

AVIATION

'No Hands' Landing

For the first time, a commercial aircraft can land when weather makes the runway completely invisible, with almost no help from the pilot—By Jonathan Eberhart

➤ **ALTHOUGH AIRPLANES** will no doubt continue to need pilots for many years to come, a new landing system makes it possible for a plane to land itself without the pilot lifting a finger.

More than 2,500 "hands-off" landings have been made by Lear Siegler, Inc., designer/manufacturer of this All-Weather Landing System (AWLS), which takes up less than a cubic foot, weighs 52 pounds, and costs about \$60,000.

The AWLS takes up where ordinary instrument landing systems leave off—over the end of the runway.

In a conventional instrument landing, the plane follows an automatic glide path beacon down to about 50 feet above the airstrip at which point the pilot takes over for the critical "nose-up" maneuver that changes the angle of the plane for touch down on the runway.

The AWLS, instead of giving control to the pilot, just switches over to a different beacon, a radioaltimeter, which enables the system to keep the plane's nose up to the proper angle.

The Federal Aviation Agency is evaluating the system, along with several less dramatic ones, in an effort to cut the minimum

legal ceiling and visibility distances in half. Pilots must now select an alternate landing field if ground observers cannot see for at least half a mile up to a height of 200 feet.

Alitalia Airlines is already using the system in 20 Caravelle aircraft flying to France and Italy. France has already passed regulations permitting landings with 100-foot ceilings and one-quarter-mile visibility.

SUD Aviation, builder of the Caravelle, is now installing the system in every Caravelle that comes off the production line. United Airlines, so far the only domestic carrier to use the Caravelle, is reportedly only awaiting FAA approval to take up serious negotiations for the purchase of the units.

A United Air Lines Caravelle, carrying this reporter and about 40 others, made three perfect "hands off" landings and one deliberate overshoot of the runway. The remarkable success of the first landing brought spontaneous applause from the press.

An official of Lear Siegler estimated that in less than ten years almost every jet airliner in the world will be using the AWLS, at least for low-visibility landings, if not for totally automatic, "zero-zero" ones.

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United Air Lines

LOOK, NO HANDS—United Air Lines pilots monitor instruments during "hands-off" landing in Caravelle jetliner. The key to the system, the little black box just below the captain's right arm, activates the automatic landing system.

AVIATION

Supersonic Transports Come Closer to Reality

➤ **IF THE INFORMATION** from two weeks of tests at White Sands missile range is correct, what has been called the biggest single obstacle in the path of America's supersonic transport (SST) program has been dismissed as no problem.

Six months of supersonic flights over Oklahoma City, Okla., brought 8,335 property damage claims to the Federal Aviation Agency.

However, jet pilots from Holloman AFB, Alamogordo, N. Mex., sent shock waves up to six times as strong through a group of test buildings, causing nothing but a few almost-invisible plaster cracks.

Most of the Oklahoma City flights produced shock waves, or "over-pressures," between 1.5 and 2 pounds per square foot, roughly the same as the ones that will be caused by the SST. At White Sands, over-pressures of 13.2 pounds produced little or no damage.

Though the tests are primarily concerned with building damage, two other areas are being investigated. During the week of Dec. 7, motion picture cameras will record a group of sleepers during sonic booms to determine their reactions.

In addition, several people from different age groups are having their hearing tested directly after each boom. This is to determine whether there is any cumulative effect resulting from the noise and shock wave.

Though none of the current tests have been completed, and more are still to come, the White Sands tests have shown that the SST is coming ever closer to reality.

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ASTRONOMY

Comet Birth Near Earth

➤ **A RARE FORM** of carbon detected in the light of comets indicates that these visitors to the sun's neighborhood were born near the earth.

They are, therefore, not wanderers from interstellar space that have strayed into the solar system. The carbon 13 spotted in Comet Ikeya shows that comets were probably formed in the same region as the earth, then blown into their vast elliptical orbits by the sun's wind.

Drs. Jesse L. Greenstein and Antoni Stawikowski, using the 200-inch telescope atop Mt. Palomar in California, discovered the rare form of carbon in spectroscopic observations of Comet Ikeya. This is the first time that any rare isotope has been definitely detected in a comet and its abundance measured.

They found that the ratio of carbon 13 to the common form of carbon 12 is essentially the same in Comet Ikeya as it is in humans. The ratio is one atom of carbon 13 to every 70 of carbon 12, similar to the earthly ratio of one to 90.

Comets have been called celestial "icebergs" because they are great blocks of frozen gasses, such as carbon dioxide, and

ice. Discovery of carbon 13 was possible because of Comet Ikeya's unusual brightness—it could be seen without optical aid last year—and because of observations with the 200-inch telescope on two nights of exceptionally good visibility.

The astronomers were, therefore, able to use the telescope's spectrograph to sort the comet's light into its various wavelengths, spreading it out sufficiently to reveal details never before seen in the spectral pattern of a comet.

Each line on a spectral photograph represents a specific wavelength that shows the chemical composition of the light source.

The fact that the carbon isotope ratio is similar for both Comet Ikeya and the earth, Dr. Greenstein said, makes it likely that comets are made of materials left over after the planets were formed.

The 200-inch telescope of Mt. Wilson and Palomar Observatories is operated jointly by the California Institute of Technology and Carnegie Institution of Washington. Dr. Stawikowski is on leave from Poland's Nicolas Copernicus University. The observations of Comet Ikeya were supported by the Air Force Office of Scientific Research.

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