

Sixty years ago this month, Jimmy Doolittle took off under a hood and flew solo on instruments alone.

FLYING BLIND

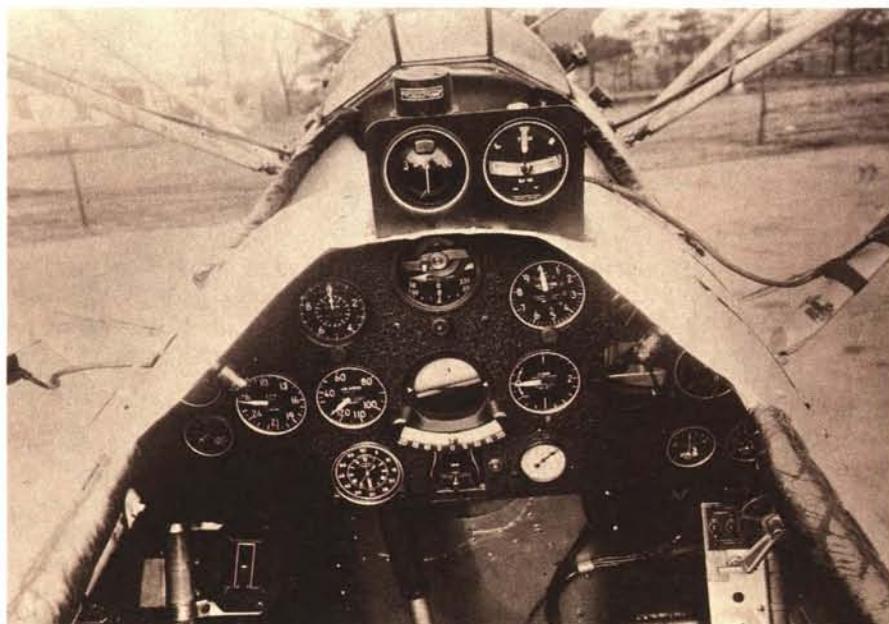
BY C. V. GLINES

THERE are two outstanding and truly significant dates in aerospace history: December 17, 1903, when the Wright brothers proved controlled flight was possible in a heavier-than-air machine, and July 20, 1969, when Neil Armstrong and Buzz Aldrin walked on the moon.

Another date between those two should be remembered for its significance to aerospace progress: September 24, 1929. That was the day Lt. James H. "Jimmy" Doolittle made the first complete flight from takeoff to landing solely by the use of instruments and radio.

Up to that time, scheduled air travel had been stymied because of man's own limitations—susceptibility to vertigo or a false sense of motion. Humans are unable to fly "blind" in the clouds for any length of time, although many tried, convinced that they were so gifted they could fly through any kind of weather "by the seat of their pants." Their contempt for bad weather led to many deaths as aviation went through its gestation period.

The inability of pilots to fly in bad weather meant that the airplane would never be able to compete



This photo of the Consolidated NY-2 trainer's cockpit shows several of the instruments Lt. Jimmy Doolittle used in blind-flight experiments. An artificial horizon and directional gyroscope (center of instrument panel) and a sensitive altimeter proved the right combination for directional control.

with ground transportation. Many thought the problems of blind flight would never be solved.

In the mid-1920s, gyro instruments and more accurate altimeters were being tested, a few pilots were being trained in instrument flying, and air navigation using low-frequency radio ranges was being investigated. An enlightened few

thought that if aircraft instruments could be perfected and married with the burgeoning radio arts of the day, perhaps the mysteries of aircraft flight in bad weather could be solved.

The Full Flight Laboratory

One of those progressive thinkers was Daniel Guggenheim, wealthy

industrialist and philanthropist, who established the Fund for the Promotion of Aeronautics in 1926. To carry out one aspect of Guggenheim's program, the Full Flight Laboratory was established at Mitchel Field, N. Y. Jimmy Doolittle was borrowed from the Air Corps to share direction of the Laboratory with Prof. William G. Brown of MIT.

Many experiments in blind landing under foggy conditions that had been previously conducted in England and France were studied: tethered balloons lined up with the landing runway to lead planes in, an electrified cable system, and the dragging of weights behind planes. Experiments with sonic and radio altimeters and various fog-dispersal methods were tried. None of these worked.

The Laboratory purchased two aircraft: a Consolidated NY-2 training plane, noted for its ruggedness, and a Navy Vought Corsair O2U-1 for cross-country flying. Several kinds of test instruments were installed on the NY-2, but the Sperry artificial horizon and directional gyroscope proved to be the right combination for directional control, along with the sensitive Kollsman altimeter. Doolittle, with Lt. Ben Kelsey along as safety pilot, made more than a hundred blind flights and landings under the hood.

"To make a landing," Doolittle explains, "the plane was put into a glide at sixty mph, with some power on, and flown directly into the ground. The landing gear absorbed the shock, and if the angle of glide was just right, the airplane didn't even bounce."

During the radio phase of the tests, it was decided that, while aural nulls (periods of silence) over a station were satisfactory for rough aerial navigation, a visual indicator in the cockpit would give the pilot the precise directional control needed during the final phase of blind landings. A pair of vibrating reeds connected to the radio set worked best. Doolittle explains:

"If the pilot was to the right of the radio beam, the left reed vibrated more vigorously and vice versa. If on course, both reeds vibrated through the same arc. As the plane approached the radio station, the amplitude of vibration increased. A



Lieutenant Doolittle prepares for a test flight (note different instruments from those in the preceding picture). To cut off all visual cues other than those provided by instruments, a hood (shown here rolled down) was fitted over the cockpit. Lt. Benjamin S. Kelsey occupied the front cockpit as a safety pilot.

single reed started to vibrate as the fan-type marker beacon was approached. It reached maximum amplitude, quickly dropped to zero when the plane was directly overhead, rapidly built up to maximum again, and then tapered down as the plane pulled away. The homing range indicator also had a distinct null in the headset when the plane was directly over the range station."

Flying Through the Fog

On the morning of September 24, 1929, thick fog engulfed Mitchel Field, and Doolittle decided to make an actual instrument flight—alone. The ground radios were manned and the radio beacons turned on. Doolittle taxied out and took off. "Came through the fog at about 500 feet," he recalls, "and made a wide swing coming around into landing position. By the time I landed ten minutes later, the fog had just started to lift."

Doolittle had wanted Guggenheim to witness the flight in actual weather, but hadn't waited because he was afraid the fog would disperse. When Guggenheim arrived, Doolittle wanted to make another

solo flight under the hood to prove it could be done, but Guggenheim insisted that Ben Kelsey go along as safety pilot. Doolittle made the circuit using the instrument landing procedure he had developed. Kelsey flew with his hands held high in the slipstream so all could see he was not doing the flying.

"However, despite all my previous practice," says Doolittle, with an embarrassed grin, "the approach and landing were sloppy. So far as I know," he adds modestly, disregarding his many hooded practice flights, "this was the first time an airplane had been taken off, flown over a set course, and landed by instruments alone."

This landmark flying feat by the "master of the calculated risk" marked the beginning of a new era for aviation. On Sunday, September 24, 1989, the sixtieth anniversary of that flight, a sculpture of Doolittle will be unveiled near the Jimmy Doolittle Hangar at the former Aircraft Radio Corp.'s airfield at Boonton, N. J., where Doolittle consulted many times with ARC's experts during the Full Flight Laboratory experiments. ■

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