

PLANES

ALL MATERIAL
MAY BE
REPRODUCED

MATS OF ALL
CHARTS ARE
AVAILABLE

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Air Research Challenge Faced by 80th Congress

Written especially for PLANES

by Senator C. Wayland Brooks (R., Ill.),
Chairman, Committee on Rules, U. S. Senate

The 80th Congress bears a great responsibility for providing American ingenuity with the tools to ensure a continuing high rate of aeronautical development. America must never again lose her lead in aviation progress.

In aviation, as in many fields of scientific progress, at the start America had the jump on everyone. The airplane was born of American ingenuity in 1903. Nevertheless, twice in the succeeding 40 years, because of failure to pursue an adequate national program of aeronautical research and development, the United States was forced to spend billions of dollars in hurried attempts to catch up with the world.

NEED GREATEST

Today the need for research is greater than ever. Intensive war development has pushed our technology to the very limits of present knowledge. Aviation research is just beginning to probe into the mysteries of transonic and supersonic speeds, rocket and jet propulsion, and remote control of flight. Solution of the baffling problems in these fields requires a new fund of scientific knowledge.

To date, however, the United States has made but a token gesture to sustain established research facilities, let alone provide for new endeavors. Where billions were spent to attain our present rate of progress, all sources combined—Army, Navy, NACA, and CAA—in the first postwar year received only \$312,000,000 for aeronautical research and development.

AIR POWER VITAL

America cannot afford to backslide again. In addition to our huge investment in the present state of the art, common sense tells us that in any future aggression we most likely will not have a period of grace in which to overtake the world. Beyond this, the nation has acquired a dominant role in shaping world peace and its people should be completely awake to the part air power plays in this responsibility. Poll after poll of public opinion reflect the conviction that America must maintain a leadership in aero-

nautical science commensurate with her status as a world political force.

But regardless of the extent to which America contributes toward its further development, the science of aeronautics, by its progressive modification of world social relationships, will dominate the future course of society.

Continued progress will require costly research but considering the return in security, and economic and social benefits, the amount needed is relatively small—it is inexpensive insurance.

Idea Town

Community air-mindedness, most important ingredient of American airpower, is being promoted in a unique manner at St. Louis, Mo.

St. Louisans have banded 35 civic groups into an organization known as the Aviation Council of Metropolitan St. Louis, Inc. Started in June, 1946, the Council is embarked on a program to make Metropolitan St. Louis a leading aviation center.

Council operations are financed by popular subscription but an indoor exposition, the Metropolitan St. Louis Air Fair, scheduled for this spring, is expected to net enough to meet budgets for succeeding years.

High Speed Era Requires Intense Study

Better designs, new structural materials, more economical power plants, and control devices with super-human intellect, are needed before travel faster than sound is practical, aircraft industry experts report.

Recent successful test flight of the XS-1, first American plane designed to fly at supersonic speed, spotlights the enormity of tasks ahead.

Because wind tunnels cannot simulate conditions through the transonic speed range, the XS-1 is being developed by the extremely expensive and hazardous means of free fall drops and flight testing.

CONTROL A PROBLEM

One of the puzzlers is how to design a plane that will fly at terrific speeds and yet land at reasonable speeds.

Experiments indicate a dangerous increase in surface friction heat in supersonic flight. Manufacturers are searching for means to insulate and provide for heat dissipation on ultra high speed missiles and planes.

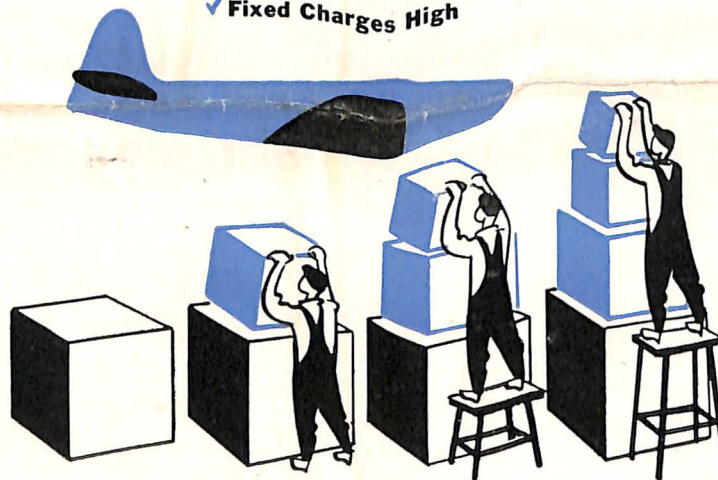
One of the chief needs is stronger materials. Researchers are experimenting with sandwiching materials and studying alloys of the metal beryllium.

Control of high speed planes and missiles is another poser. Much faster control mechanisms are needed, which will literally anticipate necessary changes in stability and directional control. Existing electronic-servo mechanisms are not fast enough, and radar signaling equipment does not cover long enough ranges.

Principal problem in powerplants is how to make one with an effective range. The XS-1 used a ton of fuel a minute on its first test run. Experts are eyeing combinations of gas turbines, rockets and ram jet engines for guided missiles and personnel carrying craft.

WHY NEW MILITARY PLANES COST MORE

- ✓ Improved Performance
- ✓ Wage Costs Are Up
- ✓ Plane Parts Cost More
- ✓ Tooling Costs More Per Plane
- ✓ Fixed Charges High



1
LOW UNIT
COST FOR
LARGE VOLUME
WAR
PRODUCTION

2
TODAY'S
SMALL ORDERS
MEAN
HIGHER
UNIT COST

3
TODAY'S
IMPROVED
PERFORMANCE
ADDS MORE
TO UNIT COST

4
TODAY'S
INCREASED
LABOR COSTS
ADD FURTHER
TO UNIT COST

"PLANES"

40-Year Growth of Air Power Contributes Much to U. S. Life

American air power observes its 40th anniversary this year—it was 1907 when the War Department initiated a request to the 59th Congress for \$25,000 to purchase the first U. S. military plane from the Wright brothers.

Today world powers estimate their security needs in thousands of planes, and old timers see a parallel in the problem of selling that first plane to Congress and the 1947 task of convincing legislators of the need for a broad research and development program in the field of supersonic flight and guided missiles.

BOMBERS TO AIRLINERS

The government's contract with the Wright brothers stipulated that the plane carry two people, fly for an hour over a 10 mile course, and reach a speed of 40 miles per hour. That was the first plane built to government specifications.

Out of World War I operational experience came important improvements in structural strength, speed, range, ceiling, and control of planes. For the first time the airplane received broad testing

as a practical man-carrying machine, and World War I bomber designs fathered the first civil transport planes.

1ST PARACHUTE

Military aviation appropriations after World War I made possible the first air mail service, financed the start of aerial forest patrol, crop dusting and aerial mapping for agriculture, and paid for development of the first successful parachute.

Almost all the laurels for operational testing of the airplane during the early years go to Army and Navy aviation, starting with the first Atlantic crossing by the NC-4, and including firsts in non-stop coast-to-coast, and round-the-world flights.

Things which today are taken almost for granted—two-way radio, blind flying, superchargers, pressured cabins, radio-controlled airways, jet planes, rocket missiles, and ocean-spanning airliners—are advances achieved by Congressional appropriations to military and naval aviation since 1907.

PLANE QUIZ

A 70 per cent score on this quiz is excellent. Sixty per cent is good. Answers on page 4.



1. In 20 years Latin American passenger traffic of U. S. air carriers has multiplied (a) 20 times; (b) 200 times; (c) better than 2,000 times.

2. During World War II the Armed Services and civil flying schools gave air training to nearly (a) 500,000; (b) 1,400,000; (c) 2,500,000 persons.

3. True. False. Recent technological developments create an immediate need for gearing all future military planning to tactics of push-button warfare.

4. What is the proper U. S. name for these British plane parts (a) air screw; (b) accumulator; (c) tail plane?

5. Reflecting growth of air power, thirty years ago aviation personnel made up 0.2 per cent of total Army strength, but in 1945 the AAF represented (a) 10.1 per cent; (b) 27.6 per cent; (c) 20.2 per cent of Army strength.

6. One year after VJ day, employment in the aircraft industry was (a) more than three times the 1939 total; (b) 1/20 the pre-war peak; (c) just short of the 1929 peak.

7. While aircraft manufacture during World War II was the largest industry in the world only (a) 60%; (b) 54%; (c) 35% of total U. S. war production was devoted to our air power.

8. Quantity orders for military planes have slowed to a trickle. However, since VJ day the aircraft industry has unveiled (a) 18; (b) 10; (c) 26 new military models.



9. Reflecting the growth of personal flying, during the first 8 months of 1946, the number of flying schools in the U. S. (a) increased by 200; (b) more than doubled; (c) more than quadrupled.

10. Pilotless missiles now in use can be fired with reasonable accuracy at targets (a) 200 miles; (b) 1,000 miles or (c) 5,000 miles away.

Record-Breaking Speed Flights Advance Conquest of the Air

What part do record-breaking speed attempts play in advancing America's conquest of the air?

What is the significance of a flight from California to Washington, D. C., in six hours and 57 minutes? What does it matter when an airliner goes from Boston to Ireland in 9 hours and 10 minutes?

TRAVEL CHEAPER

When an airliner sets a new speed record for crossing the continent, lower coast-to-coast and trans-oceanic fares are in prospect. Faster planes mean more return per plane because more revenue miles can be traveled for each hour of operation.

Speed records last year made a scientific contribution somewhat comparable to Columbus' proving the world is round. What was accepted almost as a scientific fact, that planes could not exceed a "practical" limit of 20 per cent below the speed of sound, has been disproved.

Military planning changes with each new speed record. If one jet plane can make it across the continent in a little more than four hours, a whole flight of them can be moved in an emergency in like time.

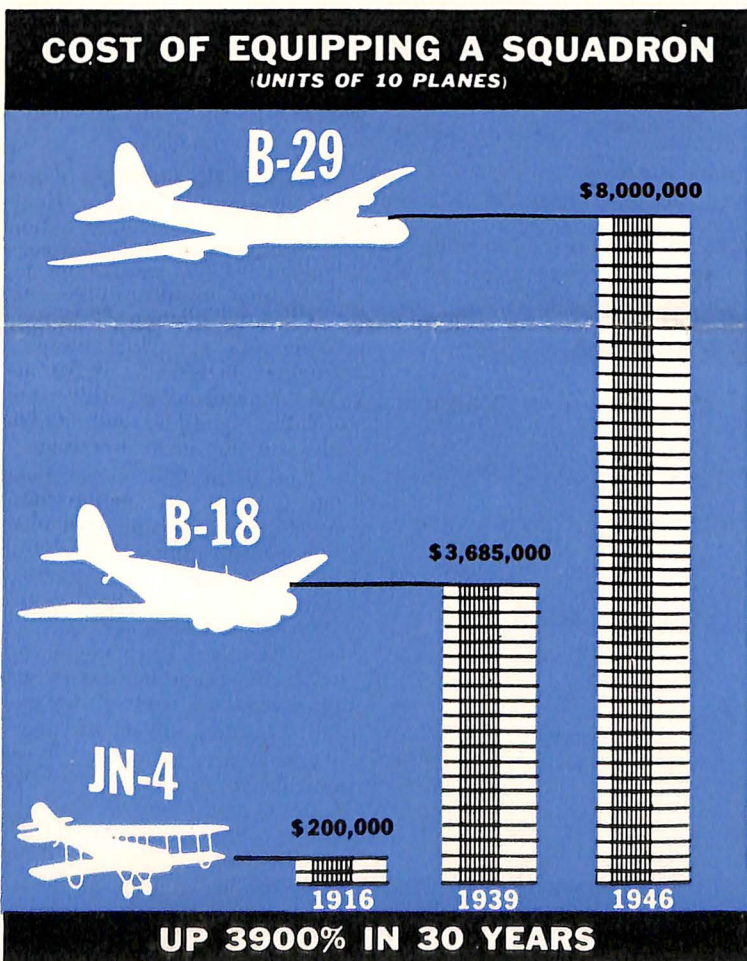
TRAFFIC PROBLEMS

Higher speeds are forcing constant revision of traffic control systems. CAA is working on eliminating

about two-thirds of the "radio fixes" for high speed airliners. These "fixes" are radio signal stations along the airways and were installed to control two-engine traffic. Each time a plane passes over one the pilot reports so that his progress can be continuously charted. If the high speed plane reported at each one, the pilot would be reporting every few minutes.

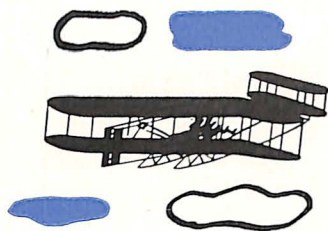
Standard airway approach procedure for two-engine planes requires the pilot to start his landing at a certain distance from the airport. He follows a given pattern, making each turn a required number of minutes. But each new high speed plane poses another problem for the traffic controller—a 300-mile-an-hour airliner doesn't poke around once it gets into the traffic pattern, and because of its greater size it must make a larger approach pattern.

Two-engine airliners coming into Washington National Airport from the west start their "let down" about 22 miles out. On the other hand, the story is told about the four-engine transport, whose pilot called the Washington tower to say that he was starting to let down for a landing. "Okay," said the Washington controller, peering into the night for the plane's landing lights, "but where are you?" "Over Pittsburgh," the transport pilot replied. That was 189 miles away.



AIR PROGRESS BY MILITARY RESEARCH

1906
1916



War Department purchase of Wright brothers' plane sets world precedent for development of military air power.

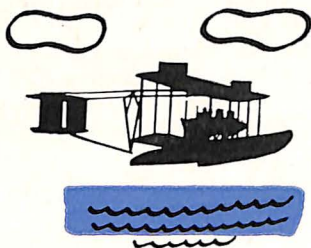
First U. S. flying schools established—for Army and Navy officers.

Military research needs bring about creation of National Advisory Committee for Aeronautics.

Flying boats pioneered by Navy.

WORLD WAR I FOUND U. S. AIR POWER LAGGING BEHIND

1916
1926



World War I brings improved radiators, engines, propellers, structure, streamlining, controls.

Military planes open first airmail service, forest patrol, crop dusting operations.

Army develops first practical parachute.

Army Air Service maps and lays out first airways.

Service fliers make first Atlantic crossing, round-world, coast-to-coast hops.

AMERICAN APATHY AGAIN ALLOWED U. S. AIR POWER TO LAG BEHIND WORLD PROGRESS

1926
1936



Commercial transports evolve from bomber design experience.

New military proving laboratories and endurance, distance and altitude flights improve plane design.

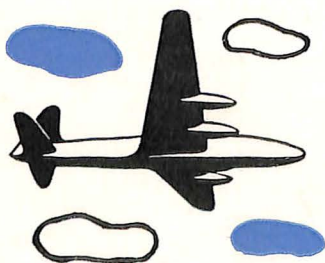
Development of military airfields and navigation aids shows way for national system of commercial air terminals.

Aviation fuels developed for military needs go into service with commercial airlines.

Military plane (Lt. James Doolittle) makes first blind flight.

WORLD WAR II FOUND AMERICAN AIR POWER AGAIN LAGGING BEHIND

1936
1946



More than 300,000 new pilots trained in military expansion program.

Military development contributes world-wide airport system—billions invested improving ports for national defense program.

Military aviation perfects air-sea rescue operations, a peacetime asset.

Civil aviation benefits from military pioneering—pressurized cabin, helicopters, jet engines, supersonic aircraft, automatic flight control, flying freighters, radar instruments.

LET'S KEEP AMERICA AHEAD IN THE AIR!

Facts and Figures

The "Pacusan Dreamboat," AAF Boeing B-29, consumed 13,000 gallons of gasoline on its record hop from Hawaii to Cairo via the polar region.

A military development, the K-30, newest, largest aerial camera, weighs 575 pounds and has 100-inch focal length and f/10 lens.

Military development recently has produced the world's most powerful reciprocating aircraft engine—5,000 h.p. with 36 cylinders, its takeoff power equals the pull of a locomotive.

U. S. long-range planes can fly to any inhabited region of the earth and return to the U. S. without refueling.

Approximately one out of four employees in the aircraft industry are veterans of the Army, Navy, Marines or Merchant Marine.

Aeronautics has been a basic subject of primary education in Russian schools for many years.

Rockets were used as a military weapon as early as 1792 in India.

VFW Speaks Out

The 2,000,000-member Veterans of Foreign Wars has advised President Truman that it "is pledged to National Security in the form of the most powerful Air Force in the world." A letter containing this statement recently was delivered to President Truman by Louis E. Starr, Commander-in-Chief of the veterans' organization.

"Our Veterans have learned, Mr. President," the letter says, "that the outstanding lesson of World War II was the advent of Air Power as the greatest striking force known. Consequently our organization is pledged to national security in the form of the most powerful Air Force in the world, capable of rapid expansion, and a number of professional modern divisions ready to be transported as an air army anywhere in the world. Our Navy also must be maintained in keeping with war's modern potential."

Aircraft saw first use in active military operations with the 1915 Pershing Punitive Expedition to Mexico.

Air Power
is
Peace Power!

Foreign Countries Invest Heavily in Air Research

Foreign countries offer the U. S. stiff competition in the aeronautical development race, according to announcement abroad.

RUSSIA—

Russia recently bought some British gas turbines for study, and the Soviet's fourth Five Year Plan provides for intense promotion of aeronautical research. The Soviet paper, *Izvestia*, claims hundreds of millions of rubles are earmarked for studies in atomic energy, cosmic rays, aerodynamics, highspeed planes and missiles.

BRITAIN—

Great Britain is developing a new big Empire Research Center, besides several rocket testing stations, and her first post-war defense budget proposed spending more for the Royal Air Force than for her entire navy. In addition, Britain, a leader in jet engine development, announces that all RAF regular and reserve squadrons are being equipped with jet planes.

FRANCE—

France has created a State Institute of Aeronautical Technology, a State Aviation Academy, and already has held a big national aircraft show to display new postwar designs.

ARGENTINA—

Last year Argentina, which played a token part in World War II, spent \$152,000,000 for military aviation. By contrast, U. S. Army and Navy combined expenditures for aeronautical research this year total \$285,000,000.

OTHERS—

Other countries which have announced ambitious and costly postwar aviation programs are Belgium, the Netherlands, Sweden and Norway.

Industry Submits National Air Engineering Proposal

Strong affirmation of the need for a broad national research development program to assault problems of high speed voiced by the American aircraft industry.

While seconding the urgency of a supersonic research program, the industry has outlined its requirements to the Government.

The manufacturers agree on the need for large, government-owned test facilities but assert that these must be available for development testing to industry. The industry also proposes that universities and scientific institutions be assigned some of the research facilities provided by the Government.

COOPERATIVE VENTURE

As the industry views a national program, the National Advisory Committee for Aeronautics would pursue basic research, military facilities would concentrate on evaluation, and the industry would concern itself with development of the product.

With regard to new laboratory facilities, the industry suggests:

1. That speedy development test service be established for industry, with laboratory time allocated on a public interest basis.
2. That test facilities be operated under the most enlightened personnel administration, to assure the best possible laboratory staffs.
3. That new research facilities be established near sources of

adequate power, and located with due respect for the lesson in dispersion taught at Pearl Harbor.

Answers to Plane Quiz

1. (c)
2. (c)
3. False. The push-button era is still distant. One pioneer aircraft designer, John Northrop, cautions that for the next 10 years the United States must depend on the atomic bomb and present type long-range bombers.
4. (a) propeller; (b) battery; (c) horizontal stabilizer.
5. (b)
6. (a). In September, 1946, employment totalled 200,000, a contrast to the war peak of 2,080,000, but better than three times the 49,000 of 1939.
7. (c). And out of a record production of nearly 300,000 war planes, more than 53,000 war aircraft were shipped to Britain and Russia.
8. (c)
9. (c). 405 in January and September 1, 1946.
10. (a) Currently used missiles have a maximum range of only 200 miles or so, and degree of accuracy for even such ranges is far from satisfactory.

