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planes

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WORLD AIR TRAVEL 36 TIMES PRE-WAR LEVELS

SAFETY IS THE AIRWORD

Flight is controlled, checked and advised by 71 terminal traffic offices and 44 flight area information services.

Pilot communicates with 127 ground stations linked by 56 special circuits and scores of other aircraft.

Pilot navigates with the help of 258 short distance radio aids, 24 long-distance aids and 160 approach aids.

Pilot draws weather information from 71 airport meteorological offices, 9 ocean weather ships, 4 storm-warning centers and hundreds of weather stations.

Fast, luxurious transport planes plying the airlines between the United States and Europe arrive in, or depart from, U.S. airports every 30 minutes. The safety of these airliners and their precious cargos is constantly guarded by unseen thousands of experts.

'PLANES'

U.S. Air Passenger Revenues, Excluding Commutation, Top Railroads' in 1954

Written for PLANES by
Brig. Gen. Milton W. Arnold
Vice President, Operations & Engineering,
Air Transport Association

In the United States some 85 per cent of all who use the common carriers—air, rail, bus—to travel 1,500 miles or more, take the "high road." In 1954 this country's scheduled airlines carried a record 35,184,000 revenue passengers. Last year, for the second straight year, passenger revenues of these lines and local service carriers topped rail passenger revenues, excluding commutation.

The Civil Aeronautics Administration has estimated that by 1960 domestic air carriers alone will be carrying 50 million passengers yearly and flying in excess of 23.7 billion passenger miles.

The strongest kind of foundation for Mr. and Mrs. America's soaring acceptance of air travel for safety, speed comfort and economy is provided by the airlines' safety record. In 1954 the scheduled airlines of the United States, domestic and international, came up with the best passenger safety mark ever achieved. They flew 30.5 billion passenger miles more than 2.9 billion miles and had an over-all passenger fatality rate of only .07 fatalities per hundred million passenger miles.

At that rate a passenger could fly safely more than a billion miles, or one flight every day for 5,766 years. This superlative record stems directly from the use of the finest equipment, backed up by modern maintenance methods carefully performed.

In the 10 years since the end of World War II the enormous chal-

lenge facing civil aviation has been to close the gap between a great new promise of air transport and the means of attaining its fulfillment.

What has been achieved in this effort can be read from its vital statistics. Since 1945, the governments and airlines of more than sixty nations have built a worldwide system of air transport services between more than 3,500 cities on all continents, linked across every ocean and over the Pole.

Worldwide air traffic has expanded 36 times in terms of passengers, and 70 times in terms of cargo, over prewar levels.

The growth of United States scheduled airlines during that period has been equally impressive. Including aircraft currently on order and to be delivered during the next eighteen months, the commercial airline fleet will grow in 1956 to 1410 aircraft—an increase in number since 1946 of about 80 per cent. And, because of the greater size and speed of the newer planes, an increase in capacity of many times that amount.

Domestic revenue airline passenger miles last year reached a new high of more than 16 billion—nearly triple the 1946 total and 13½ per cent higher than in 1953. International carriers flew 3.7 billion passenger miles—more than triple the 1946 total and an increase of more than 10 per cent over 1953.

Since December 31, 1945, the airlines have invested more than \$850 millions in new equipment and facilities necessary to meet the needs of the air travelling public.

Yet, despite this enormous expenditure, the price of the average domestic airline ticket is only 3.7 per cent greater than it was in 1939 and the average price of the international ticket is nearly 25 per cent less than it was in 1939. Today, a businessman can travel from New York to London, Paris, and Rome, spending one day in each of those cities, and return to New York before the fastest steamship departing New York has reached either England or the Continent.

Domestically, the air passenger can travel, high over all turbulence and storms in luxurious 350 mile per hour airliners, from Los Angeles to New York in little more than half the time of the fastest train between New York and Chicago.

All of this is, of course, a tribute
(See AIR TRAVEL, page 4)

Soviet Aerial Progress Poses Real Threat Air Chieftain Warns

The United States needs more and better engineers and scientists to develop superior weapons for the nation's defense if we are to meet the threat of the U.S.S.R., according to Gen. Thomas D. White, Air Force Vice Chief of Staff.

The Soviet Union, General White warned in a recent nation-wide address, has come from a period in which most of the population was illiterate to a point where their present output of scientists and engineers exceeds that of the United States, and they are now showing signs of technological maturity.

Red engineers ground out of Russian schools and universities in the past few years, he said, almost equal the total numbers graduated in the United States during the same period, and in trained scientists the Soviets have surged ahead.

Even though many of their spectacular successes have been the results of duplicating basic equipment taken from the Free World nations, the Soviets have accomplished many things that our experts said they could not do. Even more surprising, some of the things the Russians were supposedly unable to do at all,

they not only did, but did in a hurry.

As examples of this, Gen. White cited:

- The B-29—It was thought in this country that it would take the Reds six or seven years to duplicate it. It took them two.

- The jet engine—It was estimated it would be difficult to make a good copy of a British jet engine. Russia produced a better version of this engine in less than a year.

- The atom bomb—American experts predicted that it would take from six to ten years to produce a similar bomb, if they were able to produce it at all. The Soviets rocked the world with a nuclear explosion in about three years.

Gen. White said that this knowledge is evidence of the modern technology of the Soviets and the advances which are being made by them.

America's answer to this growing Red threat lies in "Power for Peace," he said, and this power lies in having forces in being and in developing superior weapons systems which will keep the United States ahead of the enemy.

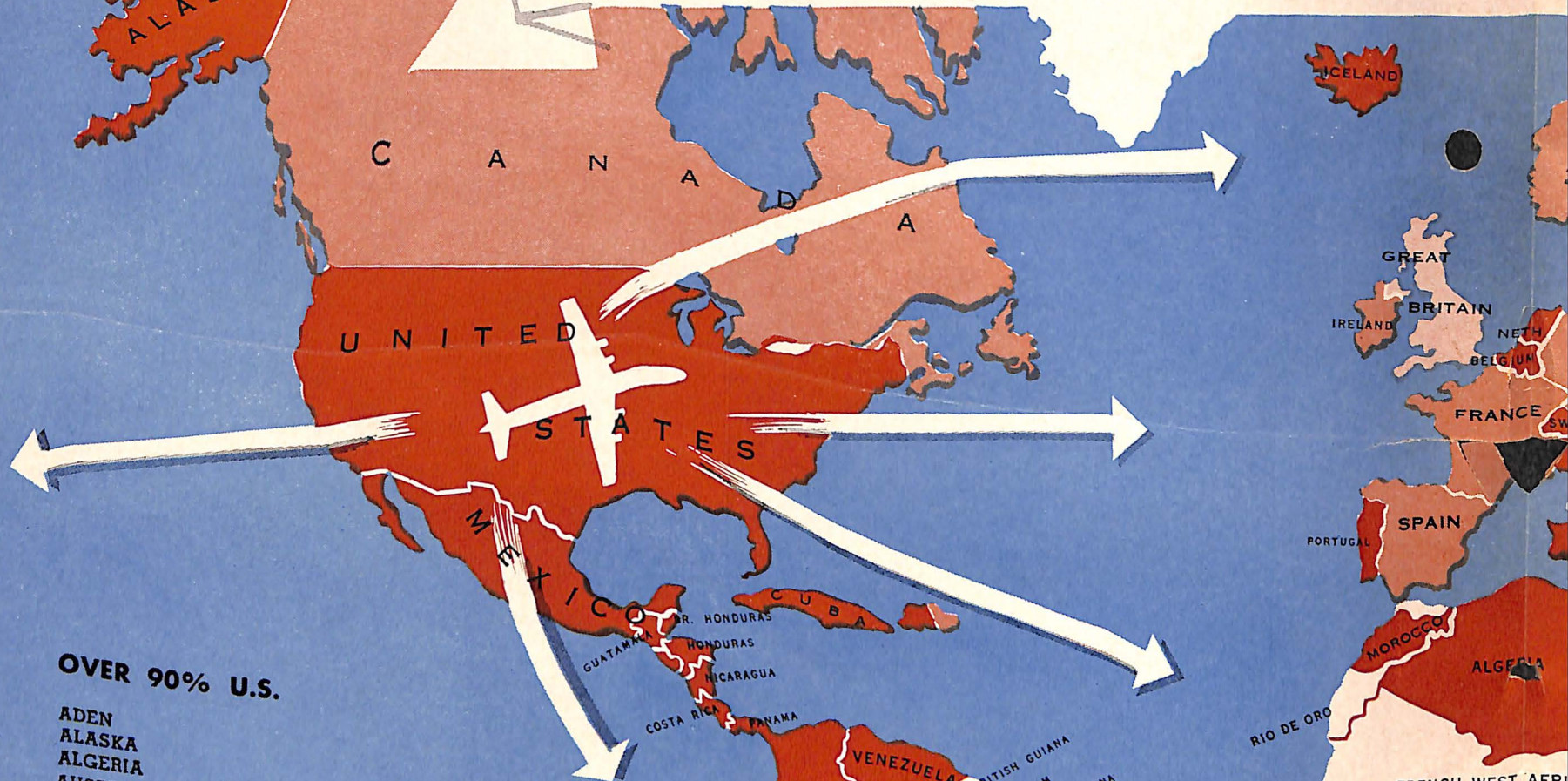
No Competition

Of the problems that confront United States aircraft engine designers and engineers, one of the most critical is weight.

It is easy to imagine the relief, then, of the design engineer of one aircraft engine builder who on a recent vacation trip visited huge Boulder Dam in Arizona and observed a small metal plate attached to the lower section of a several-story-high turbine weighing hundreds of tons.

The plate was inscribed: "This turbine is not licensed for installation in aircraft."

U.S. Aircraft Domina



OVER 90% U.S.

- ADEN
- ALASKA
- ALGERIA
- AUSTRALIA
- BELGIUM
- BELGIAN CONGO
- BOLIVIA
- BR. HONDURAS
- BRAZIL
- CEYLON
- COLOMBIA
- COSTA RICA
- CUBA
- CYPRUS
- ETHIOPIA
- FINLAND
- FORMOSA
- GREECE
- GUATEMALA
- HAINAN
- HONDURAS
- ICELAND
- ISRAEL
- ITALY
- JAPAN
- MEXICO
- MOROCCO
- NETHERLANDS
- NICARAGUA
- PAKISTAN
- PANAMA
- PHILIPPINES
- PORTUGAL
- SWITZERLAND
- TURKEY
- UNION SO. AFRICA
- UNITED STATES
- VENEZUELA
- YUGOSLAVIA

OVER 50% U.S.

- ANGOLA
- ARGENTINA
- BURMA
- CANADA
- CHILE
- ECUADOR
- FRANCE
- INDIA
- INDONESIA
- IRAN
- IRELAND
- KENYA
- LEBANON
- LIBERIA
- LIBYA
- MALAYA
- MOZAMBIQUE
- NEW ZEALAND
- NORWAY
- PARAGUAY
- PERU
- SAUDI ARABIA
- SIAM
- SPAIN
- SWEDEN
- VIET-NAM

OVER 20% U.S.

- GREAT BRITAIN
- RHODESIA



ate World's Airlines



If you should travel around the world by air, using the airlines of each country traversed, the chances are at least 10 to 1 that you would be flying on American-built commercial airliners. That is as true today as it was at the inception of international air travel in 1927, when America took a long lead in the export of commercial aircraft. This map illustrates the extent of U. S. domination of these world markets. No other nation has yet been able to match this country's combination of low seat-mile and ton-mile operating costs as a function of superior design, and low unit cost through quantity production know-how.



Source: IATA and Aircraft Industries Association

PLANES

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The purpose of *Planes* is to:

Foster a better public understanding of Air Power and the requirements essential to preservation of American leadership in the air;
Illustrate and explain the special problems of the aircraft industry and its vital role in our national security.

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Sharing The Load

By Admiral DeWitt C. Ramsey (USN-Ret.)
President, Aircraft Industries Association

The aircraft industry, perhaps more than any other, is largely dependent on allied industry in meeting the widely-fluctuating assignments given it in peace, limited emergency and in war. Even in relative tranquility, aircraft manufacturers lean more heavily on suppliers and sub-contractors than do consumer industries, which have predictable production schedules and are much inclined to maintain their own operations. Under emergency situations, the percentage of contract dollars which go to other manufacturers and suppliers soars to high figures.

This is well illustrated by a survey, just completed by the Aircraft Industries Association, of sub-contracting and supplying within 35 companies of the aircraft industry during 1954. This survey shows clearly that outside businesses, and especially small businesses (those which employ fewer than 500 people), have received more than half the dollars paid out by the prime contractors during the year, exclusive of taxes. Thus, with the aircraft industry operating at a fairly high level of production in the last five years, sub-contractor and supplier participation has increased largely as a result.

The AIA survey covered 35 major aircraft companies—including 20 airframe, 8 aircraft engine and 7 large component and accessory manufacturers.

These companies reported total fiscal year disbursements, excluding taxes, of \$8,744,270,000. Of this amount, \$4,759,320,000 (54 per cent) was paid for services and products received from some 50,000 suppliers and sub-contractors throughout the United States and in 18 friendly foreign nations. The remaining \$3.9 billion (46 per cent) was spent for wages, plant operation, reinvestment in the business and dividends to stockholders.

Small business firms, the analysis shows, comprise 83 per cent of the suppliers and sub-contractors whose products were purchased by the industry.

Small businesses were paid \$2,030,000,000 by the aircraft industry directly, for parts, equipment, components, and supplies. But an additional estimated \$1 billion was channeled to these same firms through second, third and fourth-tier supply and sub-contracting activities and through prime government contracts. So small business actually received more than \$3 billion in business from the aircraft industry in 1954. It is interesting to note, too, that many small businesses which received contracts from the aircraft companies promptly became large businesses.

The fact that 83 per cent of the nation's 50,000 aircraft suppliers and sub-contractors are small business firms comes as no surprise to the industry. The signal achievement of the aircraft industry during World War II in producing the greatest aerial armada the world has ever known is a case in point. This production record was not achieved solely by a few big airframe and engine manufacturers. It was the joint effort of all—the big and the small—that produced 96,000 military aircraft in one year.

That picture has not changed. Absolutely vital, of course, is the basic aircraft industry—the large prime contractors with their management, scientific, engineering, technical and manufacturing capabilities and resources. They cannot undertake their producing responsibility alone. They must have help from other industry in direct proportion to the magnitude of their own commitments.

But increasing complexity in modern military aircraft has brought new problems in the utilization of outside industry. The mounting performance requirements, the engines of tremendous power, electronics detection, guidance, communications and fire control systems, and heating, cooling and pressurization necessities, now demand close-tolerance work of the highest quality. Much of this work can be performed only by a limited number of experienced primary and secondary producers.

Outside industry, large and small, is necessarily geared to the fortunes of the aircraft industry insofar as aircraft work is concerned. In periods of emergency, when extreme demands are placed on the aircraft manufacturer, it is normal procedure to place more and more work with allied industry. When aircraft production is low, it is natural that less work is placed on the outside. Much that would be so farmed out in peak periods is done by the prime contractors in order to make maximum use of their costly facilities and to hold together their engineering and production teams, which are vital to the security of the country.

PLANE VIEWS

FROM HOT TO COLD
IN A HUNDREDTH OF A SECOND

A TINY DEVICE - SMALLER THAN A MAN'S HAND - USED IN A MIDGET COOLING TURBINE DROPS TEMPERATURES HUNDREDS OF DEGREES

JET ENGINE COOLING THE VOLCANIC TO BE USED FOR AIR-PLANE...

FLOOR SPACE USED IN PRODUCTION OF ONE OF THE LATEST AIR TRANSPORTS BY ONE U.S. AIRCRAFT COMPANY WOULD ACCOMMODATE

FUEL ALONE CARRIED BY A MODERN JET BOMBER WEIGHS MORE THAN A FULLY LOADED WORLD WAR II B-17 BOMBER!

20 BATTLESHIPS 69 SUBMARINES 24 PT BOATS

PLANES

Company Research Cut Plane Costs

The thousands of miles that will be flown by America's future supersonic fighting plane has been shrunk, temporarily, to a 20-foot high, air refueling laboratory, made to simulate a flying altitude of 10 miles.

The laboratory, part of a \$2.5 million aeronautical research installation, is a typical development of one major aircraft company to economically and efficiently insure qualitative superiority of American aircraft.

As the full-scale model plane is "flown," researchers record temperatures and pressures at 25 key locations as fuel is taken aboard at several hundred gallons a minute. By rolling and pitching the plane and varying the temperature and pressure in its fuel system, engineers can set up mid-air refueling conditions existing in various climates at altitudes up to 50,000 feet.

Intricate plumbing enables these planes to take aboard several hundred gallons of fuel a minute and distribute it from one intake connection to a great many tanks of various sizes all over the airplane. The speed of this operation enables all the tanks to become filled at about the same instant—thus, saving fuel and cutting the time needed for a refueling rendezvous by a flight of planes—during which they might be vulnerable to enemy action.

Air Travel Revenues Top Railroads'

(Continued from page 1)

to the fine quality of the transport aircraft produced by the U. S. aircraft industry. The transportation achievements of the past few years have been made possible only through the intelligent cooperative efforts of both the aircraft manufacturers and the airlines. The aircraft operated by the airlines are increasingly fast and dependable—and the record-breaking safety records of recent years speak for themselves.

Today, the aircraft industry represents a blend of many technologies. There is hardly a science or a craft upon which it does not draw. Its manufacturing skills have been sifted from generation after generation of inventive men of science and engineering concerned only with building a better, more useful product.

The trend continues toward more complete and highly perfected tooling and methods of manufacture to meet the demands of the advanced designs of aircraft, their engines and equipment. The genius of the aircraft industry has provided the airplane pilot with a wealth of mechanical and electronic aids in order to simplify and ease the pilot's task of flight control and to insure the safety, comfort and well being of his passengers.