

# aerospace notes

## SPECTROSCOPY

### Moon analyzer being calibrated

A unique low-energy X-ray detector is now being calibrated by scientists of the U.S. Geological Survey in Washington, for whom it will analyze a wide variety of materials, including some of the first samples brought back from the moon's surface by Apollo astronauts.

All elements give off characteristic radiation when bombarded with X-rays, but some of the lightest elements—such as carbon, nitrogen and oxygen—emit X-rays of such low energy that they are absorbed by air. Low-energy radiation is also given off by several heavier metals such as gold, platinum, uranium and mercury. The detector is therefore enclosed in an extremely high vacuum, thus allowing these elements to be studied.

Besides analyzing lunar samples, the one-ton, 6.5-foot-high detector will be used by marine geologists studying the resources on the sea floor, by hydrologists investigating the chemistry of surface and ground water sources, and by volcanologists and geophysicists examining the rocks in the earth's crust.

## PROPULSION

### Predicting solid fuel shelf life

One of the most cited advantages of solid rocket propellants over liquids is that they have a long shelf life with minimal deterioration. With new propellants being designed at an increasing rate, the Air Force has asked Lockheed Propulsion Co. in Redlands, Calif., to find a way of predicting the useful shelf life of advanced solids.

Over a two-year period, Lockheed will try to define the critical processes that take place as a propellant ages, then to look for kinds of physical and chemical measurements that can be used to predict them.

In the past, shelf life has been predicted on the basis of accelerated aging tests. Such data, the company says, can be misinterpreted, so long-term surveillance programs have been necessary to make sure the initial estimates were right.

## POLICY

### The organization gap

The biggest obstacle to the development of an operational satellite navigation system for aircraft is a mountain of confusion and red tape, rather than any technological difficulty. So reports Vernon I. Weihe, consulting engineer, speaking to a gathering of air transportation specialists sponsored by the Society of Automotive Engineers.

"The greatest deterrent," he says, "is not operational, technical or economic. The major impediment is that the organizational structure in the world today for getting this type of system into service is in disarray, and the portions which are functioning do not have the degree of sophistication required to meet this challenge."

Within the U.S., he says, "research and development cognizance . . . is so divided that agreement on an optimum or near-optimum program is probably impossible." Responsibility for such a system has to bounce around among the National Aeronautics and Space Ad-

ministration, the Defense Department, the State Department, the Federal Aviation Administration, the Civil Aeronautics Board and the Federal Communications Commission. The inclusion of other nations magnifies the problems.

However, Weihe says, it is vital to improve the present situation. "The air traffic control and navigation complex which exists today is essentially a hodgepodge of war surplus systems which have been reconfigured using modern components." Unfortunately, he concludes, the centralized control that is necessary is at present politically unfeasible.

## MEDICINE

### Heart-watching at Cape Kennedy

Launch crews at Cape Kennedy are participating in an experiment aimed at learning how stress on the job affects a person's heart.

A portable electrocardiograph is being carried by some technicians to record reliable tracings of heart activity while they work. The instrument consists of an eight-hour tape recorder worn at the waist and three sensors on the chest near the heart.

"When we take the tape recording back to the medical department, it gives a visible oscilloscope picture to study, and gives tracings the same as larger, stationary electrocardiographs," says Dr. H. Glenn Gardiner, medical director for Trans World Airlines, which provides support services at the cape.

"We are still in the infancy of manned space flight," he says. "We need studies now to compare with later launches."

## NAVIGATION

### Laser in a lighthouse

Pilots in the area of Moreton Bay in Queensland, Australia, are being asked to report on the effectiveness of a laser beam being tried out as a lighthouse beacon.

The laser beam, installed in the Cleveland light in the bay, is being evaluated by the Department of Harbors and Marine. A rotating reflector will direct the laser's thin beam through an arc that will cover the entire bay entrance. The beacon is expected to be visible for 40 miles, making it usable as a navigation aid.

## COMMUNICATIONS

### Giant satellite for military talk

A satellite as tall as a two-story house and weighing some 1,600 pounds is now being built for the Defense Department, which hopes it will become the basis for a worldwide Tactical Satellite Communications system, to give individual soldiers instant communications with distant command centers.

The prototype will be able to handle 10,000 two-way conversations simultaneously. Eight separate antennas will handle communications in the standard military UHF band, as well as the super-high-frequency part of the X-band set aside exclusively for military satellites. The synchronous satellite is expected to be aloft late this year or early next.