AIA planes

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AIR AGE JUST BEGINNING, SAYS DOOLITTLE

Helicopter Lines Serve 84 Towns, 16 Million People

Although the first commercial airworthiness certificate was granted a helicopter just seven years ago, more than 10 per cent of the nation's population today live in communities served by helicopter airlines.

These 16.75 million Americans are inhabitants of the 84 communities in the Los Angeles, New York, and Chicago areas which are served by the nation's three certificated helicopter airlines.

Others Certified

In addition to the 84 points presently being served by the three lines, there are 46 more communities which have been certificated by the Civil Aeronautics Board for helicopter service and which will be integrated into the present route systems as additional equipment and operating facilities become available.

The three lines today operate 17 helicopters, which vary in allowable passenger capacity from two to 12 persons.

The full impact of these revolutionary craft is yet to be felt, however. Best known for the tremendous tasks they performed during the Korean campaign and for delivering food, spraying crops and performing innumerable other jobs throughout the world, helicopters now are coming into their own as practical transportation vehicles.

Passenger Line

All of the present helicopter airlines are being developed slowly to determine the traffic potential and to define the current markets for this type operation. Only one line—operating in the New York area—is carrying passengers, although all three handle cargo and mail.

The oldest of the three, which inaugurated service in 1949, has al-

(See HELICOPTER, page 2)

Aircraft "Fringe" Benefits

The average employee at a typical U. S. aircraft plant received $811 in "fringe benefits" this year, in addition to his wages. These benefits, which cost the company $21-million annually, include such items as free insurance, paid holidays and vacations, social security, workman's compensation, counseling services, medical care and others.

Unit costs go up when aircraft are ordered in small quantities—and go down when they are produced in substantial volume. Typical of savings being realized by the military services through quantity orders is the case of a modern jet plane now being flown by the Air Force. The first 50 planes cost approximately 65 per cent more per unit than did the following 500.

'PLANES' SOURCE: Aircraft Industries Association

1,600 Manufacturers Are Producing Components for Complex Jet Planes

An estimated 1,600 U. S. manufacturers today are engaged in making aircraft components—some of them complicated machines and equipment that "think" and act faster than the human brain.

The minds and reflexes of pilots flying modern combat aircraft cannot react quickly enough to handle the multiple problems and strains encountered at altitudes over 50,000 feet and at combined head-on speeds in excess of 1,300 miles per hour.

To compensate for man's inabilities, America's scientists and aircraft engineers are developing automatic components and electronic systems that make modern combat and supersonic speeds possible. They are constantly searching for new equipment and methods which will keep pace with the development of engines and airframes.

The 11-to-1 "kill" ratio of American jets over the Communist MiG-15's in air-to-air combat has been attributed in part to the superior

(See COMPONENTS, page 4)

Predicts 10 Most Likely Advances In Future Years

By Lieut. Gen. James H. Doolittle

As we move into the second half-century of the airplane's existence, we can confidently anticipate that the next 50 years will continue to be an age of wonders in the air.

It is a conservative prediction to say that the second half of the 20th century will bring scientific and technological advances in aviation which will surpass even the most optimistic dreams of the past.

Will Enhance Security

These new developments will, of course, enhance our national security and our national position as a bulwark of freedom in the world today. Beyond that, aviation gains in the next 50 years should contribute enormously to the economic and physical well-being of all the peoples of the earth.

One of the nation's leading aviation authorities, General Doolittle, served during 1953 as chairman of the National Committee to Observe the 50th Anniversary of Powered Flight. Known throughout the world for his scientific contributions to aviation, and for his heroic exploits during World War II, he is presently a special assistant to the Air Force Chief of Staff.

The rapidity with which we here achieve the goals of the next 50 years, however, depends to a large extent upon the understanding and active interest of all Americans. Without the fullest participation by government, military leaders, scientists and engineers, and our aircraft industry — backed by an informed citizenry—we could well find ourselves lagging in aviation development at a crucial point in our history.

50th Anniversary Celebration

It was in recognition of this fact that we undertook this past year the observance, in a national year-long celebration, of the 50th Anniversary of Powered Flight.

During this celebration, we looked not alone to the past—but also to the future. As we move into the next 50 years of powered flight, I have been asked to forecast some of the

(See DOOLITTLE, 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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This Is 'For Keeps'

Several months ago, PLANES quoted Gen. Curtis E. LeMay, Commanding General of the USAF Strategic Air Command, as saying that "every important target in even the world's largest nation can be reached at the most within two hours after bombers cross its frontier. Time is of the utmost value. There may not be enough of it once an atomic attack is launched. . . ."

The following editorial, reprinted from the Zanesville (O.) Times-Recorder, *further emphasizes the element of time in modern warfare and in aircraft production.*

* * *

Now that war is strictly 3D . . . soldiers are no longer groundlings, and sailors no longer restricted to the sea . . . preparedness and defense require some redefining.

It will be no news to point out that, in this atomic age, a nation's defense is no stronger than its air power. And it should be equally obvious that a nation's air power is no stronger than its aviation industry.

Twice in our history, at the end of the two World Wars, we possessed the priceless advantage of world leadership in air power . . . and twice we let it wither and die in the pious hope that mankind had learned the futility of armed combat.

Once more, in recent years, as the rising tide of Communism threatened to engulf the world, we called upon the remnants of the industry we had dissipated to perform again new miracles of expansion and production. And again, for the third time, the weakened and impoverished aircraft builders have brought our air power back to a competitive level. But, as always, the task of catching-up has been performed at staggering and unnecessary public expense.

But, in the past, we have had *time*—which we will never have again. The fact that we can deliver a devastating aerial blow anywhere in the world within hours, means that we can be on the receiving end in as brief a time. And, another equally hard fact is that it takes from five to seven years to develop a single new combat plane from drawing-board to production. Thus, the failure to keep abreast in air-power is an invitation to defeat.

Survival in this villainous age demands readiness. And readiness requires a national air-power policy that maintains long-range, continuous aircraft research, development and production. It requires maintenance of the engineering and assembly teams that have been so costly to recruit and to train. And it requires recognition of the fact that only the competitive resourcefulness of healthy, financially strong private industry can give the taxpayer his money's worth . . . and effective protection against the tremendous odds the Red half of the world arrays against us.

No longer is half-a-loaf better than none.

Helicopter Lines Now Serving 10 Per Cent Of U. S. Population

(*Continued from page* 1)

ready flown well over 1.32 million miles and carried in excess of 12 million pounds of mail.

An indication of the interest helicopters have aroused is that there are over 40 applications for operations on file with the C.A.B., covering almost every important city and area in the country. Typical of these applications is one proposing service between New York and Philadelphia and another for the Detroit, Cleveland, Akron, Youngstown area.

A Belgian airline, using American-built helicopters, is currently operating an international passenger service, the only other scheduled service, and one American flag airline has taken delivery on one 'copter for experimental operation.

A recent boon to the prospects of a network of helicopter passenger routes was the announcement by the military of a 40-passenger plane with speeds estimated in the neighborhood of 160 m.p.h.. These larger planes should furnish range, speed and capacity necessary for financially successful airline operation.

PLANE FACTS

- Pilots of a late-model transport plane have at their fingertips about 1,000 pounds (half a ton) of the latest electronic equipment for aid in communications and navigation.
- More than 32,000 civil aircraft in the United States are equipped with two-way radio.
- World airlines expect to do more than two billion dollars' worth of business in 1954, according to the International Air Transport Association.
- A modern jet fighter-bomber uses about 1,345 pounds of stainless steel—enough to manufacture more than 89,600 kitchen paring knives.
- More than 10,000 jet engines have been produced by a single U. S. engine plant.
- Hot exhaust gases emerging from a conventional jet engine move at about 1,200 feet a second.

DOOLITTLE LOOKS TO AIR FUTURE

(*Continued from page* 1)

feasible and probable developments.

Aviation is, of course, dynamic and relatively young—and the rapidity with which new developments pile upon one another makes it impossible to project with certainty, for any substantial period of time, the precise direction or rate of technological progress.

In the following forecast, however, I believe that if I have erred, it is in the direction of conservatism. The following 10 developments which I anticipate in the next 50 years are not only probable, but most of them are—in my opinion—virtually certain of realization.

1. Continued, and vast, expansion of airport facilities throughout the United States and the world.

Adequate Facilities Needed

The rapidity with which aviation will continue to grow, and the extent to which it will continue to increase its impact on the national standard of life, will be determined largely by the adequacy of the airports through which all air movements must pass. We already face the danger of constriction of air traffic as a result of inadequate facilities, and consequently can expect action to be taken to greatly accelerate the airport development program in this country and abroad. Certainly all municipalities, from the largest cities to the smallest country crossroads, will soon have heliports.

Jet Airliners

2. Introduction on a wide scale of high-speed, long-range jet transportation.

By the end of this decade, jet transports should be flying on U.S. scheduled airlines, and it appears quite probable that they will be in wide use in the mid-1960's. Within 25 years, we should have air transports capable of 1,000 m.p.h. speeds under certain conditions. It has been predicted that worldwide air traffic, by jet and other types of aircraft, will reach one trillion passenger miles per year within 50 years.

3. Mass movement of short-haul traffic by helicopters.

Within a relatively few years, large multi-passenger helicopters, powered by several engines and carrying as many as 100 passengers, should penetrate deeply the short-haul travel market. Weight-lifting helicopters, or "Flying Cranes," prototypes of which experimentally have already lifted weight equivalent to a medium tank, can be developed to the point where they can transport a hundred tons of heavy equipment for short distances.

Air Freight Future

4. Transoceanic air freight by giant air transports.

The development of cargo planes that can carry 50 to 100 ton pay loads should increase the tempo of international air commerce, and divert a tremendous share of transoceanic cargo movement to air operators.

5. Appearance of practical convertiplanes.

Convertiplanes, which combine the forward-flight capabilities of conventional planes with the vertical rising and descent ability of the helicopter, are presently under development —and should reach practicability in the next few years.

Automatic Operation

6. Substantially automatic operation of many types of aircraft.

With certain military planes already operational, the pilot serves primarily as monitor—with most of the actual flying done by electronically directed and operated automatic controls. In the next half century, we shall see extensive refinement and development of electronics and automatic flight equipment, with control (from take-off to touchdown) in most military aircraft, entirely automatic. This leads to pilotless, controlled, supersonic and hypersonic (ballistic) air weapons. In the air transport field, this new equipment will contribute to even further advances in safety and schedule reliability.

Atomic-Powered Planes

7. Operational special-purpose atomic-powered aircraft.

It would appear quite conservative to predict the advent of atomic-powered aircraft by the end of this century — and probably within 25 years. If we are still faced with present design problems, however, such aircraft would have to be extremely large and would, as a consequence, be used at first only for specific purposes.

8. Development of heat-resistant materials and cooling methods for ultra-high-speed flight.

One of the greatest obstacles to spectacularly higher speeds is the lack of materials capable of withstanding the terrific temperatures generated by these speeds. For example, a missile traveling at 20 times the speed of sound would, in the earth's atmosphere, create temperatures in the order of 15,000 degrees — higher than any man has achieved except in an atomic bomb. No known material can long withstand such heat. We can look with confidence, I believe, toward attainment of lighter, more heat-resistant materials and advanced techniques which will enable planes to fly several times as fast as presently-operational aircraft.

High-Speed Air Freight

9. Use of pilotless, automatically-guided aircraft for ultra high-speed freight and mail service.

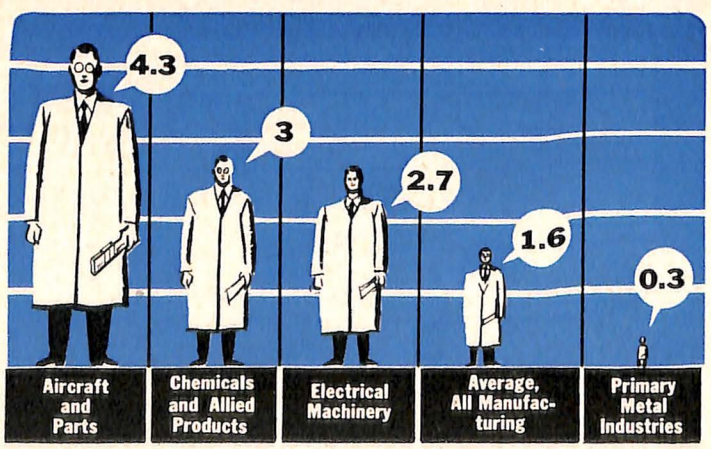
As guidance equipment is improved, missiles without human pilots should be able to carry transcontinental and intercontinental mail and express at from five to ten times the speed of sound.

10. Creation of man-made earth satellites.

While many of the technical problems involved in the production of a successful earth satellite have not yet been solved, expenditure of sufficient effort and money should lead to the required answers. It is entirely probable that an earth satellite will be built within the next 50 years, and possible that attempts will be made to send missiles through space as far as the moon.

AIRCRAFT INDUSTRY LEADS NATION IN RESEARCH

NUMBER OF RESEARCH ENGINEERS AND SCIENTISTS PER 100 EMPLOYEES



To produce the world's best aircraft in an era of tremendous technological advances, the aircraft industry requires more research engineers and scientists per 100 employees than any other U. S. manufacturing industry—and well over twice as many as the average for all manufacturing industries.

'PLANES' SOURCE: Aircraft Industries Association

Flyer Shows How Utility Airplanes Cut Travel Time

A veteran U.S. pilot, on a flying tour of 48 state capitals, recently gave an unusual demonstration of how a businessman can save more than six five-day weeks of travel time in a 20-day period.

If he had used an automobile on his 16,600-mile trip, aviation executive Max Conrad would have required over 57 days, driving a little more than seven hours a day, to complete his journey.

Total Time: 144 Hours

By flying an average of 7 hrs. 12 min. a day in a four-place utility lightplane, he completed the trip (equal to nearly six and a half transcontinental flights from San Francisco to New York) in only 20 days.

His total travel time was 144 hours. And the trip cost $1,311, including gas, oil, depreciation, insurance, upkeep and maintenance.

By automobile, approximate travel time would have amounted to some 30 additional seven-hour days —a total of 415 hours, with the trip costing $1,162 (computed at seven cents a mile).

Though automobile travel would be some $149 cheaper in this instance, the savings would be far offset by the greatly increased travel time in the case of most executives.

Comparison With Train

By train—even assuming hypothetically perfect connections and continuous travel — Conrad would have spent 332 hours in travel, and it would have cost him about $830. In actual fact, a similar trip by rail would have taken considerably longer because of the impossibility of obtaining direct and immediate connections on many of the legs of his journey.

Conrad, father of 10 children, points out that he could have carried three additional passengers in the plane, thereby cutting total cost per person to less than $328 (slightly over 1.9c per passenger mile).

He actually did carry one passenger for two-thirds of the flight, and two passengers on the final third.

The tour of the nation's capital, the capitals of the 48 states, and six other U.S. cities was made as a demonstration of the modern utility of the light business airplane.

Scheduled World Airlines Have 300,000 Employees

The scheduled airlines of the world have 300,000 employees, according to Sir William P. Hildred, director general of the International Air Transport Association.

U.S. scheduled airlines have approximately 100,000 employees—or one-third of all airline personnel in the world.

IATA reports that the 300,000 men and women of the scheduled world airlines staff transportation organizations that operate over 600,000 miles of routes in all parts of the world.

Fleet of 1,018 Planes Helps Nine Government Agencies Cut Expenses

One of the largest fleets of aircraft in the nation today is operated by nine Government departments which, by the end of June, will be using 1,018 planes, ranging from single-engined craft to huge four-engined transports.

Purchases of 69 new civil-type aircraft are planned under the fiscal 1954 budget. These planes will supplement the 949 aircraft now in service with the Atomic Energy Commission, the Department of Justice, the Department of the Interior, the Department of Agriculture, the Federal Security Agency, the Tennessee Valley Authority, the National Advisory Committee for Aeronautics, the Department of Defense, and the Department of Commerce.

The planes, used for such varying purposes as spotting aliens sneaking across the border and transporting high military personnel to key locations, annually save millions of tax dollars in transportation and operating costs.

Variety of Uses

The nine departments and agencies using aircraft are as follows:

- Atomic Energy Commission operates a fleet of nine planes in scientific exploration for raw materials, air patrol of prohibited areas, and transportation of personnel.
- The Department of Justice operates eight aircraft and will purchase four additional planes by June 30. The Immigration and Naturalization Service uses these aircraft, manned by border patrol pilots and patrol inspectors, for maintaining air-ground liaison in the prevention of illegal entries, for pursuit of suspected violators, and for the transfer of small task groups of patrol inspectors to points of emergency.
- The Department of the Interior has 57 aircraft and will add 10 more during the current fiscal year. At present, the Fish and Wildlife Service uses the bulk of the fleet, with 40 in operation and seven to be purchased. They are flown by agents enforcing fish and game laws, by biologists studying wildlife restoration in Alaska, and for waterfowl studies and game management. Geological Survey has one plane—a flying laboratory—equipped with magnetic instruments to detect minerals.

Bonneville Activities

And Bonneville Power Administration operates three planes, with one to be purchased. These aircraft are used in Oregon, Washington, Idaho and Montana for line location. aerial photography, acquisition of land, transmission line patrol, and transportation. In addition, BPA maintains two helicopters for routine and emergency line patrols, and for line maintenance at high-altitude locations during the winter months.

The Bureau of Land Management maintains two planes (with one on order) for fire patrol and the transportation of fire crews and supplies in Alaska. The Bureau of Reclamation operates eight planes (with one on order) for patrolling transmission lines. And the National Park Service employs one plane for protection patrols and surveys.

- The Department of Defense has the largest fleet of transport-type aircraft—723 in use, with 55 to be purchased during the current fiscal year. These planes are used for transportation of personnel, cargo, and mail. The Corps of Engineers of the Army has four aircraft for inspection of civil works projects.

Department of Commerce

- The Department of Commerce operates 98 planes, with the bulk of the fleet (90) used by the Civil Aeronautics Administration for engineering tests, checking facilities, investigating accidents and transportation. The Civil Aeronautics Board has seven planes for the investigation of accidents and other official business, and the Weather Bureau operates one plane.
- The Department of Agriculture has 30 planes. Sixteen are used for the transportation of men and supplies, including "smoke jumpers," to ordinarily inaccessible areas, for reconnaissance of large fires, for detecting fires in remote areas, and for routine inspection trips after lightning storms. The remainder are used for experimentation and development in the spraying and dusting of crops, as well as for fertilizing and seeding operations.
- The Federal Security Agency has four aircraft for disaster aid work and epidemic control activities.
- The Tennessee Valley Authority operates 11 aircraft, including three helicopters, for much the same purposes as does the Bonneville operation. But, in addition, four fixed-wing planes are used for malaria control spraying in the TVA areas.
- The National Advisory Committee for Aeronautics has nine aircraft for research activities and transportation.

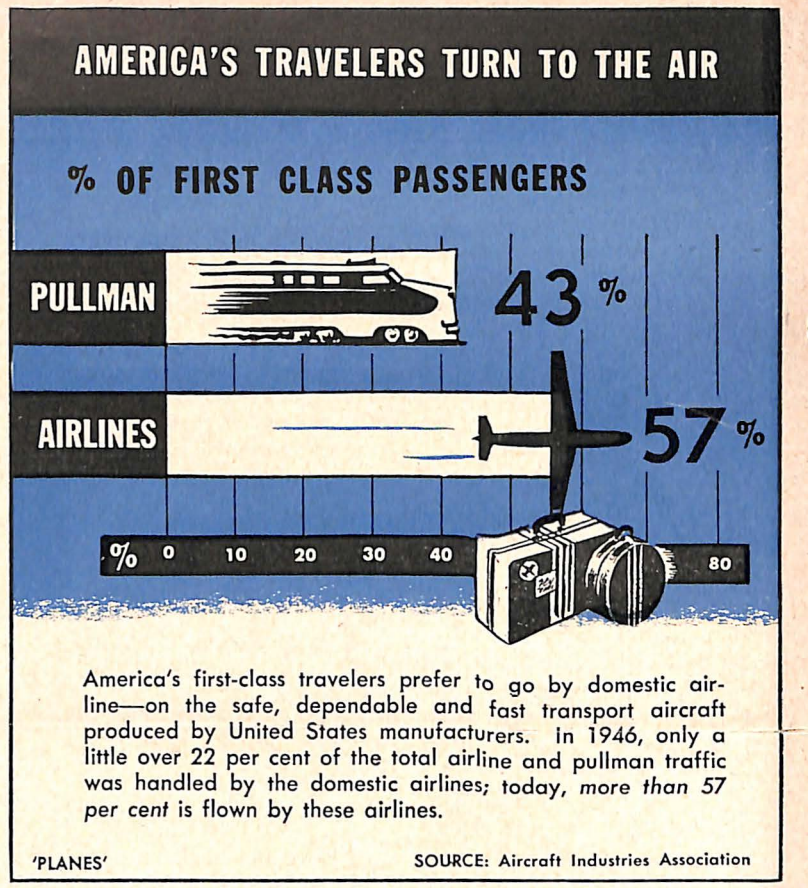
Air Quotes

"The airplane continues to be one of the most important factors in our current world—an instrument of peaceful commerce or a weapon of defense or desolation.

"The near-sighted may bewail that in an age of peril the airplane shrinks the map and exposes distant havens to swift attack and its wake of destruction.

"Such lack of vision has appeared before in history. The advent of sail, steam and gasoline also aroused regrets among those with limited points of view and little faith.

"But in appraising progress, we measure the entire picture of new ideas and new inventions. The whole picture of progress in aviation is one of the finest in all the annals of science and engineering and in all the records of human skill and daring."—*Secretary of Commerce Sinclair Weeks, October 14, 1953.*



America's first-class travelers prefer to go by domestic airline—on the safe, dependable and fast transport aircraft produced by United States manufacturers. In 1946, only a little over 22 per cent of the total airline and pullman traffic was handled by the domestic airlines; today, *more than 57 per cent* is flown by these airlines.

'PLANES' SOURCE: Aircraft Industries Association

Components Cited as Important Factor In U.S. Air Advantage Over Mig-15

(*Continued from page* 1)

electronics and other components of the American-built planes.

The U. S. Air Force had an opportunity to put a MiG-15 through its paces this fall. Top military test pilots, including Maj. Gen. Albert Boyd, Commander of Wright-Patterson Development Center, and Maj. Charles "Chuck" Yeager, the first man to break through the sound barrier, flew the plane for evaluation.

Besides determining that the MiG was generally inferior to the best U. S. planes, the tests revealed that the lack of automatic components in the Russian-built plane kept the pilot so busy that his combat effectiveness was seriously reduced.

In contrast to this, at least one American fighter is so nearly automatic that the pilot acts principally as a monitor. When the target is sighted, he squeezes a trigger switch which sets his electronic equipment in operation. The plane will then close in, aim and open fire without further assistance from the pilot.

Recent Developments

The development of much of this equipment is so recent that only about one out of 20 of the electronic and communication devices now being built had been put into production prior to the Korean War.

The Wright Brothers used five inexpensive instruments when they made their first flight. Today. as much as 50 per cent of the cost of some planes is attributable to automatic aids.

This equipment is complex and expensive. It adds to the price and weight of the plane; but it saves lives and enables pilots to maintain effective control of sonic aircraft.

As planes go higher and faster this equipment becomes even more necessary. At 40,000 feet and at 1,300 m.p.h., for instance, heat caused by air friction raises the temperature on the skin of the plane to more than 200°. Yet the outside temperature registers 65° below zero. At sea level and at the speed of sound the skin heat hits 100°. One jet engine alone generates enough heat to warm 1,375 five-room houses.

New Components

American component builders—to master one phase of this problem of high speed flight—have developed a refrigerating system no larger than a man's hand and weighing but five pounds. It has a cooling capacity equivalent to that of 45 home refrigerators.

Pressurization systems in the planes operate efficiently at altitudes of more than 10 miles. And the control boost systems on today's supersonic planes must exert the five-ton pull necessary to change the path of a sonic fighter in flight.

One components manufacturer has recently announced the development of automatic flying aids which make it not only possible "but relatively effortless for a pilot, even under extreme weather conditions, to make an entire cross-country flight, from take-off to touch down, actually without touching the controls for more than a few minutes during the trip."

These components also minimize the number of crew members necessary aboard the aircraft. One World War II bomber required a crew of 11 men. A much faster and more powerful modern bomber requires but three men.