AERONAUTICS

Aviation's Next 50 Years

In its first 50 years, aviation has grown from an infant into vibrant manhood. What lies ahead? The sonic barrier was spectacular, but the thermal barrier is deadly.

By ALLEN LONG

➤ IN ITS first half-century, aviation has grown from an infant into vibrant manhood. Whereas the Wright brothers' first successful powered airplane struggled to get off the ground to fly those historic 120 feet, today's modern jet bomber flexes eight mighty engines and roars into the blue pushed by hundreds of thousands of horsepower.

What lies ahead of this thriving industry? What will its status be 50 years hence when the airplane becomes a centenarian?

Some of the boldest experts decline to predict. Aviation already has far surpassed the wildest dreams of 1903's most outspoken experts. It could do so again.

But it may not. The industry may be approaching technological bottlenecks.

Cracking the sound barrier was heralded as a major accomplishment in aviation. But a much more formidable barrier looms at the horizon. It is the so-called "thermal barrier." It is the heat created by air friction when a supersonic plane cuts through the sky. It is capable of melting the airplane and broiling the pilot.

Approaching Thermal Barrier

Already the thermal barrier is a serious problem. Refrigerating systems are being built into test planes to keep their pilots alive. But refrigerating systems, some of them big enough to air-condition whole theaters, are heavy and impose severe aerodynamic penalties upon the plane.

At Mach 3, when the plane or guided missile is flying three times as fast as the speed of sound, aluminum begins losing its strength due to the heat. Hope, however, is offered by such metals as titanium and stainless steel. These metals combine excellent heat resistance with lightness and strength.

Improvements in jet engines have yielded great economies. They probably will be made even better in the next 50 years. But generally speaking, the efficiency of turbojet engines depends somewhat upon their operating temperatures. Materials must be developed that can withstand the terrific temperatures inside these airborne blast furnaces. Ceramic linings seem to offer some promise.

With the development of hotter-operating jet engines, metallurgists will have to create metal parts to work in the heat thrown off by the engine flame. Gears must mesh without melting. Shafts must spin without bowing.

The advance of aviation is not wholly dependent upon dreamy-eyed aeronautical engineers. The visions of these men are given substance by steady progress made in allied fields. For instance:

Today's planes are flying at altitudes far higher than once were thought at all possible. At these heights, ordinary oils fail to lubricate the engines. Instead, the oils boil off, leaving the mechanism unprotected.

However, as it became apparent that this problem was arising, petroleum technologists worked out synthetic oils to do a better lubricating job over a wider range of temperatures and altitudes. The synthetics have been designed to stick with the engine and not evaporate into the thin, almost nonexistent air 40 miles above the earth's surface.

The petroleum engineer met the challenge. But will he always be able to turn up an answer to the aeronautical engineer's problems? Will other scientists be able to keep pace?

Out of the scientists' laboratory comes the eyes of today's pilot. Out of his laboratory comes the hands and feet of the pilot. Out of his laboratory comes the brains of the pilot.

Man already is outmoded in many cases. His muscles are far too puny to pull a supersonic plane out of a dive without the aid of powerful little motors. His eyes are bound by haze, cloudiness and darkness to a narrow "operating range." Radar is required to offset that.

His mind, already jammed to the bursting point with things to remember, must be supplemented by automatic controls that fly his plane with reflexes keyed thousands of times more highly than those of the best athlete.

Will science be able to continue offsetting each human handicap with a mechanical advantage? Perhaps some intimation of the answer to this question may be obtained when the Air Force's new jet interceptor, the F-102, is examined.

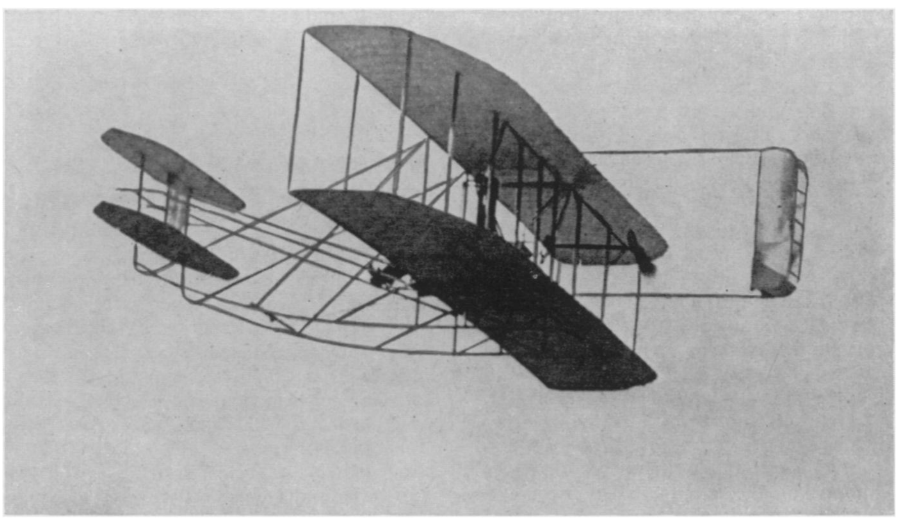
In operation, this plane is largely controlled by instruments. The pilot handles the plane only at take-off and landing. After take-off, the pilot flips a switch and a man on the ground flies the plane by remote control to the vicinity of the target. Then the pilot flips another switch and instruments in the plane take over.

The instruments search out and track the target. They guide the plane as it stalks its prey. Instruments even fire the plane's weapons at the proper time. Then, mission accomplished, the pilot flips the switch and his ground-based co-pilot flies the plane back to the landing field.

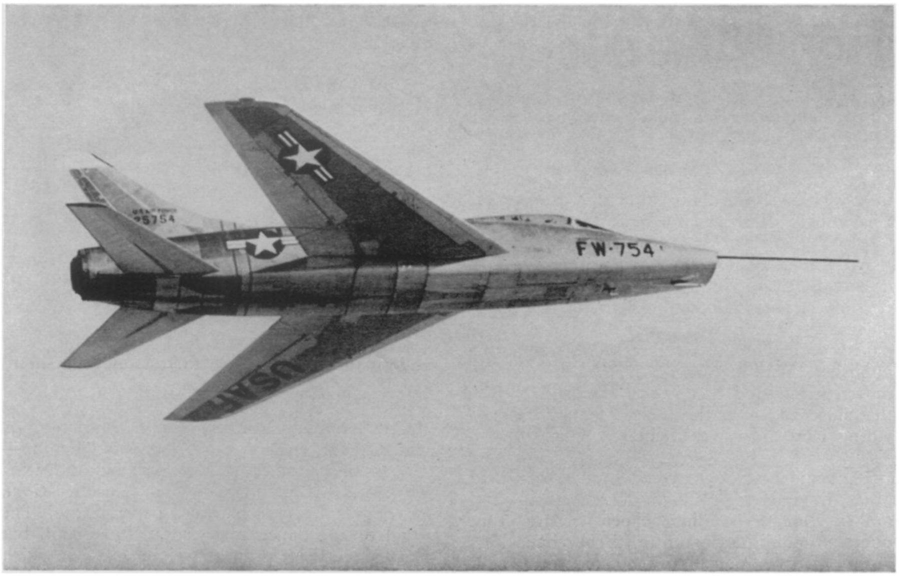
All of this in 50 years! But despite the fantastic headway aeronautical engineers have made in the last half-century, the next 50 years of aviation may be the greatest.

In 2003, someone may come across this article and smile, knowing that the "vibrant manhood" of aviation, to which this writer refers, merely was the time when the infant took its first wobbly step.

Orville and Wilbur Wright made headlines that cold Dec. 17, 1903, when their



THE OLD—This "Wright Flyer" was the latest thing in aviation when the picture was snapped in 1908. It had carried the first Army passenger into the sky only three days before.



THE NEW—This photo is the first showing the Air Force's glittering Super-Sabre, the North American F-100. The first production model, which can fly faster than the speed of sound, has a combat radius of over 500 miles.

plane zoomed into the sky, flying 120 feet in 12 seconds. Three tries later, the plane flew 852 feet in 59 seconds. Other aviation pioneers still are making headlines.

A 37-year-old Marine Corps pilot, Lieut. Col. Marion E. Carl, recently climbed to a breath-taking and record-setting height of 83,235 feet over California's Muroc Dry Lake. This shattered the altitude record previously held by Bill Bridgeman, test pilot for the Douglas Aircraft Company. But Bill still has flown faster than any other person. He swished through the sky at 1,238 miles an hour in an experimental plane last year.

Sir Miles Thomas, chairman of the British Overseas Airways Corporation, recently revealed that British aircraft designers are working on bigger and better jetliners to whisk passengers anywhere in the world within 24 hours. He said the planes will carry about 100 persons and will be able to hop from London to Australia in a day.

He also revealed that British engineers are planning an atomic-powered flying boat that can carry 200 passengers. Engineers estimate the plane will weigh 250 tons, but will be economical because it will not have to sacrifice passenger revenue to fuel.

Sir Roy Dobson, managing director of A. V. Roe and Company, predicted atomic-powered planes will be in the air within 25 years.

In the United States, work on future atomic-powered planes is progressing quietly. The Consolidated Vultee Aircraft Corporation, Boeing Airplane Company and Lockheed Aircraft Corporation all are working on the airframe design. Pratt and Whitney Aircraft Company and the General Electric Company are attempting to work out the nuclear engine.

Today the world teeters on the edge of space travel. Rocket experts are beginning to talk about space platforms, rocket ships and interplanetary voyages. Will the first rocket ship streak to the moon within the next 50 years?

It may, but many problems must be solved first. Gen. James H. Doolittle recently pointed out that a ballistic missile traveling about 20 times the speed of sound would generate temperatures of about 15,000 degrees Fahrenheit. This, he said, is far higher than any sustained temperature ever achieved on earth except in an atom bomb. No known material can withstand such heat.

Some material, however, will have to be developed if an earth-launched missile is to reach outer space. This is because the missile must travel about 20 times the speed of sound to escape from the tentacles of the earth's gravity.

Perhaps these problems seem overpowering at the moment. But it must be remembered that the problems of 1903 were even more baffling, for no one ever had made an engine-powered airplane that flew.

Yet in 50 years, aviation has run the gamut from gliders to intercontinental bombers. The future could be just as startling.

Science News Letter, November 14, 1953

ASTRONOMY

New Comet Faint And Short Tailed

➤ A FAINT new comet has been sighted not far from the pole star in observations at Palomar Observatory in California.

The new comet will be known as Abell Comet after its discoverer, George Abell.

The object is of the 15th magnitude and it has a very short tail. What will happen to this new object can not be told until other astronomers have observed it for a short time and its orbit can be computed.

Science News Letter, November 14, 1953