

Technology Notes

AIR SAFETY

Jet Engines Safe from GHOST

A package of electronic weather instruments has been sucked through a jet engine with no visible change in engine performance.

Testers wanted to find out whether balloon-borne instruments could safely be released by the thousands at air traffic altitudes without becoming a major aviation hazard. Up to 10,000 balloons are planned by the Environmental Science Services Administration as a Global HORIZONTAL Sounding Technique (GHOST) to collect meteorological data from 18,000 to 100,000 feet.

The instrument package in the test, an 8.5-inch-diameter hemisphere packed with transistors, resistors and an outer layer of solar cells, was reduced to junk by its trip through a Pratt and Whitney JT3D-1 turbofan, the type that powers Boeing 707 and Douglas DC-8 jetliners. Yet when the engine was torn down for examination, the total damage was found to consist of a quarter-inch-square nick in the outer edge of one compressor blade and a bent edge in another.

Though such damage on an actual aircraft should certainly be repaired when the plane lands, said a Federal Aviation Agency observer, it would not disrupt the flight in any way. The plastic GHOST balloons, says ESSA, are no problem because they become brittle in the cold of high altitudes and would turn to harmless bits in an engine intake.

MEDICINE

Laser Fights Cancer Through Fibers

British scientists are developing techniques to send laser beams through glass fibers, in hopes of being able to treat some internal cancers—including presently inoperable ones—without surgery.

Thanks to recent improvements which cut light loss during transmission through fiber optic bundles, scientists at the Taylor-Hobson Division of the Rank Organization in Middlesex, England, are using the fibers for laser blasts, whose concentrated energy could be used to burn out cancerous cells. Presently, 70 percent of the light is lost in passing through a six-foot fiber bundle.

OPTICS

Quartz Rod Lightens the Picture

An improved version of the endoscope, a long thin viewing device with its own light source for examining hard-to-reach places, uses a quartz rod to provide illumination 10 times as efficiently as fiber optics.

Using a conventional 250-watt movie projector lamp, the pencil-thin rod reportedly allows 200 watts of light to reach the other end, even in instruments more than a yard long. Viewing angles of from eight to 55 degrees are possible, according to Arnold W. Young of the Engis Equipment Co., Morton Grove, Ill.

First developed in England in 1963, the device presently consists of the quartz rod, a skinny microscope with a lens about every 1.5 inches and a space between them through which air is circulated to prevent fogging. The

tube housing the components is about three-eighths of an inch in diameter. The Army has expressed an interest in using the endoscope for inspecting machine gun barrels, which would require a unit only one-fifth of an inch thick.

COMMUNICATIONS

Antenna Shifts Help Microwaves

The effects of radio wave scattering, a cause of fading and other problems in microwave signal reception, can be reduced using a transmission technique devised by University of Wisconsin researchers.

Prof. William P. Birkemeier and graduate student Ordean S. Anderson found that reception of beamed radio signals can be improved in many cases by a slight shift in direction of the sending antennas. "Instead of aiming directly at the site of the receiving antenna, on the great circle, we shifted to one side or the other," Birkemeier says. "Better reception indicated that we had compensated for the beam bending caused by atmospheric disturbances."

METALLURGY

Nitrogen Smooths Metal Quenching

A process that can markedly reduce uneven stresses and warping due to rapid, uneven cooling after heat treatment of high-temperature alloys is being marketed by the Linde Division of Union Carbide Corp., New York.

Called cryoquenching, the process uses liquid nitrogen at a temperature of minus 320 degrees F. Ordinarily, a heated part such as an aluminum strut is placed in a tank of water, where the heat forms a thin blanket of vapor at the part's surface that provides slow, even cooling. The blanket lasts only a short time, however, and contact with the liquid causes faster cooling, with resultant stresses in the metal.

With liquid nitrogen, heat transfer is accomplished almost entirely by radiation and conduction through a continuous vapor blanket. Developed by Eberhard Dullberg of Grumman Aircraft Engineering Corp., Bethpage, N.Y., cryoquenching has been saving Grumman thousands of man-hours per year.

OPTICS

Traffic Light Phantoms Ended

Confusion caused by the apparent illumination of both the red and green traffic signals by the rising or setting sun can reportedly be eliminated by a new kind of glass developed at the Sendlinger Optische Glaswerke in West Berlin.

The new glass absorbs all light rays that strike it from outside, so that the signal remains dark until illuminated from within. Field tests have been completed, and signal lenses have been ordered by the city of Hamburg for 350 traffic lights that are most prone to what is termed the phantom effect.