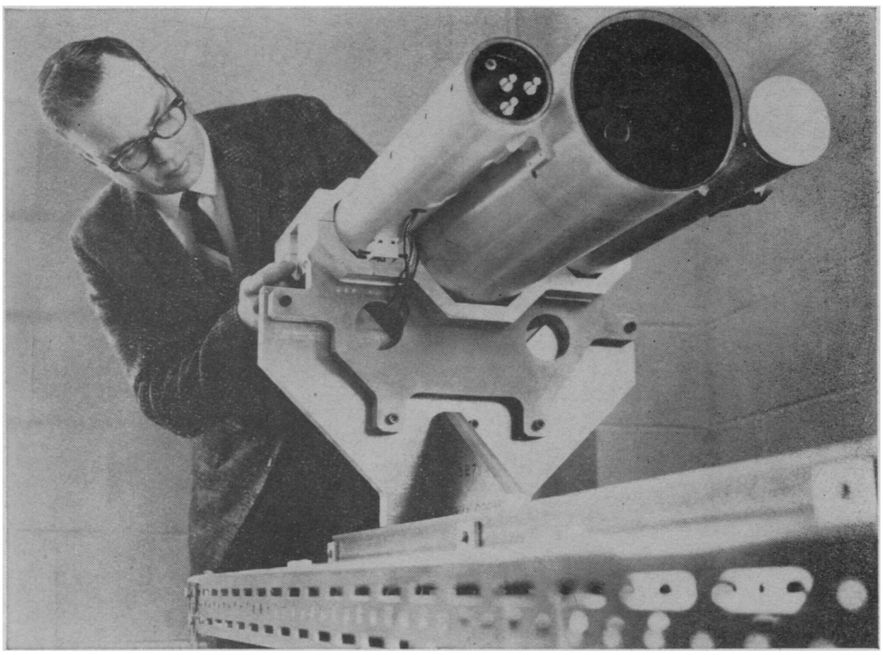

GT & E

TRACKING SYSTEM—An electrically scanned laser tracking system has been developed at subsidiaries of General Telephone and Electronics Corporation. Engineer Robert Johnson is inspecting the beam deflector (left tube), the tracking telescope (center tube) and the receiving unit (right tube) at the Buffalo, N.Y., facilities of Sylvania Electric Products Inc. The deflector was developed by General Telephone and Electronics Laboratories Inc., Bayside, N.Y.

PHYSICS

Sun Protons Affect Moon

➤ PROTONS thrown spaceward by the sun and slamming into the moon could make the lunar surface hard, an experiment at the U.S. Atomic Energy Commission's Savannah River Plant in Georgia has shown.

That the moon's surface is not covered with a thick layer of dust, as some astronomers had thought, was established by the U.S. Surveyor I and the Russian Luna 9 landings.

A test by Dr. Arthur C. Damask of the AEC's Brookhaven National Laboratory, Upton, N.Y., showed that proton irradiation can bond silica sand, a likely constituent of the lunar surface, into a self-supporting solid mass. Protons are the cores, or nuclei, of hydrogen atoms.

Dr. Damask bonded a silica sample into a solid by exposing it to the high dose of 600 million billion neutrons in the Savannah nuclear reactor. The most damaging particles bombarding the lunar surface are solar protons, with a mean energy of about 2,000 electron volts at the rate of some 100 million particles per square centimeter per second.

If the radiation dose from the reactor is assumed to be the minimum amount required for bonding silica sand, a rough estimate can be made of the equivalent exposure time on the lunar surface. Calculations show that about 600 million million protons should correspond to this threshold for bonding silica sand.

To produce a reasonably strong solid, the exposure time would have to be considerably longer than the threshold time.

On the basis of micrometeorite bombardment, scientists estimate that a complete turnover of the upper one centimeter of moon dust takes place in about 10,000 years. Thus there has been plenty of time for the solar proton irradiation to bond the moon dust into the firm surface observed by Surveyor I.

• *Science News, 89:510 June 25, 1966*

TECHNOLOGY

New Laser Can Find 'Lost' Targets

➤ THE FIRST electrically scanned laser system that also is more precise than radar in tracking rockets during launch periods has been developed.

The unit, which uses a highly concentrated light beam to locate and track its target is the first laser system capable of relocating a rocket momentarily "lost" in a cloud bank. Laser tracking systems that are scanned mechanically cannot be moved rapidly enough to relocate a speeding target once the target has been lost. In its present stage of development, the system can pinpoint, within 12 inches, the exact location of a rapidly moving object up to a height of eight miles.

The system, being built by Sylvania Electric Products Inc., for the National Aeronautics and Space Administration, is expected to be tested at Cape Kennedy, Fla., next year during a Saturn V launch.

A laser, which produces coherent light in a pencil-thin beam, is more discriminating than a radar system at short ranges.

It can select a very small target while radar "reports" all objects within its broader view.

During launch periods, radar screens tend to become cluttered with extraneous targets, such as gantries and other launch equipment, while the laser is aimed only at the target vehicle itself. In theory, a deviation in the rocket's direction at launch can be detected more precisely and hence faster by a laser.

A key component of the laser system is an optical deflector that searches out the target by reaiming the laser beam electrically when contact with the target is interrupted.

• *Science News, 89:510 June 25, 1966*