AMERICAN AIR POWER IMPROVED SINCE 1948

Industry Better Able to Expand Production Now

Available data attest to the wisdom of Congress in starting to rebuild America's air power just two years ago when it passed the Supplemental National Defense Appropriation Act of 1948. While the strength of our air arms and the rate of aircraft output are below the minimums authorities believed safe, conditions are better in every respect than in 1944-47 or 1939.

In 1946-47 our Air Force could muster only 34 groups with only one or two qualified for combat, and Naval Aviation was equally inadequate. The industry had plunged deeply into the red and its actual survival was in question.

The situation brought about the reform of the Finkelter Committee and the Congressional Aviation Policy Board. The Congress backed these reports by prompt passage of the Appropriation Act in the spring of 1948, and by subsequent steps in increasing appropriations for air power.

As a result the Air Force, while still far below the 70 groups desired as a peace time minimum, now has the equivalent of 23 groups with many of them having the best and most modern planes in the world. Naval Aviation, while still inadequately equipped, has placed new jet attack and attack planes in operation.

The change in the aircraft industry is illustrated by the following figures showing the number of planes delivered:

<table>
<thead>
<tr>
<th>Year</th>
<th>Planes Delivered</th>
</tr>
</thead>
<tbody>
<tr>
<td>1939</td>
<td>2,141</td>
</tr>
<tr>
<td>1944</td>
<td>95,318</td>
</tr>
<tr>
<td>1946</td>
<td>1,659</td>
</tr>
<tr>
<td>1949</td>
<td>2,044</td>
</tr>
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</table>

The current production rate is higher than in 1949. These figures show graphically that the industry is in better shape to expand in case of an emergency than it was in 1939 or 1946. Clearly, however, much time would be required for the industry of 1950 to reach a volume similar to that in 1944. The editorial in this issue also points up some continuing financial problems of the industry.

New aircraft models of America's air arm hold virtually all the records established by the B-45, the world's first operational four-engine bomber, have been assigned to combat units and are ready for any emergency that may develop.

Aircraft Manufacturing Profits Far Below Most Other Industries

Aircraft manufacturing profits consistently are far below those of practically all other industries. Compiling the figures for 27 aircraft and parts companies, National City Bank of New York found that in 1949—best year since the end of the war—they had a net profit margin of 3.3% on sales. At the same time, for the 1,710 manufacturing companies included in the survey the average profit margin was 8.6%. The chart also shows that the wide spread has prevailed throughout the past five-year period.

Test of "Swarmer" Operation Shows Equipment Needs

Written especially for Planes by Maj. Gen. William H. Turner Deputy C-r-s- for Airpower, United States Air Force

Exercise SWARMER was a test case. In seeking solutions to the problems resulting from employment of air transport alone to establish and sustain—over a protracted period—a friendly force deep in hostile territory, SWARMER was planned and executed, using only those transport aircraft readily available to the Air Force in its MATS and domestic Troop Carrier organization.

Once the initial mass air assault—an air drop of paratroops and parachuted equipment—had obtained its objectives, SWARMER demanded for its success continuous, day and night, all-weather, mass air supply to allow friendly forces to build up manpower and materiel strength to mount and sustain the offensive against entrenched "aggressor" forces in this first real test of a two-airhead operation.

New Manufacturing Methods Pushed In Drive to Cut Costs of Airplanes

Great advances are being made in the joint Air Force—aircraft industry program to improve the efficiency of modern complex aircraft and at the same time substantially reduce the cost of manufacturing.

Background of this program was described in the February, 1950 issue of Planes.

Progress of the program is significant by the fact that AMC has approved the listing of 10 methods development contracts. It now has under consideration a list of 19 other high priority undertakings proposed by the Manufacturing Methods Committee of the Aircraft Industries Association. These were selected as the most important from a list of 200 submitted by the industry.

The Manufacturing Methods committee points out that money spent for the development of a new process or a new time-saving, cost-cutting, accuracy-improving machine may mean the saving of millions of dollars in the final cost of turning out airplanes.

 Guarantying Reinforcements

The solution to the turn-around problem is not easy; it requires a clearcut organization with one

—See Airlift page 4—
Airplane Industry

Profits and Enterprise

By DaWh C. Ramsey (Admiral, U.S.N., Ret.),
President, Aircraft Industries Association

The chart appearing on page 1 in this issue of PLANES compares graphically profit ratios in the aircraft industry with those for other manufacturing corporations. This chart shows that the aircraft industry's profit in 1949 was only 7.3 percent on sales, according to the National City Bank of New York, whereas the same ratio for some 1700 manufacturing corporations in all industries combined was 6.8 percent.

The chart also shows that throughout the past five years the profit margins in aircraft have averaged far below those of industry as a whole. Much the same situation prevailed during the war, according to the National City Bank's data. However, the situation before 1939 was quite different. Then, the industry's earnings were at levels fully comparable to those of other industries.

In the prewar days, when profit margins were at least double current rates, companies in the industry, as a matter of course, financed their own competitive efforts in the commercial field, and they owned their own plants. They looked to NACA for aerodynamical and other basic research and to the military services for only a very few special testing facilities.

Competition in the military field was characterized by development contracts placed by the military with the private companies and by design competitions for military procurements. The size of the contracts placed, and the rate of delivery required, were of an order which demanded no sudden or impracticable expansion of facilities.

Today, in our post-war uneasy peace, the industry picture is complicated and unclear as to the present, and far more complicated and uncertain as to the future.

Today, design, prototype manufacture and flight qualification of new commercial transports are so expensive in both time and money as to be almost prohibitive as a speculative private venture by any single company. Currently, the industry looks to government to help solve this problem.

The costs of developing the supersonic military airplane, its powerplant and its accessory technical and military equipment are so great that much difficulty is being met by the military in providing for competitive developments by two or more private companies in each type class.

Production contracts and required rates of delivery create serious problems as to expansion of production facilities. The utilization of idle government "stand-by" plants and machine tools has been an understandable solution in many cases, although there have already appeared disturbing signs of political pressures which tend to complicate subsequent procurement decisions.

These are the post-war developments which give rise to the imponderables which concern the industry as it tries to visualize its future.

The prewar picture of the industry and its relationship to the military services is so simple that the fundamentals are clear. World War II furnished a full-scale test of the soundness of these fundamentals in preparing the industry to discharge its responsibilities to the services and to the country. The record of its war performance has been written, and the industry feels it can stand on that record.

That record is in strong contrast to the catastrophic failure of the nationalized aircraft industry of France in the hour of that country's greatest peril.

That record is also in favorable contrast to the performance of the government-dominated German aircraft industry which, after a good start, proved to have had its initiative and flexibility so impaired as to have been a disappointment to the tactical head of the German Air Force, Reichsmarshall Hermann Goering. The latter expressed this disappointment during interrogation by our Air Force officers after the war when he is reported to have said that:

"he envied the Allies nothing more than their financially independent private competitive aircraft industry and its ability thereby to develop new models.

"The post-war trends, typified by the markedly lower level of profits and the increased government aid and controls, suggest the need for careful examination of this situation in the light of the lessons of World War II.

PLANES Quiz

Seventy per cent score on this quiz is excellent. Sixty per cent is good. Answers on Page four.

1. Delicate instruments last longer in jet planes than in conventional planes. True. False.
2. Fast flying jet planes can get radio reception up to (a) 1,000 miles; (b) 2,000 miles; (c) 5,000 miles. True. False.
3. U.S. scheduled airlines now have in service (a) 800 airplanes; (b) 1,000; (c) 1,500. True. False.
4. Most military vehicles can now be carried by air fully assembled. True. False.
5. A jet-powered transport can be started and made ready for takeoff in (a) five minutes; (b) 15 minutes; (c) 30 minutes. True. False.
6. Certified helicopter pilots in the U.S. now total (a) nearly 700; (b) nearly 1,800; (c) nearly 2,500? True. False.
7. Jet aircraft can operate up to (a) 35,000 feet; (b) 45,000 feet; (c) 55,000 feet? True. False.
10. A modern airplane has been developed which can change the angle of its wings while in flight. True. False.
Aircraft Quantity Still ‘Deficient’ Despite New Fund

Spurred by the challenging remarks of Rep. Carl Vinson, D. Ga., Chairman of the House Appropriations Committee, the testimony by General Dwight D. Eisenhower, the House of Representatives has voted an increase in procurement of Ti medium bomber aircraft with the rehabilitation and modernization of Ti medium bomber aircraft as tankers. This increase over the original Administration budget for 1951, if approved by the Senate, would further strengthen the Air Force’s striking forces by permitting the rehabilitation and modernization of 71 medium bomber aircraft and transport aircraft to be used in combat. The Navy’s $100,000,000 share will provide for the procurement of 55 Ti medium bomb planes, each of which will be used by the Navy as a tanker in the event of war. Although plans scheduled for Navy procurement during 1951 are increased to 912 by this action, the House Appropriations Subcommittee, stated, ‘The vote means that the Navy can have a first-line, modern air arm based on present operating strength and in keeping with the modernization of the Navy’s fleet of ships, a modern air arm and the warplanes which have been procured in the last few years have been patterned to operate with second line aircraft.

Exhaustive Tests

Six million square feet of blue prints were used in designing one of the biggest U.S. warships now in service, plus more than 2,300 man-years of work. Many of these were used to report data than are in the Encyclopaedia Britannica. Fire tests included a 40,000-mile run for the power plant, 11,800 simulated cycles of the tricycle gear, five years of wind-tunnel tests and 1,900 test runs for the generator system, reports the 1949 Aircraft Year Book. Official publication of the Aircraft Industries Association of America.

Flooring of the airplane was tested in the plane factory by the tramping of more than a million feet. Flight tests were made totaling 76,000 hours, and including 54 flights between Seattle, Tampa, Los Angeles and New York.

Costly Machines Needed to Build New Planes, But They Save Money

Machinery—big, powerful and complex—is required for the production of today’s modern aircraft. Such machinery makes possible improved manufacturing techniques, expandability of equipment and materials, reduced production costs—but it also carries a big price tag which is needed for projects, such as the six-jet bomber which will be one of the mainstays of the Air Force. By contrast, the same company needed less than $4,600,000 worth of machinery to go into production on a bomber which carried one of the heaviest roles in World War II.

Work Loads and Precision

But these modern machines represent more than a difference in dollars and cents—they represent a tremendous difference in work loads and precision. Gone are the days when fuselage skin could be built up with a pair of tongs. Hundreds of pounds of pressure are needed to shape the heavy-gauge tin plate in a medium bomber. Electronically-controlled precision tools do the tapping and trimming, and precision tools and processes are needed less than 1/16-inch tolerances. Instead, tolerances of plus or minus 0.072 are common on wings and fuselages. One jib要看，for example, maintains accuracy to within one-thousandth of the diameter of a human hair.

Modern Aircraft Require Giant Precision Tools

Typical of this speciality of work is the 1949-1950 tooling up of one bomber factory: One of the primary needs was large equipment capable of drilling precision holes with distances up to 20 feet apart in the bomber wings and master gauges. In addition, such fabrication would require milling and drilling operations, both vertical and horizontal.

General practices followed by manufacturers in the past would call for the purchase of three separate machines—a horizontal boring machine, a combination vertical and horizontal planer and a heavy duty horizontal and vertical milling machine. However, in a special development, all three operations were combined in one machine. The price of the single machine was less than half of the total price of the three others combined. Also, use of the single machine saved valuable floor space for other manufacturing operations.

A Washington, Iowa, woman has a private pilot’s license, but never drives an automobile.
Typical Industrial Uses of Airplanes

The Civil Aeronautics Administration compiled the table below in a survey of the current status of the use of aircraft in various activities. Altogether, the CAA lists a total of 80 different industrial uses for planes.

<table>
<thead>
<tr>
<th>Operational Use</th>
<th>Number of Operators</th>
<th>Number of Aircraft</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spraying ripe fruit with &quot;Stop Drop&quot;</td>
<td>42</td>
<td>136</td>
</tr>
<tr>
<td>Plant Pollination</td>
<td>47</td>
<td>115</td>
</tr>
<tr>
<td>Crop Desiccation</td>
<td>24</td>
<td>675</td>
</tr>
<tr>
<td>Crop Dusting</td>
<td>16</td>
<td>1,883</td>
</tr>
<tr>
<td>Crop Spraying</td>
<td>776</td>
<td>1,327</td>
</tr>
<tr>
<td>Seeding</td>
<td>432</td>
<td>1,077</td>
</tr>
<tr>
<td>Smokey Crowding</td>
<td>24</td>
<td>73</td>
</tr>
<tr>
<td>Mapping and Surveying</td>
<td>87</td>
<td>139</td>
</tr>
<tr>
<td>Aerial Photography</td>
<td>225</td>
<td>313</td>
</tr>
<tr>
<td>Forest Fire Fighting</td>
<td>116</td>
<td>53</td>
</tr>
<tr>
<td>HIGHWAY PATROL</td>
<td>19</td>
<td>2,100</td>
</tr>
<tr>
<td>Power Line Patrol</td>
<td>162</td>
<td>99</td>
</tr>
<tr>
<td>Pipeline</td>
<td>30</td>
<td>400</td>
</tr>
<tr>
<td>Oil Well Service</td>
<td>114</td>
<td>1,93</td>
</tr>
<tr>
<td>Soil Erosion</td>
<td>89</td>
<td>139</td>
</tr>
<tr>
<td>Ambulance Service</td>
<td>400</td>
<td>500</td>
</tr>
<tr>
<td>Delivering Mail, Newspapers</td>
<td>111</td>
<td>216</td>
</tr>
<tr>
<td>Checking Cattle</td>
<td>886</td>
<td>926</td>
</tr>
<tr>
<td>Hauling Feed and Equipment</td>
<td>814</td>
<td>965</td>
</tr>
<tr>
<td>Mineral Prospecting</td>
<td>45</td>
<td>60</td>
</tr>
<tr>
<td>Game Survey</td>
<td>79</td>
<td>118</td>
</tr>
<tr>
<td>Coyote Hunting</td>
<td>464</td>
<td>772</td>
</tr>
<tr>
<td>Rainmaking</td>
<td>55</td>
<td>74</td>
</tr>
<tr>
<td>Mosquito Control</td>
<td>141</td>
<td>255</td>
</tr>
<tr>
<td>Air Police</td>
<td>147</td>
<td>204</td>
</tr>
<tr>
<td>Aerial Fire Fighting</td>
<td>147</td>
<td>204</td>
</tr>
<tr>
<td>Antifrost Agitation</td>
<td>66</td>
<td>133</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1,077</strong></td>
<td><strong>6,117</strong></td>
</tr>
</tbody>
</table>

Out on the Town

A helicopter skims over Springfield, N. Y., (Pop., 1,000), spraying every nook and coveil with DDT laden aerosol fog to wipe out flies and mosquitoes when the community became alarmed by a sharp increase in polio cases. This is one of the many new industrial uses of airplanes and helicopters. In the U. S. 265 communities were sprayed or dusted from the air last year.

Aerial Spraying Now Utilized By Numerous Cities

Towns and cities in half the states of the U. S. are calling on the airplane to rescue them from epidemics of disease and from destructive, blighting and expensive infestations of insects. A major increase in the practice of aerial spraying and dusting of communities is one of the highlights in the steadily expanding use of aircraft for industrial purposes.

First large scale spraying of cities from the air was undertaken in 1941 when 119 communities were covered. In 1949 the number was increased to 265 and a much larger number will be covered this year, it is indicated by early applications for waivers filed with the Civil Aeronautics Administration.

Kansas City List

Aerial application of the new chemical compounds is being used for numerous purposes. In some cases DDT is sprayed in efforts to reduce the incidence of polio and to eliminate hordes of mosquitoes and flies. In many other cases, spraying of dusting is being used to wipe out infestations of insects. For instance, in semi-arid Kansas where distribution of trees would be an irreparable loss, 74 different communities last year used aerial application of lethal chemicals to wipe out the canker worm which attacks foliage of trees. An example in the Miami, Fla., area where last year aerial spraying was utilized for 10 days for weeks to combat mosquitos. Public health officials report that this was not a remedial instance of bad effects from toxicity upon people or animals.

Companion Industries

The widespread increase in the use of airplanes for this type of work is illustrated by the number of communities in 23 states which last year secured waivers from the Civil Aeronautics Administration for the purpose. The breakdown is as follows:

- Arkansas 1, Colorado 7, Delaware 1, Idaho 21, Illinois 31, Iowa 21, Kansas 74, Maine 1, Michigan 9, Minnesota 20, Nebraska 8, New Mexico 7, New York 2, North Dakota 1, Ohio 10, Oklahoma 17, Pennsylvania 3, South Dakota 4, Tennessee 1, Texas 22, Wisconsin 14, Wyoming 5.

- Waivers are secured from CAA by operators of the dusting or spraying aircraft to permit low flights below the usual altitude.

- Latest figures available to CAA show that 1,724 operators are using 4,906 planes in crop dusting, spraying, seeding, fertilizing and defoliation.

- Companion industries have developed also, with 227 companies making equipment used in such operations and 19 schools giving courses in agricultural aviation of which are applicable to the newer techniques of spraying cities.

AIRLIFT

- (Continued from page 1)

In some instances, airlift authority made wholly responsible for the airliorn with its unload- ing equipment, unloading and loading aircraft units, aircraft parking and dispatching as well as local de-

Trends and Developments

The number of personnel employed in air transport industry increased from 5,648 to 12,832 between 1943 and 1949 and the number of planes in service rose for the first time in years, from 7,149 to 24,117. The world's total plane production for 1949 was 12,353, of which the U. S. share was 4,906.

- Single authority and responsibility is essential to get the aircraft quickly unloaded and back into the air and the landed cargo speeded to the fighting troops.

- We know that navigational equipment and techniques assure the regular, safely spaced, and continuous flow of aircraft are vital; we must have navigational aids which cannot be neutralized by interference. We know that our operational techniques must be designed to guarantee the arrival of aircraft into the airhead, both day and night—regardless of bad weather. The assault troops, once parachuted, must be guaranteed their backup reinforcements of men and matériel, and on no account abandoned or succumbed because of operational ability and adequacy.

- The matter of aircraft design is of real importance. Awkward, unwieldily, and bulky loads (which are inherent in air-transport of present-day Army ordinance) must be carried.

- Evaluating Aircraft

- Although it is recognized that a lighter aircraft might better be used in the early stages of an airborne operation, when parachutes of men and equipment are the order of the day, a heavier "truck of the air" for landing the heavier equipment and the continued mass delivery of troops and supplies during the sustained build-up is an essential. The latter would be particularly useful if it were designed to do both missions.

- Our concept of operation must be stabilized, our training standardized amongst all air transport units, our air transport organization streamlined, our all-weather navigational aids and facilities improved, and our transport aircraft—present and future—carefully evaluated in order to bring about this guarantee for continued heavy, and sustained flow of men and matériel.

Legion Reports On Air Power Of U.S.

A new report — "The Fiftieth Decade of Air Decision"—assessing America's air power and recommending measures for increased national security, has been published by the American Legion.

The new publication examines the current status of military aviation, air transportation, research and development, and the aviation industry. It outlines recommendations to improve these basic factors of America's air power to provide for increased national security and greater contributions to our national economy.

The booklet was distributed in cooperation with the Aircraft Industries Association of America. Copies are available on request from the National Security Commission of the American Legion, Indianapolis, Indiana, or from the Aircraft Industries Association, 610 Shoshone Building, Washington, D. C.

Facts and Figures

Twenty-eight Ohio counties will sponsor air tours this summer for farmers and soil conservation interests desiring to study good and bad land use and soil practices. The Ohio Forestry Association also sponsors a state-wide aerial tour of strip mines, reclamation and forest lands.

Approximately 300 motion picture films and 150 filmsstrips are listed in a new catalog of visual education aids available for loan to educational institutions, aviation and civic groups and other interested organizations. The list is available from Civil Aeronautics Administration, Washington.

Answers to Planes Quiz

1. True. Engineers estimate that in one currently flying jet plane the instruments will have 30 to 40% longer life than in a jet plane of 1949.
2. (c) High frequency aerials buried in the soil of a modern plane (to reduce radiation) are used to reduce the plane's radar signature to 1,800 miles reception.
3. (b) January 1, 1949, the scheduled airlines of the U. S. had in service almost 1,100 aircraft—more than twice the number in service four years ago.
4. True. One mammoth transport, now in operation, has 96% of all military vehicles, fully assembled. It can carry 200 troops, or a load up to several thousand pounds.
5. (a) Engineers say the time for starting up the engines and checking the equipment is reduced from 27 to 5 minutes.
6. (a) The last count made by CAA showed there were 659 helicopter pilots certified on May 1, 1949, New York, California and Illinois lead, with 3,143 pilots certified.
7. (c) Much upper air research is being done but because of inherent difficulties of jet operation in extremely thin air, it is now generally considered that 55,000 feet represents the extreme at which jets in their present stage of development might be expected to function normally. A British fighter holds the altitude record of 93,445 feet.
8. True. A degree temperature in transport can amount to a reduction in payload of as much as 3,500 pounds.
9. Yes. At the last count, 25,896 ex-G. I.'s were taking flight instruction at various private flying schools throughout the country.
10. True. A new three-engined jet bomber and a new jet intercept fighter built for the Air Force have variable incidence wings which can be adjusted for takeoff while the fuselage remains stationary. The required amount of lift is obtained for takeoff while the fuselage remains stationary. The required amount of lift is obtained for takeoff while the fuselage remains stationary. The required amount of lift is obtained for takeoff while the fuselage remains stationary. The required amount of lift is obtained for takeoff while the fuselage remains stationary.