper
Printing
Glass I
Ceramics
Tobacco

4. Attached to Construction Office
Main Committee for Building, Construction
Group for Building Industries
Reich Plenipotentiary for Wooden Building Construction

5. Attached to Technical Office
Main Committee for Weapons Industries
Main
" 
Armaments Industries
" 
" 
Armored Plated Vehicle Manufacturers
" 
" 
Automobile Industries
" 
" 
Rail Vehicle Manufacturing Industries
" 
" 
Shipbuilding Industries

6. Attached to Electricity Office
National Group for Electricity Control
Electricity Supplies Group
Gas and Water Supplies Group
ARMAMENTS INSPECTORATES
(Specimen Table of Organization)
(1935-1943)

Arms and Inspectors
Chief

Central Branch

Army Branch

Navy Branch

Air Force Branch

Admin Branch

Adjutant Branch

Arms and Detachment

Inspectors

Detachment

Arms and Detachment

Inspectors

Detachment

Arms and Detachment

Inspectors

Detachment
<table>
<thead>
<tr>
<th>Main Com</th>
<th>Main Com</th>
<th>Main Com</th>
<th>Main Com</th>
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<tbody>
<tr>
<td>Wns (Tix)</td>
<td>Amme (Geilenberg)</td>
<td>Tanks &amp; Tractors (Blehm)</td>
<td>Shipaldg (Reiland)</td>
<td>Naval Sub-surface (Paulus)</td>
<td>Fuselages (Frydag)</td>
<td>Engines (Werner)</td>
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**VERTICAL ORGANIZATION**

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Aircraft Equip (Heyne)</td>
</tr>
<tr>
<td>Military &amp; Gen Equip (Zangen)</td>
</tr>
<tr>
<td>Main Com Mechanery (Lange)</td>
</tr>
</tbody>
</table>
| Main Com Rail 
ve-Hicles (Degens-) |
| Main Com Krauch Program |
| Main Com Mater Vehicles |
| Main Com Signal Equip |
| Main Com Zr- sane |
| Main Com Cpe (t) |
| Main Com Wnerew (Mueschen) |


---

1. Abbreviated as Main Com
2. Abbreviated as Main Cart
Horizontal Organization

Main Cart: Iron Production
Recycling
Special Cart:
Raw Steel Sheet Iron (Peisch) (Naef)

Main Cart: Iroh Processing -- Neeti
Castings Forgings Refinement
(Naaf) (Langenohl) (Schreuder)

Main Cart: Metals -- Fitzner
Special Cart:
Light Metals (Naaf) Hvy Metals Hvy Metals Light Met -- Metal
Raw Materials Raw & Pre-Processing (naaf) Pre-Processing (naaf)
& Processing (Bercher) (Eichaueler)

Precious Metals Industrial Raw Materials
(Hirtes) (Haas)

Main Cart: Factory Equipment & Machinery Elements -- Kluy
Machinery Requirements Factory Equipment & Machinery Elements (Kluy)
Standard & Specialized (Malk) Specialized (Zehr) (Devs)
Screws (Bessen)

Main Cart: Electric/Technical Products -- Lueschen
Electricals Electrical Equipment Construction Electricals
Transformer Switch Gen Electro-Lighting Electrical
Materials Equipment Technical Techniques Ceramics
(Scharewsky) (Fischer) (Hartmann) Constr. Ceramic & (Scheid)
Elements (Kehn) (Preissinger)

Gages, Meters, Special Ships Aircraft
Wires, Special Ships Aircraft
& Parts for Electrical Electr. Equip
Cables Electro Electr. Equip

Special Cartels not Members of Main Cartels:
Varnishes Molding Plastics Industrial Wood
(Peppe) Synthetic Materials (Link) (Baldewig)
Textiles (Link) (Otten)
GERMAN AIR FORCE

PATTERN OF COOPERATION BETWEEN MINISTRY FOR ARMAMENTS
AND WARTIME ECONOMY WITH COMMITTEES AND OTHER AGENCIES

Legend:
Min Ruk
Ministry for Armaments & Wartime Economy
Amt Bau
Building Construction Office
Techn.Amt
Technical Office
Rue-Lieferungs Amt
Armament Deliveries Office
Produktions-Amt fuer Verbrauchsguter
Office for Production of Consumer Commodities
Hauptausschuss Zelle
Main Committee for Fuselages
Hauptausschuss Panzer
" " " Tasks
Wirtschaftsgruppe
Group for Economy
Hauptring
Main Cartel (or Main Ring)
Wirtschafts-Gruppe
Group for Economy
Senderausschuss Baumeister A
Special Committee for Model A
Senderausschuss Baumeister B
Special Committee for Model B
Unterausschuss
Sub-Committee
Arbeits-Kreis
Working or Study Committee
Wehrkreis-Bzw. Inspektions-Bereich
Corps Area, simultaneously Inspectorate Area
Bezirks-Beauftragter
District Commissioner
Bezirks-Obmann Zelle
District Industrial Chief's Committee
Bezirks-Obmann
" " Chief
Ruestungs-Obmann
Armament Factory Chief
Bau-Bevollmaechtigter
Commissioner for Building Construction

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<table>
<thead>
<tr>
<th>German</th>
<th>English</th>
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<tbody>
<tr>
<td>Gewerbeamt</td>
<td>Regional Labor Office</td>
</tr>
<tr>
<td>Rüstungs-Inspektion</td>
<td>Armaments Inspectorate</td>
</tr>
<tr>
<td>Wehrkreis Beauftragter</td>
<td>Corps Area Commissioner</td>
</tr>
<tr>
<td>Bezirks-Lastverteiler</td>
<td>Regional Chambers of Industry</td>
</tr>
<tr>
<td>Gau Wirtschafts-Kammer der</td>
<td>of the Provincial Chambers or</td>
</tr>
<tr>
<td>Landes-Wirtschafts-Amt</td>
<td>Boards of Industry</td>
</tr>
<tr>
<td>Rüstungskommission</td>
<td>Armaments Commission</td>
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</table>
THE GERMAN AIR FORCE

AIRCRAFT PROCUREMENT

PART TWO

by

STUDIENGRUPPE GESCHICHTE DES LUFTKRIEGES

KARLSRUHE, GERMANY
CHAPTER 1

INDUSTRIAL PLANNING AND DEVELOPMENT

Preparations for Mobilization and for Relocation of Industries.

a. Industrial Development, 1933-1939. The eight aircraft manufacturing firms still in existence in 1933, namely, the firms of Junkers, Dernier, Bayerische Flugzeugwerke, Heinkel, Arado, Focke-Wulf, Fieseler, and Klauz, combined had 8,976 square yards (7500 square meter) of factory space available.

Each firm followed its own construction principles, some using wooven, some mixed, and some light metal structures, and their organization set up accordingly varied widely one from the other.

The same applied to the six aircraft engine firms still in existence at the time, namely, the firms of Junkers, Siemens, BMW, Daimler-Benz, Argus, and Hirth. With the only exception of the firm of Hirth, the aircraft-engine manufacturing firms were only subsidiaries of larger manufacturing firms. The presentation given in this chapter is based on reports from Oerest-Ingenieur Basse-Warten and Oerest-Ingenieur Thomas, both retired, plus the personal experience gathered by the present writer while serving as Chief of Aircraft Procurement.
concerns, a circumstance which applied to most of the firms engaged in the manufacture of general armaments.

In spite of the limited funds and technical facilities available, progress had been made in the field of development, particularly as far as commercial aviation and aviation spare parts were concerned, a fact which had also found recognition abroad.

However, the essential conditions did not exist in Germany, neither in respect to the necessary funds nor to factory facilities, for the serial production of aircraft to create an air force even on a very limited scale.

In view of the large armament program required in 1933, and in particular in view of the necessity to create an entirely new air force, the newly established Technical Office found itself compelled to exercise a powerful influence on the expansion of the entire industry and extending beyond the activities of development and procurement, a circumstance very different from circumstances in most countries.

The necessity to achieve optimum results in respect to technical economy and performances with the industrial capacities in existence and those to be newly created called not only for the issue of basic directives concerning the locality of factories in line with tactical considerations and their size, but also concerning their operational installations out of consideration for the planned missions of the individual
firms concerned.

What made this particularly difficult was the necessity on the one hand to exercise a far more than normally powerful influence on the internal affairs of industry while, on the other hand, avoiding as possible any restriction of the industries' own systems of economy and initiative.

The program planned by the General Staff for the activation of units in the 1932-1933 period provided the basis for the industrial planning study worked out in the Technical Office within a number of days and nights.

The purpose of this study was to insure that, as far as capacities and operational requirements were concerned, the conditions would exist in the industry which were essential for the activation of an Air Force of the initially planned size, and to keep that Air Force operable against the eventuality of a mobilization, besides developing the industry in conformance with a pattern which would meet these requirements.

Another purpose of this planned direction of industrial development was to provide against faulty investments, which would have had to be expected with certainty if the firms had carried out their own expansion in accordance with their own plans and desires.

The limited man power and raw materials supplies
at Germany's disposal made it impossible to proceed in con-
formance with the principles of free economy.

The outcome of the whole study was that the whole airc-
craft industry was subdivided into a number of concerns for
the production of bomber aircraft, plus individual firms
for the manufacture of fighter, reconnaissance, dive-bomber,
and
bomber/school and other training aircraft, while the engine
manufacturing industry was organized in categories producing
liquid-cooled and air-cooled engines, and engines for train-
ing planes.

In deciding on the locations for new factories and on
the expansion of existing factories, careful consideration
had to be given to Germany's exposed position to air attack,
in order to reduce to a minimum the hazards of an unexpected
air attack or a surprise advance into Germany by ground
forces. For this reason new factory establishments were
permitted only in the areas designated Inner Germany, border-
ed on the west by an almost straight line, on the east by a
line east of Stettin to west of Breslau, and in the northwest
by a line from west of Bremen to Osnabrück to east of Fried-
richshafen. In view of the striking range of aircraft in
these days, the air defense measures taken, these areas could be considered safe against air attack.

The only exception to the above rule was that of the
Ruhr region. Here, the establishment of new factories had
to be permitted whenever necessary because of the impossibil-
ity to relocate the basic materials industries situated in
the area, for the air defense of which special measures were
planned.

In other cases, the expansion of existing factories
outside of "Inner Germany" was permitted only when the ex-
pansion planned depended on local conditions.

Any departure from the above principles could only be
considered if it could serve to enable existing factories
to accelerate armament activities during the first phase of
the rearmament program. A condition imposed in such cases
was that a start was to be made at establishing a shadow fac-
tory within the protected area which, as the rearmament pro-
gressed could serve as a substitute for the original factory
if needed, and at the same time could be operated to over-
come bottlenecks which might occur.

A repair factory containing all required installations
was planned and actually established in Eastern Prussia to
support any units which might have to be committed from that
the rest of
area, which was separated from Germany by the Polish
Corridor.

Consideration for the methods of approach and attack
in these days imposed further restrictions on decisions
concerning the choice of locations for new factories and on
planes to expand existing factories. Approach and attack in
these days depended on visual observation, which made it ne-
necessary to avoid placing factories in the vicinity of salient
landmarks, rail installations, important bridges, river-bends,
rail intersections, lakes, and as forth. The same restrict-
ions applied to targets which it had to be presumed were
already marked in the target folders of foreign powers.

Another thing which had to be avoided was the erection
of residential houses in the vicinity of large factories
situated on the outskirts of cities or elsewhere, since any
such buildings would have come within important target areas
and this would have exposed the civilian population to in-
creasingly serious hazards.

Against these tactical considerations, the factories
themselves made fully justifiable demands, since these fac-
tories had to rely on the availability of the required man-
power in the interests of smooth a progress as possible
in the manufacturing processes. For this reason, the manage-
ment in most cases desired to locate factories as close as
possible to large men power reserves, meaning in the vic-
nity of large cities.

The C Office therefore had to take all arguments and
counter-arguments into careful consideration before any
decision could be made concerning the individual sites chosen. Other factors of decisive importance in such decisions were the conditions upon which the successful operation of a factory hinged, namely facilities for the transportation of personnel and materials and finished products to and from the factory, the availability of adequate electricity supplies, water, and gas, etc.

One underlying cause in many cases for the desire of industrialists to establish their factories as close as possible to large cities was the wish to keep operating costs as low as possible for later peacetime operations, in order to be able to compete with other firms, another was the wish to avoid the difficulties which had to be expected in the transfer of personnel from one locality to another. It was for such reasons that many industrialists showed such a marked preference for Berlin.

As a matter of fact, the movement of personnel from large cities to the vicinity of small or medium-sized towns did encounter exceptionally serious difficulties, because it was almost invariably impossible to provide family quarters for some time, so that the separation of families was unavoidable. Even power fluctuations in such factories were therefore extraordinarily high and were one of the causes for disrupted operations within the factories.
Another restricting factor in the selection of factory sites was the consideration which had to be given to agriculture. The German Government was doing everything possible to make the country as independent as possible of food imports, so that factories could not be established on agriculturally valuable ground. In like manner it was essential to avoid depriving agriculture of man power.

A careful analysis of all important factors involved in the selection of factory sites produced the factory distribution plan illustrated by the map included with this study as Appendix 22.

The plan provided that at least two physically separated factories must exist for the production of each type of aircraft and each type of engine. From the viewpoint of industrialists it was obvious that a consistent application of such measures would encounter exceedingly serious difficulties. The fact that conditions were actually created in which it was possible whenever operating difficulties developed in a factory, or when a factory was destroyed during the war, to fall back on a shadow factory without too serious difficulties was due to the understanding shown by the firms involved and their willingness to sacrifice their own business interests.
The newly established concerns for the manufacture of bomber aircraft were as follows:

Dornier-Nord, with an assembly factory in Wismar and subsidiary factories in Wismar and Danzebeck;

Heinkel, with factories at Rostock, Marienheide and subsidiary factories in Rostock;

Henschel, with factories at Berlin-Schoenefeld and subsidiary factories at Johannistal and Wildau;

Dornier-Sued, with factories at Oerpfaffenhofen and subsidiary factories at Aschersleben, Leipoldsheim and Schoenefeld;

ATG, with factories at Leipzig-Meckau and subsidiary factories at Leipzig-Furtwaengler and Giesatschezer.

The dangerously located Dornier-Friedrichshofen works remained in operation as development stations, which also applied to the limited possibilities for expansion of the Junkers Werke at Wessau.

The following individual factories were established or expanded:

Peckel-Wulf at Bremen
Arado at Warneucken and Brandenburg
Fieseler at Hannel
Bayerische Flugzeugwerke at Augsburg
AGO at Aschersleben
Werser Flugzeugbau at Bremen
Erfla at Leipzig.
For the aircraft engine manufacturing industry the following factories were planned and then established:

Bayerische Motorenwerke at Muenchen-Allach and Eisenach
Junkers at Keletten
Daimler-Benz at Genshagen, near Berlin
Siemens at Berlin-Spandau and Baedern
Pumerische Motorenwerke at Stettin-Arnimwalde
Niederschlesische Werke (Stettin) at Breslau-Querum
Mitteldeutsche Motorenwerke (Stettin) at Leipzig-Taucha

plus the following to manufacture engines for school and practice aviation:

Hirth Motorenwerke at Waltersdorf
Argus Motorenwerke at Berlin-Reinikendorf.

The development factories of Daimler-Benz at Stuttgart-Untertuerkheim, and Hirth-Motorenwerke at Stuttgart-Zuffenhausen, both outside the region considered safe against air attack, remained in operation for the time being as development stations. Serial production of the engines developed by these two firms was moved to the factories at Genshagen and Waltersdorf, respectively, mentioned in the above lists.

In the case of the firm of Junkers, serial production of both fuselages and engines was transferred to Keletten, the object being to loosen up the industrial concentration at Dessau.

The planned locating of factories and the fact
at least two factories existed for the manufacture of each aircraft type provided reasonable safeguards. Efforts were made to make the industry even safer against the impact of war through the issue of directives regulating the lay out of the individual workshops, and by means of air defense and air raid protection measures as well as measures to be taken within the factories.

Initial regulations restricted the size of individual construction sheds to a maximum of 4000 square meters (approximately 4490 square yards), and of hangers to a maximum of 5000 square meters (approximately 7 200 yards), and they were to be spaced at least twice the width of the structure concerned apart. The individual structures were placed so as to minimise the risks of being hit in stick-seeing runs. Roofs were designed to avoid reflecting the sunlight, and the colors of roofs and walls were to match the surrounding terrain as closely as possible. Arrangements were also to be provided for blackouts and for protection and action against fire and explosions.

A regulation requiring the construction of air shelters either under or outside of the workshops initially met opposition by the industrialists because of the higher construction costs involved. Later, during the war, however, these shelters proved a very sound measure.
Owing to the unsettled international situation in the first few years after 1933, the German Government pressed for an accelerated execution of the rearmament program. Since the purchase of aircraft and other armament equipment from foreign countries could not be entertained, so that the activation of the planned units depended entirely on the output by the German industry, special measures were needed to accelerate industrial development. Immeasurable matters had to be cleared up concerning the building operations involved, and to have used the normal bureaucratic channels in doing this through the various administration, building central, passive air defense, and planning authorities would have cost considerable time, and resulted in serious delays. To avoid any complications and to clear up other details, the Technical Office appointed its representatives at the more important works as its local industrial executives. The mission was to establish the closest possible cooperation between the factories and the Technical Office, as the mission assigning agency, to accelerate the execution of sub-contracts and to bring about the speediest possible settlement of all formal details with the local authorities. In practice, their functions corresponded to those of the Wartime Economy Inspectorates, which were still under organization and therefore not yet fully operable.
In addition to the activities outlined above, the industrial executives were to organize within the individual firms the Mobilization Planning Offices, which were to be responsible for the maintenance of the factories at a level adequate to meet the requirements of any possible mobilization, and were to train factory personnel for their missions. In addition to looking after military interests, in the matter of preparations against the eventuality of a mobilization, they therefore also had to assume responsibility for industrial-economic missions.

Industrial Executives were appointed only at a few of the more important firms active in the armament program, namely, the following:

- Bayerische Motorenwerke Munich-Allach and Eisenach
- Dornier Aircraft Works Friedrichshafen and Munich-Oberpfaffenhofen
- Heinkel Aircraft Works Warnemuende and Restock, Marienheide
- Arado Aircraft Works Warnemuende

The measures introduced had an exceedingly favorable influence on the operability of the factories mentioned, and after the desired objectives had been obtained the posts of Industrial Executives were abolished and all responsibilities for such action in the factories was transferred to the permanent local Armaments Economy Inspectorates.

Plans to activate an increased number of units in
the next few years presupposed the implementation and execution of new procurement programs, and this in turn presupposed increased industrial capabilities. As a guide to the continuing expansion of the industry, the industrial firms were therefore furnished project planning missions (Projektierungsauflagen). These mission letters stated the production and mobilizations-preparation program for a specified period, and this was to serve as a basis on which firms could recommend measures for further expansion of their plant, for the allocation of further installations, for air defense measures, for the allocation of the necessary skilled and unskilled labor, for the use of additional sub-contractors, and also as a means to determine in advance probable future difficulties, in particular bottleneck which might develop.

The Project Plan submitted by a firm on the basis of the Project Planning Mission, was used to initiate any measures which might be necessary for the timely removal of anticipated difficulties in the fields of planning, production facilities, raw materials supplies, labor, and the use of sub-contractors.

By means of this method the Technical Office was able to remain clearly posted on the progress made in the arms industries, and on the current capabilities and operational conditions of the whole industry as such.
b. Industrial Preparations against the Eventuality of Mobilization. In addition to the programs the firms were to fulfill during peace, the Project Planning Mission letter gave precise details on the manufacturing procedures in the event of mobilization.

To insure the availability of the supplies essential to maintain the units in a tactically operable condition and for increased training activities, it was therefore necessary to coordinate the measures planned for industrial development and factory investments with the Mobilization Plan, which thus, in the final essence, was the deciding factor in all planning. In contrast with the peacetime program, which provided for one working-shift per day in factories, calculations for execution of the mobilization program had to be based on two daily shifts of 8-10 hours. Peacetime and wartime production requirements were to be so coordinated that once the program resulting from the Project Planning Mission letter was completed, there would be no further need for investments for the peacetime or wartime manufacturing program or for any operational changes in the factories. This was something that definitely had to be avoided in the interests of a speedy transition to wartime production.

1. Plans provided for factories to have a operating capacity 25 percent larger than the mobilization requirements, so that if one factory was incapacitated through enemy action, its manufacturing program could be divided among four other factories.
To insure this smooth transition to the mobilization
production plan, a number of internal measures had to be taken
such as the procurement of appliances and gages in the quan-
tities needed for fulfillment of the mobilization program,
measures to insure that all construction data was safely
stored outside of the factories in shelters as proof as possi-
ble against invasion, and measures to insure that the pre-
scribed supplies of materials for six months in advance were
stockpiled.

A Mobilization Planning Office established in each fac-
tory, and staffed by personnel trained by the Military Economy
Inspectorate, which also investigated them to insure their
reliability, was responsible for all planning for the peace-
time and mobilization program. The other important mission
of this office was to compile the factory mobilization work-
ing schedule.

Each firm was required to adapt to its specific re-
quirements the the specimen mobilization schedule furnished
by the Technical Office as a guide. This schedule was to
state the logical sequence of all individual measures after
the declaration of industrial mobilization, starting with
the first instructive telephone discussion with the firm's
directorate, followed by notification of the various depart-
ments of the firm, in each case adapted to the needs of
the program established by the Technical Office and the aircraft, aircraft engine, or other equipment types involved.

Any change to a program or the issue of a new procurement program necessitated a revision of the mobilization schedule.

The appropriate branch of the Military Economy Inspectorate supporting the firm involved maintained continuing checks to insure proper implementation of these measures.

The proper handling of all details concerning preparation of the organizational and operational conditions insured timely recognition of any difficulties and hindrances developing in operating procedures and the introduction of measures to remove them.

For central purposes and to gather experience, the Technical Office in 1935 and 1936 ordered a test mobilization, based on the mobilization schedule, for a number of firms.

The measures were taken without prior warning to the firms involved, the first case being that of the aircraft manufacturing firm of Arado, Brandenburg. The reason why this firm was chosen was that it was at the time establishing its factory in Brandenburg and at the same time was converting its program from mixed to metal construction of aircraft.

At the commencement of the trial mobilization the output was twenty aircraft monthly. Within six weeks the firm increased its output to forty and within eighteen weeks to
120 per month. This fulfilled the requirements established in the official Mobilization Plan and the test mobilization was halted.

The aircraft manufactured in the test were as follows:
Arado 68 Fighter Model
Arado 96 Training Model
Arado 66 School Model,
all of the mixed-construction type, and
Junkers W-34 Model for Advanced Training, a light-metal construction.

The initial number of employees was 2000 and mounted during the test to 6000. The additional personnel were moved in according to plans by the Technical Office in response to requests by the firm, and were taken from the most varied professions. The firm’s mobilization program included the establishment of training courses to retrain new personnel, and this part of the program was also implemented. All prescribed measures for the billeting and feeding of new personnel were taken, so that no difficulties worth mentioning occurred.

At the beginning of the test the factory had in operation 11 000 square meters (approximately 21 560 square yards) of factory space, and plans provided for expansion to between 20 000 and 21,000 square meters (approximately 39 200 and
41,160 square yards, respectively) by the autumn of 1938.

The increased output required under the mobilization plan also necessitated an accelerated expansion during the test, and the final target of 21,000 square meters was achieved within four months.

During the initial stages of the test, production operations encountered difficulties in the transition from mixed to light-metal construction, since an entirely new branch had to be established to handle manufacturing activities under licence.

Parallel with the increased factory personnel and the enlarged factory space, office staffs, clerical personnel, and technical staffs naturally also had to be increased, while stocks, control systems, former construction operations also had to be built up to meet the mobilization schedule requirements. The same applied to the procurement of the additional tooling machines, particularly for the processing of light metals, the forms, gauges, expendable, and manufacturing materials, needed.

Since housing shortages within the city of Brandenburg made it impossible to billet the newly moved in personnel there, they had to be billeted in the surrounding areas, and transport facilities had to be provided.

Pursuant to regulations the firm kept the technical
Office currently posted on the progress made and the experience gathered, and the Technical Office used this information in the preparation of revised Mobilization Schedules.

One important requirement revealed was the planned increase in output necessitated the timely provision of an increased number of supervisory personnel, who had to be trained under the peacetime manufacturing program for the missions they might have to assume in the future. Furthermore, it was found more advisable to expand the various branches step by step in line with the progressing program rather than to expand them all simultaneously immediately upon initiation of the test mobilization. This would naturally incur a smaller initial acceleration, but any such loss would soon be made up by the high increase achieved later. The big advantage here is that the whole manufacturing process can be advanced more systematically.

Although the demands made in the test mobilization of only one factory were relatively small, so that it was not possible to draw inferences for a general industrial mobilization, the experience gained was nevertheless exceedingly valuable because of the light it shed on the processes of a mobilization within any one factory.

Project Planning Missions were assigned only to firms manufacturing final products with direct support from the
Technical Office. The final manufacturing firm was fully responsible for the final product, including the parts supplied by the sub-contractors it employed.

In comparison with the large number of firms participating in the manufacture of equipment, the number of firms thus involved as manufacturers of a final product was relatively small. In cases where such firms manufactured only a single final product for only one branch of the military establishment, no difficulties were encountered in giving it the necessary support or in preparing it for mobilization.

For internal operational reasons, however, the majority of the sub-contracting firms endeavored to obtain contracts to manufacture for more than one military branch. In addition to their mission of general supervision over the whole field of sub-contracting activities, the Military Economy Inspectors in such cases had to clarify the situation and regulate allocations from and responsibility by only one military branch, and to take the necessary steps to prepare such firms for their mobilization missions.

In each Military Economy Inspectorate, the Central Branch thus had to bring about a fair balance between the three military branches in the field of sub-contracting activities. Proper arrangements had to be made in close cooperation between the Central Branch Chief and the final
manufacturing firm for the assignment of mobilization missions and contracts to the sub-contracting firms.

This whole complex of sub-contracting was of basic importance, but it was only at a relatively late juncture that the problems involved could be attacked, since the primary need was to build up the decisively important firms. An examination of the conditions which had meantime developed in the sub-contracting field in many cases revealed the necessity for the final manufacturers to change their sub-contractors. This was necessary for transportation reasons, since some final manufacturers in the southern parts of Germany had important sub-contractors in the northern parts of the country and vice versa.

Other measures which had to be properly planned to insure the smooth functioning of a possible mobilization included clarification of the demands which would be made on the transportation and communications system and the steps which would have to be taken in cooperation with the appropriate local authorities; steps which would have to be taken in cooperation with the local military recruiting offices and the local labor offices to insure procurement of the necessary manpower for the armament industries in the event of a mobilization; and the inclusion, in cooperation with the appropriate organs of the Plenipotentiary for the National...
Economy of civilian requirements in all planning.

6. Industrial Expansion and the de-Valuation of Industry During the War. Up to 1936 the systematic expansion of the German aircraft manufacturing industry proceeded according to plan without encountering any serious difficulties.

The ready availability of large numbers of unemployed had a favorable impact on the consistent and speedy execution of the industrial program, so that the Air Force gained a considerable lead over the other branches, the Navy and the Army.

Increasing activities in the building industries to meet new requirements developing from the expansion of the Army and the Navy; from the measures introduced for execution of the Four Years Program; and for the comprehensive program of public building activities, which included construction of the Autobahn superhighways, finally resulted in excessive demands on the construction potentials available, which led to supply shortages in building materials and to a shortage of skilled personnel. A stage of complete exploitation of the available building potential was reached already early in 1937.

For the above reasons efforts to execute the next stage of the Air Force industrial expansion program, which was to be completed in 1942, encountered difficulties. Iron shortages made it impossible to complete this phase according to
plan and resulted in quite considerable delays in the meeting of deadlines.  

Difficulties encountered in building construction for industrial purposes encountered particular serious difficulties after the outbreak of the war, and the final outcome was the establishment of a "German Geering Construction Program" in June 1941, responsibility for the execution of which was assigned to Spear. Pursuant to directives from Geering the structures provided under this plan were to be of non-permanent types, and were to be demolished and replaced after the war. It has not been possible to ascertain to what extent this program was actually carried out. Obviously it failed to produce any improvement in the building construction field.

The manufacturing programs established on the basis of the resupply requirements stated by the General Staff presupposed the allocation of increased quantities of building and manufacturing materials, as well as additional labor. After approval of the program by Geering, assurances were received that these requirements would be met, but in most cases nothing of the sort happened. The manufacturing programs were passed on to the industry for execution, and the

1. See Letter "St. He 134; art. 2136/37 gen.Mb. 30. 10. 1941" to Geering.
industrial firms involved met about putting up the necessary buildings. "\text{H} owing to the failure to fulfill the necessary conditions, however, the firms were unable to complete these buildings within the required time.

In almost all cases the results of the above circumstances were that only approximately 20–30 percent of the intended numbers of personnel could be placed in the incompleted buildings.\(^1\)

On the assumption that the required prerequisites would be met, the Army, the Navy, and the Air Force, independently one from the other, were to implement the programs involved, and this led to a very serious scattering of effort in the building industry. These circumstances finally influenced Speer to request approval from Hitler "to reduce the buildings in consonance with the existing conditions and to cancel all long-range programs."

There can be no doubt that a curtailment of the building programs and the employment of the available man power and use of the available material to complete a few projects would have led to the speedy completion and early use of the projects thus handled, and would have produced greater advantages than the simultaneous continuation of a large number of building projects.

\(^1\) From "\text{Er\"achter der Sitzung der }\text{zentralen Planung}," 25 March 1942.
This was a case in which the lack of a central authority to control all armament activities produced unfavorable conditions for proper exploitation of all available raw material supplies and all available man power. Proper control would have insured far greater advantages through better exploitation of these potentials.

The same year brought the commencement of heavily massed enemy bombing attacks and created the urgent necessity to shift emphasis in building construction to measures for the relocation and wider distribution of industries. The implementation of such measures was triggered by the air attack against the Heinkel Werks at Rostock, Warnemunde.

The factories located along the northwest coastline of Germany and in the general northwestern areas were regarded as being most endangered. The immediate measures planned aimed initially at moving the "Heinkel Werks, for serial production, to the Polish areas of Budzyn and Baranow, and the development stations of the same firm to Schwechat, near Vienna. Other plans provided for movement of the factories of the Weser Flugzeugbau to Berlin-Tempelhof while the parts-manufacturing section of the firm were to go to Biehnische-Kammig (in Bohemia), with an air base at "Smern, Saxony; and for movement of the factories of the firm of Focke-Wulf, Dresden to alternate sites in Serau/Niederlausitz and...
later in Prennau. Per the time being it appeared unnecessary to move the factories of the firms of Blohm & Voss and Dornier in Wismar, because of the measures taken by these two firms on their own initiative to distribute their works more widely. However, the firm of Dornier was assigned additional alternative sites in the form of the Neustadt-Glewe airfield.

In addition all organizational preparations were ordered for the movement of the other firms located in the northwestern coastal areas, and a few months later for the manufacturing plants still situated west of a line extending from Stettin through Berlin to Munich.\footnote{See "Stand der 'erlagerungen 1942, Bl-A-P1., 14.10.1942," and "G1-Besprechung vom 2.9.1942."}

Investigations were initiated to determine possibilities for the relocation of each and every important factory. In the case of factories already in process of movement it was essential to maintain production in the old premises as long as possible in order to thus create an additional reserve of manufacturing facilities. In the case of factories to be relocated because of damages incurred, a number of new sites were to be determined, one site in such cases being provided for more than one firm when necessary.

In cases where more than 75 percent of all manufacturing
plant of a firm was located west of the previously mentioned line, relocation factories were to be placed in operation immediately.

Internal air raid precautions to be taken included the erection of fragmentation-proof walls between the various testing machines, the distribution of stores and the mechanical workshops, the construction of ponds for firefighting water supplies, and of boxes affording protection against fragmentation for completed aircraft.

The order implementing relocating measures for the entire Air Force supporting industry from areas west of a line extending from \textbf{K/S} Stettin through Berlin and Munich initially applied to 230 factories engaged exclusively in the manufacture of items for the Air Force. In collaboration with the Air Force Branches and Sections attached to the various armaments industries authorities, with various special committees, cartels, and with the factories themselves, the data needed for the establishment of a special schedule was completed by December 1942.

Since the measures thus ordered naturally also affected firms not working exclusively for the Air Force, the \textbf{Mi}
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\textbf{O} issued general directives for the entire armaments industry to prepare a study on alternative sites.\textsuperscript{1}

\textsuperscript{1} See \textbf{GL-Besprechung, 5.2.1942}
Investigations pursuant to an order from the Chief of Air Force Special Supply and Procurement Service dated 26 August 1942 had revealed that difficulties were to be found more particularly in the case of sub-contracting and raw materials supply firms.

Adoption by Ministry of Procurement (Min Mun) of the orders formerly issued by the Chief of Air Force Special Supply and Procurement Service and the order extending the measures to the entire armament industry meant that all firms working for the armament industry were affected.

It was found that building and space considerations made relocation on such a comprehensive scale unfeasible, so that definitions had to be modified. For this reason the movement of factories was dispensed with if their loss would not cause serious disruptions throughout the entire manufacturing industries.

In the case of factories manufacturing small items of equipment and the relocation of which proved difficult, adequate precautions could be taken by stockpiling in the receiving factories, provided adequate supplies were thus stored to last until the factory concerned could be restored to operability.

In the case of factories closed down because the manufacture of their products had been concentrated for more
rational operations, the tools and installations thus falling into disuse were to be stored at some other location, so that a new factory could be established immediately if the factory currently manufacturing the items should be damaged.

In spite of all these modifications, however, the relocation of numerous installations manufacturing vitally important and unique items had to be set in motion.

During the relocation processes it was not possible to distinguish between the factories established for relocation purposes and those established for the expanding program, since the alternate factories in eastern regions were placed in operation at once while the manufacturing processes in the original factories located in the western regions continued. This automatically increased manufacturing potentials. The firm of Heinkel can be quoted here as an example. In this case complete alternate factory installations were established at Schwechat, while the installations at Maringanna nevertheless continued in full operation and were even expanded.¹

A case meriting special mention here is that of the movement of the well-wearing manufacturing industry after the two air attacks against Schweinfurt on 17 August and 14 October 1943. The reasons why the damage done by these two attacks was particularly perilous for the entire armament...
industry *Schweinfurt* was that 60 percent of all ball bearings manufactured in Germany came from Schweinfurt, while firms in that town produced 100 percent of all German-made conical, cylindrical, and roller bearings. The loss of this production could have resulted in a decisive reduction of the German armament output, in some cases could even have put a complete stop to armaments manufacturing, for an indefinite period.

Steps had already been taken prior to the attacks to relocate and redistribute the industry, so that Schweinfurt at the time was only producing 60 instead of 80 percent of the total German output. However, the scope of post-relocation was far from adequate to ensure an output adequate to meet the minimum requirements for German armament production.

A commission appointed immediately after the second attack and headed by Director General "Essler of the Bergmann Werke, Berlin, succeeded by using all means available, in restoring at least some parts of the Schweinfurt manufacturing installations to operability. The Commission also managed to move out and repair some of the damaged machinery within a very short space of time, to relocate some of them in other factory premises, some standing unused until then, to further distribute manufacturing activities, to establish all conditions necessary for a speedy resumption of manufacturing activities, and to find quarters for the personnel re-
required, besides arranging for the necessary transportation facilities, and so forth. Other measures introduced, primarily by the Chief of Air Force Special Supply and Procurement Service, included the use of slide bearings instead of ball bearings in cases where it was not to be anticipated that the change would impair functions. By all these measures combined the Commission succeeded in averting a very serious disruption of German armament manufacturing activities.

When the Western Allies continued their concentric attacks against the ball-bearing factories in February 1944, serious repercussions on the German industries were again successfully averted by extemporized local and practical measures, such as the concrete protection of underground cellar premises, further decentralization, relocation of installations to underground tunnels, to limestone quarries, and so forth.

It goes without saying that the execution of the necessary measures made severe demands on all members of the Commission and on the staffs of the factories concerned, all of which demands were fully met by all concerned.

The investigation of relocation measures carried out pursuant to instructions from the Ministry for 

had created the possibility to establish alternate or shadow factories for the manufacture of unique items not yet determined, and to lessen and in some cases completely
avert the influences of air attacks. By 1 September 1944 areas totalling 6,383,259 square meters (roughly 13,225,457 square yards) were made available to the firms represented by the three main committees for aircraft fuselages, aircraft engines, and Air Force equipment, or arrangements had been made for the availability of this space, so that a start could be made at putting a large part of the relocation program into effect at once.1

However, the measures thus taken to safeguard manufacturing activities were still inadequate in view of the fact that the Allies were gradually extending their air operations to as far as the eastern and southern areas of Germany, and to Austria and Hungary since the end of 1943.

In connection with the execution of the Home Defense Program, Field Marshal Milch had considered it essential to place primarily the factories manufacturing engines in caves and these manufacturing fuselages in two completely concrete-protected factories, and had reached agreements with Speer for construction of the latter.2

Plans also provided for protected premises in the case of the Ustaarkwerken at Vienna, the Avia works and fuselage factories at Wiener-Neustadt, and the Messerschmitt Works at Augsburg. However, implementation of these plans hinged

1. See "Er-Verordnung vom 13.10.1943."
upon allocation of the required quantities of concrete, which were not available because of the low priority awarded for the Air Force supporting industries. This made it unavoidable to use the small allocations available for expansion of the existing factories, as in the past, in order to achieve optimum results.\footnote{See "Stellungnahme der Reichswehr, 15 October 1943."}

It was not until the Fighter Production Staff assumed responsibility for the manufacture of fighter aircraft on 1 March 1944, when these activities were awarded top priority, that conditions were created which made it possible to place at least the factories manufacturing fighter aircraft in protected premises.

In view of the urgent pressingly urgent need for fighter production, Hitler ordered the immediate construction of two large factories for the purpose in addition to the movement of other factories to underground premises. Preference in the movement to the bomb-proof premises was to be given primarily to these factories whose products made "a great technical improvement possible," and represented a bottleneck in the whole manufacturing program.\footnote{See "Protokolle der Besprechung bei Goering vom 1.5.1944."}

Hitler had ordered that 600,000 square meters (roughly 1,152,000 square yards) should be prepared in the form of
bunker type shelters for factories to produce 1000 Me-262
jet fighters and 2000 piston type fighters, a total of 3000
per month, and plans provided for the completion of these
premises by the end of 1944.1

One of these factories was to be located in the Bohemia-
Moravia (Czechoslovakia) region. For the second factory, the
project already under construction north of Kauferring was
to be enlarged to the required size.

To what extent these two projects were completed or
placed in operation by the end of the war cannot be said with-
out further research on the subject.2

Relocation of the entire aircraft industries would have
required a total space of 5 000 000 square meters (roughly
9 600 000 square yards), of which approximately 1 900 000
square meters (roughly 1 920 000 square yards) were required
for semi-finished products and parts or part-assemblies,
some of which could not be relocated so that protected pre-

1. See "Nachrichten der Reichsleitung von 19.10.44."
2. See "Nachrichten der Reichsleitung vom 29.12.44."
The intention was to meet these requirements through the use of existing underground premises or tunnels, and the construction of concrete bunker type shelters.

The available building construction potential was inadequate even for these purposes, so that the movement of underground premises had to be restricted to factories producing the most important items. The projects in question here were the He-335 and He-262 aircraft types and the tooling machines used in the manufacture of fuselages and aircraft engines. Assuming that 80,000 machines existed and that each required between 10 and 12 square meters (roughly 19.6-23.52 square yards), this meant that 1,800,000 square meters (roughly 2,528,000 square yards) of space were needed for the two aircraft types mentioned above.

These requirements were to be met by the use of mine-shafts, tunnels already in existence, and fortifications, plus natural caves, the two concrete-protected works previously discussed, and tunnels still to be constructed.

The spaces thus available for use were as follows:

- Tunnels: 896,000 square meters (roughly 570,200 square yards)
- Fortifications: 78,000 square meters (roughly 152,880 square yards)
- Natural Caves: 58,000 square meters (roughly 113,360 square yards)
Mine Shafts (assumed) 1,900,000 square meters (roughly 3,648,000 square yards).

In the case of mine shafts, however, it had to be borne in mind that mining operations had to continue undisturbed, and that some of the spaces available would be unsuitable for use owing to mining factors (exposure to weather, inaccessibility, etc).

No protection could be provided for the rest of the space required, namely, 520,000 square meters (roughly 1,144,000 square yards), so that efforts had to be made to escape the effects of air attack through wide dispersion.

In preparing premises for the movement of industries underground, the least work was required in mine shafts, tunnels, and fortifications. Then followed concrete structures, and as the least unfavorable the construction of new caves. The records available at writing are inadequate for a complete survey of all work done up to the end of the war on the program to move industries underground. The same applies to the detail work accomplished in this field, since developments in the military situation necessitated frequent changes in the measures taken.

Besides the increased efforts during the last years of the war to move industries underground, current work con-

L. See "General-Brummelung um 26.5.1941."
continued to relocate above-surface, unprotected, factories and to repair factories damaged by bombs on a steadily increasing scale, so that labor forces had to be shuffled around constantly. Finally, the need arose towards the end of the war to move back to Germany the factories which had been relocated in other parts.

SUMMARY

The build up of the German aircraft industry proceeded in accordance with the mobilization plans issued by the Technical Office periodically as long as adequate construction materials and man power were available, which was the case up to 1936. In the following year the defense budget was drastically and unexpectedly cut; besides curtailing manufacturing programs, this interrupted the consistent development of the industry.

It is to be assumed that the reasons for these incisive measures were of political-financial and foreign-policies nature. On the one hand, a rapid rearrangement would have considerably reduced Germany's foreign currency reserves, on the other hand the harmony evident at the 1936 Olympic Games called in Germany--Note by Translator seemed to indicate lessening tension in foreign affairs. It was 1938 before

1. See letter from "Betriebsleiter der Junkers-Werke Darmstadt vom 10.3.1936; Information also from personal experience of the present writer."
industrial expansion and the production of armaments again gained momentum. Then, however, it was no longer possible to carry out the program according to schedule, since the continued build up of the armament industries in general, building projects under the Four Years Plan, and a comprehensive program of public building construction by far exceeded the available potentials.

If the build up of the aircraft industry had continued consistently and without interruption, far larger manufacturing capacities undoubtedly would have been available at the outbreak of the war. In the absence of a general industrial mobilization it is difficult to judge whether and to what extent the larger capacities of the aircraft industries would have produced results at the beginning of the war. However, a certain lead would have been gained before building materials began to become scarce from the end of 1937 on.

Once the war had begun, conditions improved because of the curtailment of private building operations and because of the use of prisoners of war as labor, but mounting re-supply requirements nevertheless seriously delayed the completion of projects under construction.

The requirements stated by the General Staff changed constantly, usually with an upward trend, in accordance with
the current military objectives aimed at. This naturally resulted in larger and continuously fluctuating production and building programs. The planned programs were coordinated with existing technical capabilities. They were approved by the Commander in Chief of the Air Force, and the undertaking was received that the necessary allocations of additional man power, testing machines, and building materials, upon which execution of the programs depended, would be made available. Usually, however, only partial allocations were received and in some cases none at all. On the assumption that these stated conditions for execution of the programs would be fulfilled, a beginning was made on the various projects, but progress was usually exceedingly slow. The outcome of these circumstances was that a number of construction projects were initiated simultaneously, but each of them received only a small percentage of the required personnel.

These conditions ruled not only in the case of the Air Force, but also in the cases of the Four Years Plan, the Mineral Oil Plan, the Electricity Development Plan, and the aluminium Production Plan, and probably also in the fields affecting the Army and the Navy.

These methods resulted in a serious dissipation of effort in the building industries which could have been averted
251 If a superior authority had existed to insure uniform direction of all armament production activities. The lack of such an authority had a particularly adverse impact on the expansion of the armament industries, since the simultaneous start on a large number of projects, each with only a small percentage of the labor required, logically caused delays in the armament programs.

A concentration of all available labor and materials on a small number of construction projects would have insured a speedier completion and usability of the building, thus giving preference, under the methods actually employed there was no possibility to conjecture when any particular building currently under construction could be used.

The difficult situation in the building industries finally influenced Minister Speer to request approval from Hitler "...to ruthlessly cut back building activities to a scale resulting from existing conditions, and in doing so to be allowed for the time being to postpone execution of all programs established as long-view projects."1

Although this measure clarified the situation in the building industries the lack of a uniform direction of building activities nevertheless continued to have disadvantageous influences.

It was 1 May 1944 before Ministerial Director Darsch.
and thereby the Ministry for Armaments and Wartime Economy, was placed in control of the entire building construction industry, at a time at which there was no longer any thought of continued expansion of the various industries.\footnote{}}

The only projects which could now be taken into consideration were those connected with the repair of war-caused damages, the above-surface relocation of factories, and the preparation of underground premises in tunnels and so forth for bomb-proof factories.

The independent status of the three military branches and the lack of a uniform direction of armament activities had adversely affected efforts to obtain an optimum use of available man power and materials, and building facilities.

That the factory space of 3,500 square meters (roughly 6,960 square meters) available in 1943 was increased to 3,000,000 square meters (roughly 5,760,000 square yards) available in 1945 represents an exceptional performance by the industry, and it must be borne in mind that the actual total space available was probably larger, since the figures given here have been computed from the number of man hours recorded and the time items were under construction in factories.

The plan of dispersing the various buildings of a factory in the terrain, so far as the Air Force supporting industries
were concerned, was devised with due regard to the approach and attack methods of air warfare at the time, in order to reduce the risk of losses in the event of stick bombing. The tactics of area bombing introduced in 1943 to some extent made such measures illusory. The dispersion of factory activities in individual and physically separated workshops nevertheless still offered considerable advantages over large single structures of the types then customary. It was only later, in the light of experience with the properties of reinforced concrete structures, that the construction of large buildings again appeared justifiable.

The only effective protection against area bombing, however, was the movement of factories to underground premises in caves and tunnels, or to premises under reinforced concrete covers, under the premise, however, that all manufacturing processes from the receipt of semi-finished products, including all appliances and articles of equipment, must then be concentrated in one such spot. These possibilities had been discussed between the Chief of Special Supply and Procurement Service and Reich Marshal Goering immediately after the first attacks of the new type in 1942, and partial agreements had been reached with Minister Speer.

Postnote 1, p. 348: See "Nationalsozialistische Verwaltung" 1.1.1944."