Technology Notes

AVIATION

Feeding the Choppers

A new closed-circuit refueling system for the UH-1A "Huey" helicopters now being used in Vietnam reportedly has cut refueling time in half.

Using the new system, developed by the Army Aviation Materiel Laboratories, Fort Eustis, Va., aircraft can be refueled while engines and rotors are running; up to 30 extra gallons of fuel can be carried in the tanks; fuel contamination is reduced; battery wear, which eventually forces a need for "hot starting," is reduced; the need for an electrical grounding cable is eliminated.

A quick-disconnect fitting that automatically seals the tanks when the nozzle is removed allows extra fuel to be taken on by enabling the helicopter to stay on the ground until the last minute. The Army says that the system can be adapted to other types of helicopters, as well as to fixed-wing aircraft and ground vehicles.

CHEMICAL ENGINEERING

Fuel Cell

Texaco research scientists at Beacon, N.Y., have developed an intermediate temperature fuel cell operated on hydrogen and oxygen.

W. B. Mather Jr. and A. N. Webb reported to the American Chemical Society meeting in New York last week that they have operated these cells at 200 degrees C. continuously for three months. Cell power densities as high as 110 milliwatts per square centimeter have been attained, but they say a density of 65 to 70 is more reproducible.

The paste electrolyte consists of boron phosphate dispersed in phosphoric acid. Mather and Webb said the phosphoric acid electrolyte is thermally stable, rejects carbon dioxide, has high ionic conductivity, has good mechanical properties, and does not need regeneration with water.

ACOUSTICS

Miniature Sonic Booms in the Lab

In order to study sonic booms in the well-instrumented convenience of their laboratories, three physicists have been using tiny microbooms produced by an electric spark.

The spark creates a shock wave much like that of a plane crossing the sound barrier, but microbooms only occupy a tidy half-inch of space at any given instant. Their chief disadvantage, according to Dr. D. T. Blackstock of the University of Rochester, N.Y., is that they are spherical rather than cylindrical, unlike regular sonic booms. This can be corrected mathematically, however, he said.

Dr. Blackstock suggested that future studies of boom effects on structures might be carried on in the laboratory with microbooms and miniature houses and other buildings.

TRANSPORTATION

A Walking Truck

General Electric, under the Defense Department's Advanced Research Projects Agency, has taken another step toward the age of robots with its "walking truck," or Quadruped.

Shaped like a 10-foot-high giraffe with the operator slung where the ribs would be, Quadruped, says GE, will carry a quarter-ton load over "extremely rugged terrain impassable to wheeled or tracked vehicles, at speeds up to five mph." Future versions are intended as cargo or troop carriers, portable mounts for artillery or ship-to-shore shuttle transports.

COMMUNICATION

High-Flying Emergency Radio

A pocket-sized emergency radio that will enable two-way communications over a 50-mile range with a balloon-borne antenna will be tested by the Air Force this spring.

Originally designed for use during spacewalks in case an astronaut becomes untethered, the transceiver has only about a five-mile range on the ground. The additional range will come from a 2-by-4-foot balloon which can be inflated from a small gas cannister to loft the antenna 120 feet into the air. Balloon, tether and gas supply will weigh less than 24 ounces.

An emergency-tone generator built into the unit will offer a range up to 80 miles. The transceiver was developed by Sylvania Corp., Waltham, Mass.

METROLOGY

Measuring Projectile Fragments

A device which can measure the cross-sectional areas of projectile fragments in only three seconds has been developed by the Army for evaluation of high-explosive ammunition.

A shell fragment is simply dropped down a chute, and at the press of a button the average cross-sectional area is shown in square inches on an electronic counter. Electron beam scanning of the fragments is the heart of the electronic planimeter, which can do in five minutes what used to require eight hours with the previously-used oil drop method.

AIR SAFETY

Go-No-Go Systems for Aircraft

Two aircraft checkout systems that will signal automatically if something is malfunctioning enough so that the plane should not take off, are being tested by the Army.

One is the Automatic Light Aircraft Readiness Monitor, aptly named ALARM, in which temperature, pressure and vibration sensors automatically establish an aircraft's flightworthiness. The other is called the Sonic Analyzer, based on the idea that almost all rotating components produce characteristic sounds, whose frequency patterns can indicate defects.