ENGINEERING

# TV Speeds Radar Data

AN ARMY-AIR FORCE experiment has proved that closed-circuit television can speed up exchange of radar information between the two services.

Lt. Col. Hollis Dakin and Lt. Paul A. J. Bue, Army Pictorial Center, Long Island City, N. Y., tell how TV was used in Virginia to exchange information on planes approaching the Norfolk area.

A television camera, using a highly sensitive vidicon tube, monitored the plotting board at the Air Force's installation at Cape Charles. The picture was relayed southward 18 miles to the Army's Fort Story base, and then westward another 18 miles to the Army's Norfolk base.

The picture was displayed on a closed-circuit TV monitor near the Army's own plotting board in Norfolk. This enabled the man plotting Army radar data to see and plot quickly Air Force radar data. With a two-way system, the Air Force could likewise plot Army radar data quickly.

Exchange of radar data this way showed that the time lag could be cut sharply between plotting the Air Force "spot" at Cape Charles and plotting the same spot at the Army's Norfolk base. The time lag in plotting was cut routinely to 25%, and sometimes to as little as 16%, of the time previously required by the telephone-relay method.

In this old method, an Army man stationed at the Air Force base read the plot from the Air Force plotting board, then by telephone told Army plotters in Norfolk where to plot the spot. This step was involved, the two officers report in the *Journal of the Society of Motion Picture and Television Engineers* (May).

First the Army man at Cape Charles had to read the Air Force plot, then explain the plot verbally to the Army plotter in Norfolk. In turn, the Army plotter had to translate the verbal information into a plot for his board. Sometimes, the time lag was so great that decisions had to be made as to whether there was one or two "targets" in areas where radars of both services overlapped.

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ASTRONAUTICS

# Complex "Moon" Succeeds

EXPLORER VI, sent up on Aug. 7, is the most complex satellite launched by the United States.

The 142-pound satellite orbits the earth from 150 miles at its lowest point to some 25,000 miles at its farthest, completing one revolution in 12.5 hours. This highly elliptical flight path means that the satellite's instruments will cover a larger volume of space near earth for a longer time than any previous satellite.

Scientifically, probably the most interesting information to be radioed back from space during its predicted lifetime of at least one year will come from the three devices contained in the satellite to map the radiation belt ringing the earth. Each of these instruments concentrates on recording a specific radiation energy level. From their telemetered readings scientists should be able to determine exactly how dangerous the earth's natural radiation belts will be for future space travelers.

For space probes and trips to the moon and planets, performance of some of the technical equipment included for the first time in a satellite will also be of great interest. Of particular importance is the efficient operation of the 8,000 solar cells carried on its "paddle wheels" to convert the sun's energy into electricity for recharging the satellite's chemical batteries in flight. The electronic gear in the satellite run by the batteries, in addition to the scientific equipment, includes three transmitters and two receivers.

Another technological development being tested for the first time is the use of digital telemetry. The space data thus transmitted earthward are much easier to handle and much more rapidly available than when the information is sent in analogue form.

One light-weight device in the satellite measures its velocity in orbit. This will allow scientists, for the first time, to determine if a change in course is necessary. The satellite has at its center a five-pound, solid propellant "kick" rocket that can be used to lengthen its lifetime by lifting its perigee point if necessary.

Peeping out of one side of the payload is a small open lens that it is hoped will give the first television-like picture of the earth from space.

Other experiments include a micrometeorite detector to guage the size and speed of meteoric particles hitting the satellite, two types of magnetometers to map the earth's magnetic field, and four methods for studying the behavior of radio waves.

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PHYSIOLOGY

## Anxiety, Fear Important In Pain-Relieving Drugs

EXPERIMENTAL PAIN is very different from "natural" pain and true anxiety or fear may be the difference.

Some long-term studies have shown that persons with either acute or chronic pain respond in a "remarkably precise quantitative fashion to a given dose of a given narcotic." However, this is not true in experimentally caused pain, Dr. Henry K. Beecher of the Massachusetts General Hospital, Boston, reports.

In evaluating the effects of narcotics or analgesic drugs that relieve pain, using humans in experimental pain situations presents problems. It is impossible to make even cautious generalizations about pain caused by illness or surgery, for instance, based on experimental pain.

Dr. Beecher suggests, however, that experimental pain produced slowly may be useful in judging pain-relieving drugs. An anxiety factor or fear may thus be introduced similar to the "real life" situation, he concludes in *Science* (July 31).

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