



September 1954

Vol. 10, No. 8

planes

OFFICIAL PUBLICATION OF THE AIRCRAFT INDUSTRIES ASSOCIATION OF AMERICA

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AIRLINES CAPTURING U.S. TRAVEL MARKET

All USAF Fighters In Combat Wings Now Jet-Powered

Every fighter plane in combat units of the United States Air Force today is a jet.

Four thousand of these modern, high-speed jets are organized in more than 50 fighter wings — standing ready to defend America at an instant's notice. Other hundreds of Air Force jet fighters are assigned to the Air Training Command, the Air Materiel Command, the Proving Ground Command, and the Air Research and Development Command.

Guard Wings Have Jets

Moreover, 23 Air National Guard fighter wings (virtually entirely jet-equipped) add to the USAF's first-line jet fighter strength.

For some months, 100 per cent of the fighters produced by the U.S. aircraft industry have been jet-powered. The last Navy piston-engined fighter produced by the industry rolled off the production line last January, and Navy air units are rapidly being converted to jets. The last Air Force piston-engined fighter was built in 1949.

Advanced Types Being Built

As production of the latest U.S. jet fighters continues, earlier model jets now in operational fighter units are being replaced by atomic-age jets. These newest jets are far more complex, more deadly—and as a result, more costly—than their reciprocating-engined predecessors. But the infinite precision and effort which goes into their creation has paid great dividends.

Every new jet fighter now being (See NEWEST JET, page 2)

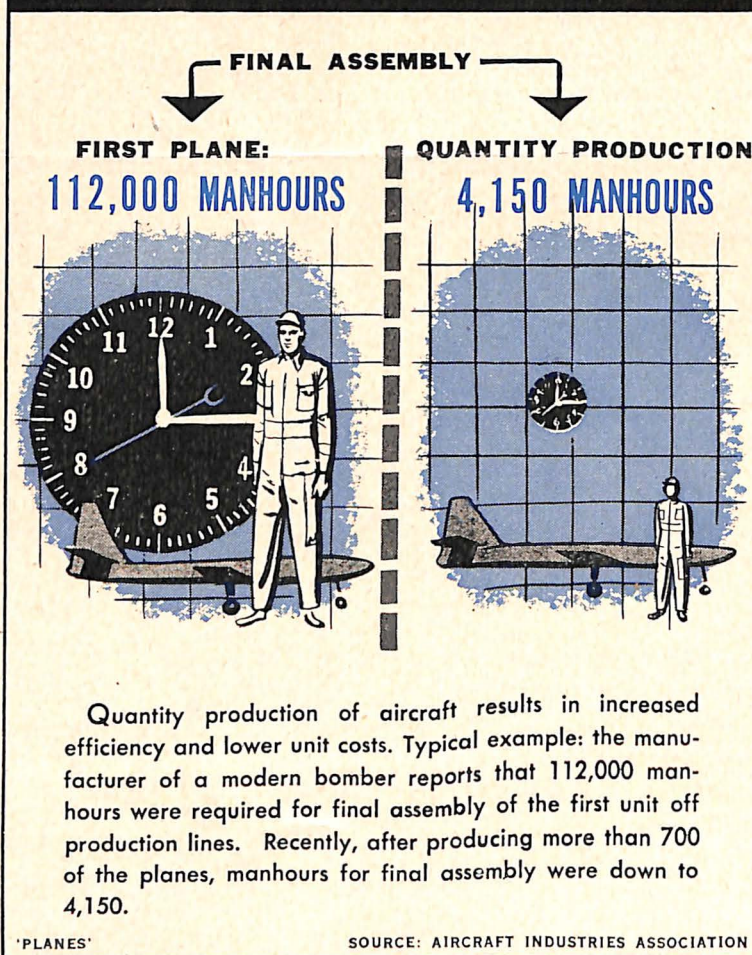
Aircraft Industry's Record Of Safety Rises in 1954

Aircraft plants have always been a safe place to work—but latest figures show that the industry's safety record continues to get better.

For the first quarter of 1954, only 2.9 disabling injuries occurred in the industry for each one million manhours worked. This figure compares with 3.2 for the first quarter of 1953.

For all manufacturing industry, the first-quarter injury-frequency rate was 11.8. Only six of 127 manufacturing industries had better safety records than did the aircraft industry.

PRODUCTION EFFICIENCY



Air Traffic Boom Seen by Johnson In Next Decade

By Earl D. Johnson
President, Air Transport Association

Americans, along with the rest of the world, have adopted the airways as the prime means of long-range, high-speed transportation.

This revolution in transportation continues unabated, and the next years should bring further changes which may even overshadow those since World War II.

Already, the U. S. scheduled domestic and international airlines carry more passengers more passenger-miles in a single month than they carried during the entire year of 1940. It is estimated that by the end of the current calendar year the scheduled airlines will have flown about 34 million passengers approximately 19 billion passenger-miles—an increase of 9.7 per cent in passengers and 7.4 per cent in passenger-miles in a single year.

Sees Future Gains

Based on current trends in the common carrier traffic market, certain studies show U. S. airlines, in 1965, could well be carrying about 87 million passengers (well over half the present population of the U. S.) somewhere in the neighborhood of 27 billion passenger-miles each year (equivalent to more than one-and-a-third million trips around the world).

These studies reveal there will be an accompanying increase in mail and cargo between now and 1965, when the airlines should be carrying around 229,000,000 ton-miles of mail (up 138 per cent over 1953) and around 581,100,000 ton-miles of cargo (up 124 per cent over 1953).

Travelers Turn to Air

It is significant that today the airplane has captured the major portion of the first-class travel market, as more Americans turn each day to the advantages of safe, high-speed, economical air transportation. By the end of this year, seven out of every ten first-class travelers in the nation will be using the airlines. (During the first quarter of 1954, the scheduled domestic airlines carried more than 65 per cent of all first-class travelers.) More (See U.S. TRAVELERS, page 3)

American-Built Aircraft Now Operated In 103 Countries, AIA Survey Reveals

By John H. Payne, Director
Export Service, Aircraft Industries Association

Continued U.S. domination of the world aircraft market is indicated by recent studies showing that American-built civil aircraft are at work today in 103 countries of the world.

In the years 1947-1953, the U.S. aircraft industry exported 6,430 civil aircraft and 2,893 civil aircraft engines to these 103 countries.

The industry also exported thousands of military, cargo and used transport aircraft in the same period, but figures on unit shipments are not releasable because of military security.

Civil aeronautical exports alone, however, accounted for \$293.6-million of the industry's total \$2,534.4-million in exports during the seven years. (For the first five months of

1954, value of U.S civil aeronautical exports was \$45.8-million, compared with \$25.8-million for the same period in 1953.)

In 1947-1953, 418 transports were purchased by 48 nations at a total price of \$247,757,000. In addition, 311 helicopters with a value of \$12,406,000 were shipped to 44 different nations; and 5,701 utility airplanes valued at \$28,852,000 were shipped to 89 countries.

The United States' leading civil aviation customer was The Netherlands, with purchases of \$55,679,999 in the years 1947-1953. France was a close second, with purchases of \$43,795,708.

Leading customers for transports (See AMERICAN, 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.

Publication Office: 610 Shoreham Building, Washington 5, D. C.

New York Office: 350 Fifth Avenue, New York 1, New York.

Los Angeles Office: 7660 Beverly Boulevard, Los Angeles 36, California.

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Airplanes and Missiles

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

In recent weeks, the American people learned that an Air Force research plane has flown faster than 1,650 miles per hour, and reached a new altitude in excess of 90,000 feet. This plane, flying faster than the speed of a rifle bullet, knifed through space at the rate of more than one mile every 2 1/5 seconds.

Some months earlier, an American-built rocket reached speeds in the neighborhood of 5,000 miles per hour, and an altitude of some 1,300,000 feet.

These two achievements of products of the United States aircraft industry stemmed from intensive programs of research and development aimed at maintaining this nation's leadership in the air.

Such phenomenal accomplishments bring sharply into focus the fact that today the aircraft industry is developing aircraft and missiles which, while their genealogy can be traced back through the original Wright Flyer, are as different from early airplanes as modern man differs from the Neanderthal.

In addition to producing some 22 types of jet combat aircraft since World War II, the aircraft industry has placed increasing emphasis on the development of pilotless air weapons. Today, our manufacturers are at work on at least 26 different models of guided missiles. Every major aircraft and aircraft engine builder has teams of engineers and production specialists—representing thousands of man-years of experience in aeronautics—assigned to the resolution of problems arising in the design and development of guided missiles.

These weapons have been described variously as "push-button" planes, as guided missiles, as pilotless aircraft. But by whatever name they are known, their design, development and production must call upon the vast reservoir of experience in aeronautical and allied sciences which has been built up over the past half century by the aircraft industry.

Today, the Defense Department is spending as much money on guided missile research and development as on piloted aircraft research and development; and new discoveries are paving the way toward increased performance of aircraft and increased effectiveness of missiles.

The problems facing development of guided missiles are similar, in many respects, to those which stand in the way of continued performance increases in piloted aircraft. They include, for example, problems relating to guidance and control, the use of new materials, dependability, fuel economy, and electronics installations. Thus, the research and development efforts of the aircraft industry which are aimed either at aircraft or guided missiles are interrelated—and in many cases pay double dividends.

In the continuing conquest of the air, as represented by the modern supersonic fighting plane and the late-model missile, the engineering and production teams of the aircraft industry will play a vital part. The millions of manhours invested in development and production of these aircraft and missiles will yield a rich return in our pursuit of national security.

PLANE VIEWS



Newest Jet Fighters Carry Atomic Punch In Aerial Arsenal

(Continued from page 1)

built is capable of delivering atomic weapons. The world's first known fighter capable of flying faster than sound in level flight is expected to enter operational service before the end of this year.

And with fighter wings now completely jet-powered, the Air Force is equipping an increasingly large percentage of the nation's bomber striking force with long-ranging jet planes. By the end of next year, every medium bomb wing in the Strategic Air Command will be operating late-model six-jet supersonic bombers.

How Far Can You Travel In a Five-Year Period?

A typical plane operated by a U. S. international airline flew 3,000,000 miles (equal to 120 times around the world) in a five-year period.

The big four-engined transport carried 150,000 passengers, made 110 transpacific trips, and logged 13,000 hours in the air.

PLANE FACTS

- A non-scheduled airline last year flew 30 thoroughbred cattle from Seattle to Anchorage, Alaska. On the way, the airline fed and milked the cows—and employees even delivered a calf!
- A pit large enough for a five-room house was required to contain the bulk of machinery and center die mechanism of the world's largest stretch press, recently installed in a U. S. aircraft plant. The 750-ton capacity press weighs more than 400,000 pounds.
- A modern fighter plane sucks 132,000 cubic feet of air into its turbines every minute of flight. That's enough air to keep the average human being alive for nearly four months.
- A new USAF aerial camera for recording rocket and bomb strikes at low level by jet aircraft can take six photographs per second at shutter speeds as high as 1/2000th of a second.
- A modern intercontinental bomber has more reserve power than today's commercial transports use for their main propulsion systems.

Air Quotes

"The principal fact that we must all bring ourselves to face is just as simple as it is ominous. The simple but ominous fact is that the greatest nations on earth can now cripple or devastate each other from a distance. They are rapidly improving their ability to demolish everything through the air without waiting for a slow approach on land or sea.

"In recent years the development of the long-range airplane and the manufacture of increasingly powerful bombs have opened the interior of every nation to attack. Fortified boundaries no longer provide protection, nor do satellites, or allies, or mountains, or seas. Now it is true for nations, as it has been for individuals for the past 500 years, that the only guarantee against attack is the ability to strike back—to strike back so hard that the crime of aggression will bring nothing but defeat."—*Gen. Nathan F. Twining, Chief of Staff, USAF, June 15, 1954.*



American Leadership In World Air Market Indicated In Survey

(Continued from page 1)

were The Netherlands, which purchased 71 valued at \$55,195,000; France, which purchased 35 valued at \$39,926,000; and Belgium, which purchased 27, valued at \$14,807,000.

These transports ranged in size from 3,000 pounds up, with the majority over 30,000 pounds. Average cost per transport was slightly over \$592,000, with the larger, airline-type planes averaging slightly over \$1,000,000 each.

Seven members of the British Commonwealth of Nations (Australia, Bahamas, Canada, India, Union of South Africa, United Kingdom, and Pakistan) purchased 84 transports valued at \$49,172,000.

Canada led all other nations in the purchase of U.S.-produced helicopters, buying 62 valued at \$2,319,000. Argentina and France bought 33 helicopters each, at a price of \$1,535,000 and \$991,000 respectively; and Japan bought 21 valued at \$1,218,000. Average price for helicopters exported during the seven-year period was about \$40,000.

Largest customers for utility aircraft were Argentina, with 849 planes valued at \$2,650,000; Canada, with 793 planes valued at \$3,232,000; Brazil, with 791 planes valued at \$4,603,000; and Mexico with 587 planes valued at \$3,114,000. Average price per utility airplane was slightly over \$5,000.

U. S. TRAVELERS TURN TO AIRLINES

(Continued from page 1)

over, coach—or tourist—air traffic has also boomed since its inception in 1948. Last year, scheduled coach operations totalled 3,726,000,000 passenger-miles.

It is a bold man who will predict the future. However, predicated on the over-all traffic gains to date, plus the inherent dynamics of the industry itself, we believe that air transportation will account for about 40 per cent of domestic inter-city revenue passenger miles (rail, air and motor bus) by 1965. (This figure could be affected by the many factors which are tending to increase travel in this country.)

Military Air Travel

It is an indication of the trend toward air travel that the military services have, for reasons of efficiency and economy, emphasized the use of airlines for movement of military personnel. A little over five years ago, prior to 1949, only two per cent of the military establishment's official group movements of 15 or more individuals traveled by air. Today, *over half of all military group movements*, in that quantity,

are made by the airlines.

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

Airline Costs Rise

Despite the rapid growth of the scheduled airline industry, rising costs have kept the carriers from reflecting this growth in their profits. However, we believe that the manufacturers will improve aircraft to a point where we can lower our operational costs and thus continue to aid the growth of the air transport industry.

The estimates of air traffic rates through 1965 are based on the continued use of the most efficient and profitable piston aircraft now available, together with pure jets, turboprops, and helicopters when they

enter carrier operation. The latter types are certain to have a strong impact on the composition and utilization of airline fleets. By the late 1950's, pure jet transports should be operating on some long-haul transoceanic schedules—and later, transcontinentally as well. In the



Earl D. Johnson

A former Under Secretary and Assistant Secretary of the Army, Mr. Johnson became president of the Air Transport Association last February. He served in the Army Air Force in World War II, leaving the service as a colonel.

1960's, substantial numbers of helicopters should make their appearance on short route segments (up to stage lengths of 250 miles).

Great Impact on Economy

It is clear, beyond question, that the sharp rise in air transportation has contributed to increased business productiveness, an infusion of energy in the national economy, and to greater convenience and mobility for the nation's population.

The fact that these accomplishments have occurred over so short a span of years is an indication, I believe, of the even greater achievements in air commerce which we may expect in the future.

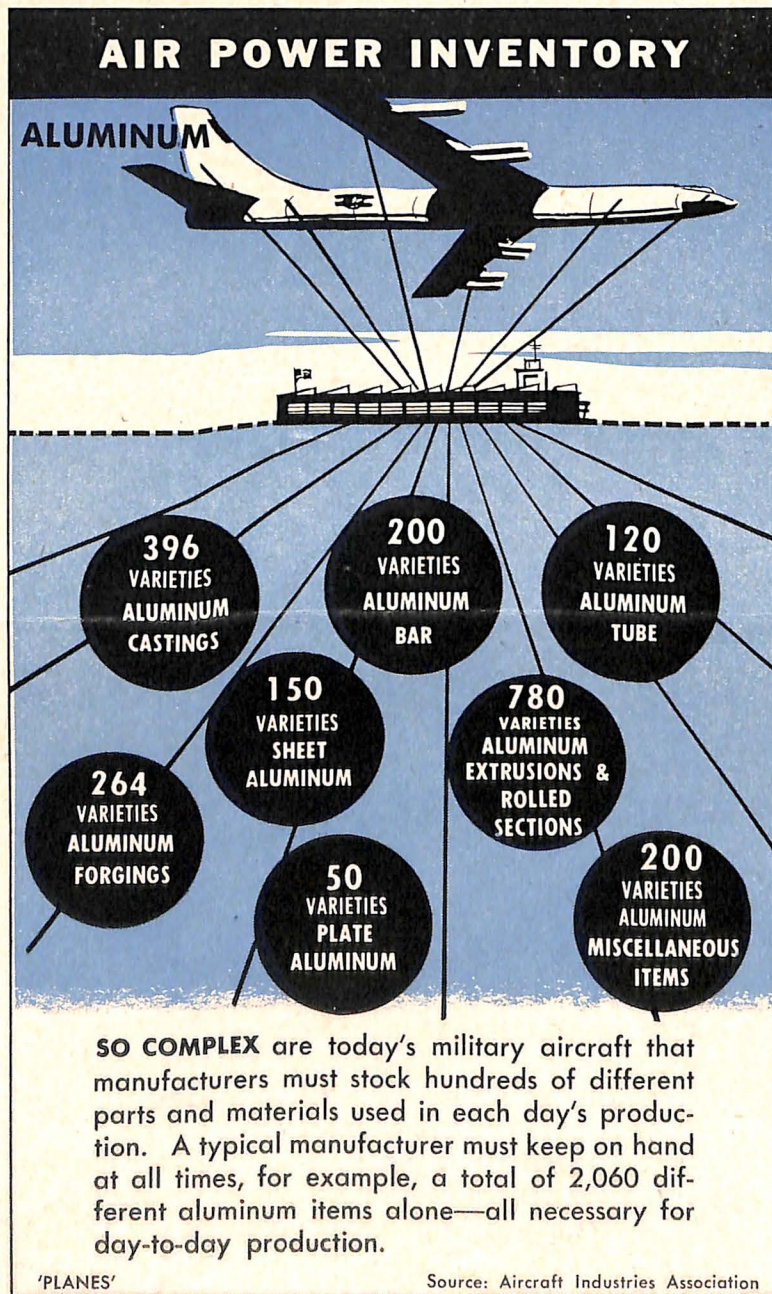
New Process Cuts Costs By \$300,000 Per Year

A new method for putting protective finish on non-clad aluminum alloys is expected to reduce a major aircraft manufacturer's costs by approximately \$300,000 per year.

Nine 80-foot tanks (eight for an alodine process, and the ninth for chromadizing) are used by the manufacturer. Two traveling cranes lift racks of parts (at times 100 or more to a rack) from tank-to-tank.

It takes about one hour to run non-clad aluminum alloys through the cost-saving alodine tanks. The chromadizing tank is used to clean Alclad parts and prepare them for painting.

The installation is believed to be the largest of its kind in the United States.



Six-Fold Hike in Helicopter Strength Due as Army Plans Big Air Expansion

The United States Army is due to have a new 3-D look by mid-1959. This third dimension will be one of altitude.

In a modernization program designed to bolster the Army's aviation strength over the next 57 months, plans call for a six-fold increase in Army helicopter strength. In addition, greatly increased numbers of light utility aircraft will go into service for artillery spotting, reconnaissance, command and courier missions, column control, transportation of Army supplies and units, medical evacuation and aerial photography.

Now Have 3,300 Aircraft

Experience in Korea and World War II already has resulted in establishment of a sizeable Army air service. Today, the Army operates 3,300 aircraft, with an additional 600 lightplanes assigned to the National Guard. These planes give the traditionally earthbound troops vastly improved mobility, freeing both men and equipment from the limitations of mud, mountains, morasses, and roads.

Emphasis will be placed on a build-up of Army helicopter strength, which now stands at less than 200. Under the present setup, most of the 200 helicopters are assigned to six Army transportation companies (each with 21 cargo and two utility 'copters), with the remaining rotorcraft distributed among the Army's 17 divisions.

1,200 'Copters by Mid-'59

By mid-1959, the Army's helicopter strength should rise to about 1,200. Twelve cargo battalions (36 companies) will account for 756 cargo and 72 utility helicopters. In addition, 26 to 28 helicopters and 16 fixed-wing aircraft will be assigned to each of the Army's divisions. And 16 non-divisional units (such as heavy, armored tank battalions and headquarters units) will also operate helicopters and fixed-wing aircraft in limited numbers.

The tremendous expansion of Army air strength was decided upon

Components Get Smaller As Aircraft Get Bigger

Modern supersonic aircraft are composed of thousands of parts and components — each manufactured with the precision of a fine watch.

Every inch of space and ounce of weight that can be cut from these components means increased performance.

Typical of achievements in the field of building smaller parts for bigger planes is one manufacturer's success in reducing by 35% the weight of an actuator, used to move ailerons and flaps on a fighter's wing. Weight of the new actuator is 31 ounces, compared with 41 ounces for the previous model.

The manufacturer has compiled over 700,000 research and development hours in this field alone, and has produced 419,773 actuating units.

after a survey of airplane and helicopter usage during World War II and the Korean War. In Korea, Army pilots flew close to 500,000 hours while on 140,000 combat missions of reconnaissance and artillery spotting. Many additional hours were logged on administrative flights.

In Korea, too, helicopters airlifted more than 16,000 casualties from the battle fields, and hundreds of troops and hundreds of tons of supplies were moved over difficult terrain and mountains in time-saving operations.

One commander said that his aircraft enabled him to "see more in less time than six skilled, but earthbound, observers distributed along the regimental front." Another commander said the use of one plane enabled him to "take 20 jeeps off the road for messenger service."

Subcontractor Purchases 2,800,000 Parts Monthly

A major aircraft subcontractor purchases more than 2,800,000 parts each month.

The purchases, ranging from beeswax to 15-ton machine tools, are made from industries in every section of the country—all contributors to America's air power buildup.

Total weight of the 2,800,000 parts is estimated at 350,000 pounds. These parts—an average of almost 140,000 per working day—are processed by the company's Material Control Department for distribution throughout the manufacturing organization.

WHY PLANES COST MORE

For a new aircraft, 18,000 separate and distinct types and kinds of materials are required.

Since 1925, weight of military aircraft has increased from 15 to 20 times.

More than 1,440,000 engineering manhours were required to bring a late-model fighter to the point of first flight.

Radar equipment alone in a modern night fighter weighs 1,100 pounds.

One modern heavy bomber contains 68,000 shop-made parts, not including bolts, nuts, rivets, engine parts or Government-furnished equipment.

During World War II, aircraft radio receivers had from six to 20 channels. Today, some receivers have over 1,000 channels.

Tolerances on tiny steel balls inside the bearings of modern aircraft must sometimes be one-tenth millionths of an inch.

Aircraft Factory Draws Workers from 149 Towns

The aircraft payroll at a typical Midwestern aircraft plant travels a long way—and is a vital factor in the economic life of two states.

A recent survey shows that the company's employees live in 149 towns—134 in Kansas and 15 in Oklahoma.

USAF Heavy Bomber, Now in Production, Conceived in 1946

How long does it take to create a modern bomber—from drawing board to production model?

With complex modern aircraft, incorporating new principles and new theories of design and propulsion, the lead-time may be as long as seven years. Of course, only a part of that time is required for actual manufacture of the plane—but years are required for design, for production of experimental models, and for testing and evaluation of the experimental models before actual production begins.

Plans Started in '46

A 350,000-pound heavy bomber, which recently entered production, was constructed from basic requirements set up by military planners in 1946—the year after World War II ended.

Six months later, the manufacturer was awarded a contract for engineering studies and preliminary design. In September, 1947, the first public announcement was made that two experimental bombers of this type had been ordered; and in November, 1951, the first of the two experimental planes emerged from the factory.

It was not until April, 1952, that the first of the two experimental bombers took to the air. *And not until March 18, 1954, did the first production model fly!*

Long Production Cycle

Even for less complicated products than modern planes, time is required to get into production. A typical 1954 automobile, for example, stemmed from design work begun in mid-1950. But because of the revolutionary advances in aeronautics, even more time is required for the creation of aircraft. The USAF jets that dominated the skies over Korea came off the drawing boards in the year that World War II ended. And the piston-plus-jet-engined heavy bombers that today are the spearhead of the Strategic Air Command were conceived in 1939, entered in design competition in 1941, and first produced in 1947.

Industry Needs Thousands Of Engineers for Research

America's air power leadership depends on new ideas—and for this reason, the aircraft industry is one of the nation's largest users of engineers for research and development.

Recent studies show that the aircraft industry has more research scientists and engineers per 100 employees than any other manufacturing industry.

A single aircraft manufacturer, for example, has a combined total of 7,673 engineers and scientists doing research and developmental engineering work necessary to the continued improvement of current models and the introduction of new and better aircraft.

POWER IN THE SKIES

THE ENGINES of a modern heavy bomber are more powerful than the engines of the largest Japanese battleship of World War II.

'PLANES' SOURCE: AIRCRAFT INDUSTRIES ASSOCIATION