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# planes

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## NEW PLANES BOLSTER AMERICAN AIR POWER

### AIR POWER SAVES MAN POWER



"We have found that one helicopter can move 7 tons of supplies in one hour over a piece of terrain such that it would have taken about 400 laborers something like 16 hours to do the same job."

Assistant Secretary of the Navy for Air James H. Smith, Jr.

Source: Aircraft Industries Association

'PLANES'

## 6 Out of 7 Planes Used by Airlines Of World Are Produced in America

If you take a trip by airline anywhere in the free world, the chances are better than 6 out of 7 that you'll travel on a plane built in the United States.

A recent survey of 67 airlines in 43 different countries reveals that more than 86 per cent of the transports they use were produced by the United States aircraft industry.

### Covers IATA Members

The survey covers equipment operated in 1953 by members of the International Air Transport Association. These IATA members in 1953 carried 76 per cent of the world's scheduled airline passengers, flew 88 per cent of the scheduled passenger miles, 75 per cent of the world's air cargo, and 92 per cent of

### Training Pays Off

At a major aircraft company last year, more than 6,000 employees attended off-hour training courses and received approximately 300,000 hours of training.

The company reports that this training pays off. During the same years 23,000 employees were advanced in grade and rate of pay, increasing their wages nearly \$5,000,000.

the air mail.

The survey shows that 2,108 of 2,441 airliners operated by the 67 airlines are of U. S. design, compared with 333 built in other countries. (In 1952, a similar survey covering 64 airlines showed 1,998 planes of U. S. design and 309 planes of foreign design. The new figures represent an increase of 110 U.S.-produced planes and 34 planes built by all other foreign nations.)

### Nations Use U.S. Planes

Of the aircraft listed for IATA members in the 43 countries, the following nations have fleets 100 per cent equipped with U.S.-built planes:

Brazil, Ceylon, Colombia, Cuba, Cyprus, Finland, Greece, Iceland, India, Israel, Italy, Japan, Mexico, Venezuela, the United States, Portugal, and Yugoslavia.

The percentage of U.S. equipment in IATA members' operating fleets in other nations is as follows:

Holland 98 per cent; Chile 94 per cent; Belgium 94 per cent; Union of South Africa 93 per cent; Canada 91 per cent (including 23 aircraft of U.S. design produced in Canada); Philippine Islands 91 per cent; Switzerland 90 per cent.

(See WORLD, page 2)

## Aircraft Producers See Mounting Need For New Engineers

Despite the fact that the U.S. aircraft industry today is believed to be the largest manufacturing employer of engineers in the nation, continuing shortages of these highly trained specialists are reported by almost every major plane producer.

With an estimated 73,000 engineers at work in the industry, there is a constant need for additional engineers in all categories.

Primarily responsible for the current shortage of qualified engineers is the fact that mounting complexity and performance requirements have led to tremendous increases in engineering effort that must go into both new and production models.

For example, the first production model of a typical new jet required 1,340,000 engineering manhours up to first flight, compared with 110,000 up to the same point for a World War II fighter built by the same manufacturer.

It has been estimated that 150 times as much engineering talent is required by a typical aircraft manufacturer today as was needed by the average manufacturer in 1927, the year that Charles A. Lindbergh flew the Atlantic.

## Aircraft Industry Geared to Produce For U.S. Defense

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

The United States aircraft industry is better able today to fulfill the nation's requirements for military aircraft than at any time since the cessation of hostilities in World War II.

As a result of the Korean build-up and a program which calls for a state of readiness in "an age of peril," the industry has been able to bring into production military aircraft of the highest quality, and to press development of revolutionary types upon which our national security will rely in future years.

Equally important, we have reached a position from which aircraft production could be expanded rapidly in event of extreme emergency.

### Goals Set for '57

Although the nation's air arms will not reach their full scheduled strength or modernity until mid-1957, they are equipped today with aircraft of unprecedentedly high performance.

Every combat airplane now being built for the Air Force, for example, is jet-powered—and all USAF fighter wings already are completely equipped with jet planes. A number of supersonic models are in production, including a lightweight jet fighter capable of flying much faster than the speed of sound. Another jet fighter, the world's first known combat plane capable of supersonic level and climbing flight, is already being delivered to operational units.

### Building Advanced Bombers

Deliveries of long-range jet bombers continue at a high level. More than 1,000 six-jet medium bombers have been produced for the Air Force, and by the end of next year all Strategic Air Command medium bomber wings are scheduled to be equipped with these planes. To replace these planes eventually, the free world's first known supersonic bomber has recently been ordered into production.

Expanded production is also underway on a giant intercontinental jet bomber to replace the present USAF globe-girdling heavy bombers which are powered by a combination (See AIRCRAFT, page 3)

## PLANES

*Planes* is published by the Aircraft Industries Association of America, Inc., the national trade association of the manufacturers of military, transport, and personal aircraft, helicopters, flying missiles and their accessories, instruments and components.

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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## "Fustest with the Bestest"

Nathan Bedford Forrest's formula of "Fustest with the Mostest" has been a pretty good slogan for victory of ground armies through history. But "Fustest with the Bestest" fits the air armadas better.

The air battles of Europe and Asia proved time and again that quality is the prime asset of any air force. The Germans found that out. So did the Japanese. So did the North Koreans and Chinese more recently. Ask any air commander and he will tell you that he would rather have one flight of higher-performance, tougher, more returnable airplanes than a squadron of lesser quality. And the loud "amen" comes from the men who fly them.

That is why every aircraft manufacturer in the United States today is more jealous of the quality of his product than anything else he builds into it. Not the tiniest effort is spared that would contribute one small advantage in quality, and this painstaking, highly-organized application is paying off for the nation, not only in better airplanes but in manufacturing economies as well. The industry calls it Quality Control.

Every aircraft manufacturer in the United States today has a system of quality control. Within the manufacturing plants are highly skilled technicians who carefully check and recheck the work being done at each stage in the production line. At any time, a particular part or component may be rejected if it does not fall into the specified pattern of quality.

As an example, a typical plant has a total of nearly 1,000 men who are constantly on the alert for substandard materials and craftsmanship. The company spends \$5.5-million a year in this one plant to assure that highest quality is built into each airplane. No more productive investment has the company ever made.

The problem of quality control is approached through three sub-departments. The first is the process control department. Its staff has the know-how to take engineers' drawings and determine how to form sheets of metal to difficult contours without compromising material strength; or how to heat-treat large pieces of highly tempered steels evenly to increase their reliability; or how to drill holes at tolerances of two ten-thousandths of an inch.

The second is known as quality control administration. Here are formulated the directives which assure that the processes worked out by the process control department are complied with.

And third is the inspection department, staffed by experts who do the actual measuring and testing—making positive that quality is built-in.

Another typical company reports that since installation of a new system of quality control in November of last year, re-work in the plants has been cut 35 per cent, saving thousands of dollars and man hours. By employing set quality standard procedures, unacceptable work is pinpointed at its source, whether it is in the material, the milling, the machinery, or even in welding or soldering.

This control of quality from the first through the final stage of production is assurance that America is getting the most air power for every dollar expended. It is assurance that American pilots will return safely after their missions have been accomplished.

The aircraft industry, as well as the military forces, is well aware that we must be prepared at any hour an attack might occur—not only with forces in-being and in-readiness, but with forces of the best quality we are capable of building.

It is on this built-in quality that so much future history depends.

## PLANE VIEWS

### POWER

ONE HEAVY BOMBER HAS AS MUCH POWER AS NINE LOCOMOTIVES



A HIT BY ANY ONE OF 104 ROCKETS CARRIED BY A NEW USAF INTERCEPTOR CAN DESTROY THE BIGGEST BOMBER EVER BUILT!

### WIND

WHISTLING OVER WINGS AND FUSELAGE OF PLANES AT TODAY'S TOP MILITARY SPEEDS IS 10 TO 12 TIMES GREATER THAN ANY HURRICANE EVER RECORDED...



by Aircraft Industries Association

## World Airlines Using U.S.-Built Airliners In Larger Numbers

(Continued from page 1)

Argentina 85 per cent; Malaya 85 per cent; Australia 84 per cent; Sweden 83 per cent; France 80 per cent; Indonesia 77 per cent; Eire 75 per cent; Lebanon 71 per cent; Kenya 63 per cent; New Zealand 59 per cent; Portuguese West Africa 59 per cent; Spain 57 per cent; Vietnam, Indochina 55 per cent; England 48 per cent (including 22 planes of U.S. design produced in Canada); Mozambique 32 per cent; Southern Rhodesia 29 per cent; and Egypt 9 per cent.

Only two countries listed by the International Air Transport Association do not operate any U.S. aircraft on their scheduled airlines: Iraq and Nigeria.

## Air Safety Demonstrated By Korean War Air Lift

Recent figures show that the Pacific Air Lift during the Korean War was a convincing demonstration of the safety of air transportation.

During three years, the air lift planes flew 110,000,000 miles (equal to 4,417 times around the earth) with only one serious accident.

The air lift carried 277,909 passengers and 108,725,750 pounds of supplies to Korea.

## PLANE FACTS

- A new automatic electrical system for high performance aircraft eliminates at least 10 pilot functions—and requires no manual switching. It sharply cuts time needed by the pilot to get in the air once he climbs in the cockpit.
- A record 29,939 useful suggestions by employees were adopted by the management of a major aircraft engine company during 1953. These suggestions were received under an employee-incentive program, which gives cash awards for ideas that lead to product improvement, reduced costs, increased safety, or new products.
- The \$1,400,000 weekly payroll of a single Southern aircraft plant goes to employees in 38 different counties.
- More than 7,800 persons are employed at LaGuardia Airport in New York. Annual payroll is \$36-million.
- Insulated electric wire in a modern transport would stretch 16-miles.
- The smallest of 569 forgings and castings used in one jet fighter is the size of a pack of king-sized cigarettes. The largest is 10-feet long, and shaped like an over-grown hockey stick.

## BUILDING AMERICA'S SECURITY



For every jet airplane delivered to the U.S. military forces each day in 1949, America's aircraft industry is delivering five today.

In 1949, the U.S. Air Force had no jet bomber wings. Today's medium bomber wings are almost completely jet equipped and all of the Air force fighter wings have been converted to jet propulsion.

'PLANES'

Source: AIA estimates

## Aircraft Industry Building New Types Of Planes to Bolster U. S. Air Power

(Continued from page 1)

of piston and jet engines.

In production of Naval aircraft, progress has been equally rapid. All Navy fighters now in production are powered by jets, with many of the new carrier aircraft capable of delivering nuclear weapons. In recent months, a bantam-sized jet attack plane capable of carrying atomic bombs has been ordered into production along with at least two new supersonic Naval fighters.

To propel future Air Force and Navy planes, we are developing a variety of engines with power output ranging up to almost 25,000 pounds of thrust.

As the industry creates newer and better aircraft, these planes in turn must be produced in sufficient quantity to enable our combat forces to maintain their present qualitative superiority in equipment.

### USSR Capabilities

We recognize, of course, that the United States is not the only nation in possession of thermonuclear weapons, intercontinental bombers, and other highly advanced military aircraft. Neither are we the only nation possessing the skills and capacity for developing even more startling aeronautical equipment.

Our early estimates of Soviet technological capabilities apparently far underrated their true capaci-

### Flying on the Ground

When an Air Force installation recently completed 100,000 hours of training in a flight simulator, it was determined that this ground training was the equivalent to flying 15 million miles at 150 miles per hour in a twin-engined transport type aircraft.

That's equal to about 600 times around the world.

The flight simulator duplicates flying problems on the ground.

ties. Recent advances made by the Russians in the aeronautical and allied fields have brought a full awareness that any slackening of effort, any diminishment in the pace of research and development, could well serve to forfeit our present lead in air power.

### Must Keep Superiority

The Assistant Secretary of the Air Force for Materiel, Mr. Roger Lewis, has emphasized the need for a healthy aircraft industry, for continuing research and development, and for a level of production sufficient to keep our forces modern:

"We must continually work to insure that tomorrow's weapons will be ready for tomorrow's possible war," he said. "After we have built the strength we need, our requirements for equipment will decrease sharply and we will then have to switch from a period of growth to one in which we sustain our force and keep it modern. . . ."

### Need Healthy Industry

Mr. Lewis added that "we are determined to preserve—and we must have the support of Congress in maintaining—a healthy aircraft industry, competent constantly to invent and develop new weapons, broadly dispersed and capable of immediate expansion. The price is not too great. Certainly the cost to date of regaining our strength would have been far less had we not had to rebuild in 1950 the aircraft industry we destroyed in 1945."

The security of the free world today depends, in large measure, on the superiority of American aircraft and American air power. The best assurance that this superiority will be maintained is this nation's announced intent that it will continue an adequate and stable level of production, backed by intensive research and development, through the critical years which lie ahead.

## Field Representatives Of Aircraft Industry Perform Key Roles

To increase performance and capability of today's military planes, several thousand American civilians at U.S. military air bases throughout the world serve as aeronautical trouble-shooters and as the eyes and ears of the aircraft industry.

A recent survey of approximately 35 airframe, engine and accessory companies reveals that they have a total of 2,547 field service representatives, 397 of them overseas.

### Work with Military

Although they are civilian aircraft employees, these technical representatives work closely with military personnel—both in peace and in war. They feed a constant stream of technical information based on actual operational or combat experiences to their companies.

At the same time, they serve as technical advisors to the military services. They assist in bringing the latest information and technical data to the attention of depot personnel and often they locate in the depots spare parts which would otherwise be overlooked. Their rush calls to the factory frequently result in the airlift of urgently needed parts or special tools to the men at the far end of the line.

### Mobility Is Asset

A particular asset of the technical representatives is their mobility, enabling companies to shift them rapidly to assist the services, to collect information, or to correlate data wherever their services are most urgently needed.

Assistant Secretary of the Air Force Roger Lewis has called them "a valuable link" and "worth their weight in gold" in the transmission of "late information from a factory to the field" and also in transmitting "important suggestions aimed at producing improvement from the field to the factory."

## Air Traffic Jumps As Small Airlines Give Vital Service

Many Americans have never heard the names of some of the nation's 14 local service airlines, but last year these small air carriers flew the equivalent of more than 1,830 trips around the world.

### Started After WW II

These local carriers—small airlines that feed into the larger terminals—came into being after the end of World War II, and in the last six years their commercial revenue and the number of commercial passengers carried has jumped nearly 500 per cent.

For example, in 1948, three years after the original local service carrier certificate was awarded by the Civil Aeronautics Board, 425,695 passengers were carried. Last year almost two million passengers did their flying aboard fast, twin-engined local service planes.

### Serve 440 Cities

These lines today serve 440 cities in 42 states, and 260 of these cities receive their only air service from the local carriers. Many of the passengers rely on the local lines to get them to hub cities where they can board the planes of the trunk airlines which criss-cross the nation.

Although the flights of these carriers average a landing every 74 miles (compared to an average of 234 miles for trunk lines) they flew over 45.7 million plane-miles in 1953.

Forming an important air transportation link which would be vitally needed if there should be another war, these airlines operate a fleet of 160 multi-engined planes which could be used to transport troops in an emergency.

### Exclusive Service

One of their more important contributions is the exclusive service they provide in many sections of the country. In the State of Washington, for instance, 20 of the 26 cities which have airline service depend entirely on the service offered by the local carrier.

By using the local airlines, passengers have the benefit of all-the-way air travel between most of the major cities of the nation, completing a link that was missing in the nation's transportation system for many years.

## Suppliers in 34 States Help Build Big Bomber

A recent study shows that 1,868 large and small business firms, located in 34 different states, supply parts, materials and services going into a late-model jet bomber.

Three-fourths of these firms are small businesses—with less than 500 employees.

On an overall basis, the manufacturer reports, approximately 60 per cent of total Air Force procurement funds assigned to the company for jet aircraft production are devoted to suppliers who furnish raw materials, parts and assemblies.

## Air Quotes

"The maintenance of a steady level of aircraft production is important under any conditions, but it is crucial when our military plans are focused on the long pull. In these circumstances, we cannot tolerate sharp expansions and contractions in the aircraft manufacturing industry since we may have to call on it for all-out production at any time during a long period of uneasy peace. I need not stress the fact that by so stabilizing the aircraft manufacturing industry we are laying the foundation for efficient production and decreasing costs to the Government."—Senator Leverett Saltonstall (R. Mass.), July 28, 1954.



may have to call on it for all-out production at any time during a long period of uneasy peace. I need not stress the fact that by so stabilizing the aircraft manufacturing industry we are laying the foundation for efficient production and decreasing costs to the Government."—Senator Leverett Saltonstall (R. Mass.), July 28, 1954.

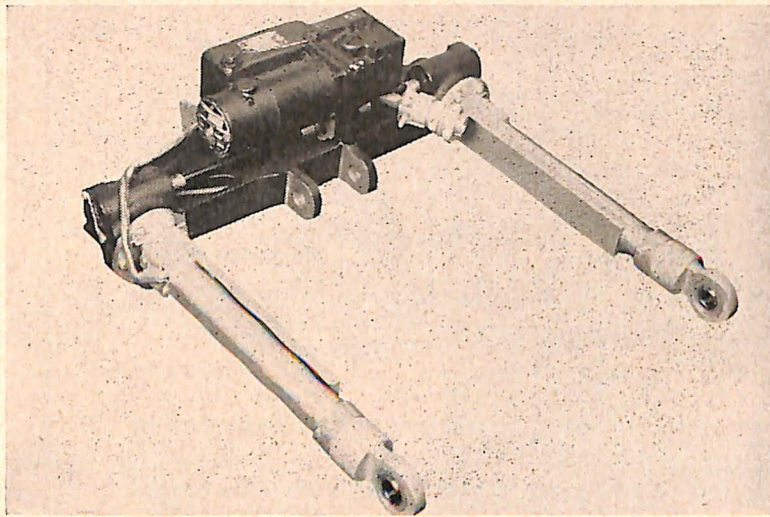
### New Fuel Test Facility Can Outpump 1,400 Gas Stations

To check fuel functions of new aircraft, a major aircraft plant has installed a Fuel System Test facility that has the pumping capacity of 1,400 service stations.

With the new facility, tests are conducted on the complete fuel system, fuel tank vent system, fuel tank pressure regulators, and fuel measuring systems.

The new facility will enable tests at 130 degrees to minus-85 degrees fahrenheit, and at altitudes up to 80,000 feet. The installation cost \$750,000.

## Pilot Safety Depends on Tiny Device That Can Take a Heavyweight Wallop



You could support the full weight of 35 Cadillac automobiles if you were as strong for your size as the 8½-pound aircraft seat actuator pictured above.

At today's high jet speeds, pilots can bail out safely only by being "shot" out of the cockpits in their seats.

An 8½-pound seat actuator (pictured above) has to be able to take the force of the explosion, remaining intact, and take the seat and pilot with it out of the plane under the explosive force of the ejection.

To do the job, the actuator must be able to withstand a 10,000-pound load (equal to the weight of two Cadillacs) without failing. With the same weight to strength relationship, you could support about 35 Cadillacs.

In routine flight, the actuator's job is to raise and lower the pilot's seat, so he can have maximum visibility when landing or flying in combat, and greater comfort on long flights.

Rigorous tests insure that the actuator does the best possible job. It goes through environmental tests (for example, withstanding fungus such as exist in damp climate, corrosive action of salt spray, and attacks of sand and dust). It also must pass other tests, including prolonged submission to vibration, high altitudes, and extreme temperatures.

The infinite care in engineering, production, and testing which goes into this small component is typical of that required for all parts and accessories of modern high-speed aircraft. The payoff for painstaking manufacturing procedures is the rugged dependability and top performance of today's military and civilian aircraft.

## Aircraft Workers Get Higher Wages Than U.S. Average

The average aircraft worker in the United States today earns \$953 more per year than he did in July, 1950, when the Korean War started.

And he earns \$726 more per year than the average U.S. manufacturing employee.

### Wage Increases Since '50

The aircraft worker's higher earnings resulting from wage increases granted by the industry in the past four years account for one-fifth (\$765.9-million) of the industry's estimated \$3.54-billion payroll for 1954. (These figures do not include "fringe" benefits such as free insurance, paid holidays, vacations, social security, workmen's compensation, counseling services, medical care, and others.)

### Monthly Payroll Jumps

The combination of increased wages and higher employment has resulted in a sharp rise in aircraft payroll dollars funneled into the national economy. With 265,400 persons employed at the outbreak of the Korean War, total monthly payroll for U.S. plane builders amounted to approximately \$76.5-million. Today, with more than 803,000 employees, the industry's monthly payroll is approximately \$295.5-million.

In mid-1950, the average annual earnings for aircraft workers were \$3,450, compared with \$4,413 today. In this same period, average weekly earnings for aircraft workers rose \$18.32 while the average for all manufacturing industries went up only \$11.71.

Average annual employment in the industry since the Korean buildup began: 281,800 for 1950; 463,600 for 1951, 641,600 for 1952, 790,300 for 1953, and approximately 803,700 today.

### 24 Times Around World Before Major Overhaul

A jet engine recently powered an Air Force plane the equivalent of 24 times around the world without a major overhaul.

Its manufacturer estimates that, using a conservative 435-m.p.h. as an average ground speed, the engine powered a plane well over half a million miles through the air.

As a result of continuous engineering improvements and precision manufacturing, time between major overhauls on new jet engines is continually increasing. Only a few years ago, 150 hours was considered excellent for this particular type engine.

This new record of 1,400 hours is equal to 59 continuous days and nights without landing.

Reports the builder: "If you estimate an average fuel flow per hour of 280 gallons, it follows that the fuel metered through the engine in this case was equal in quantity to enough gasoline for a family auto to be driven more than seven million miles at 18 miles to the gallon."

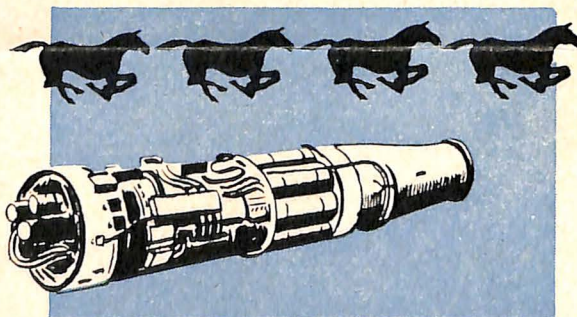
## MORE POWER PER POUND

### WORLD WAR II



$\frac{2}{3}$  HORSEPOWER PER POUND

### TODAY



4 HORSEPOWER PER POUND

The engines which powered America's military aircraft at speeds in the neighborhood of 400 m.p.h. in World War II produced one horsepower for every pound-and-a-half of engine weight.

But, as the result of advanced research, engineering and manufacturing techniques, some of today's fighter aircraft—which travel through the air in level flight at speeds faster than sound—are powered by jet engines which weigh less than four ounces for every horsepower produced.