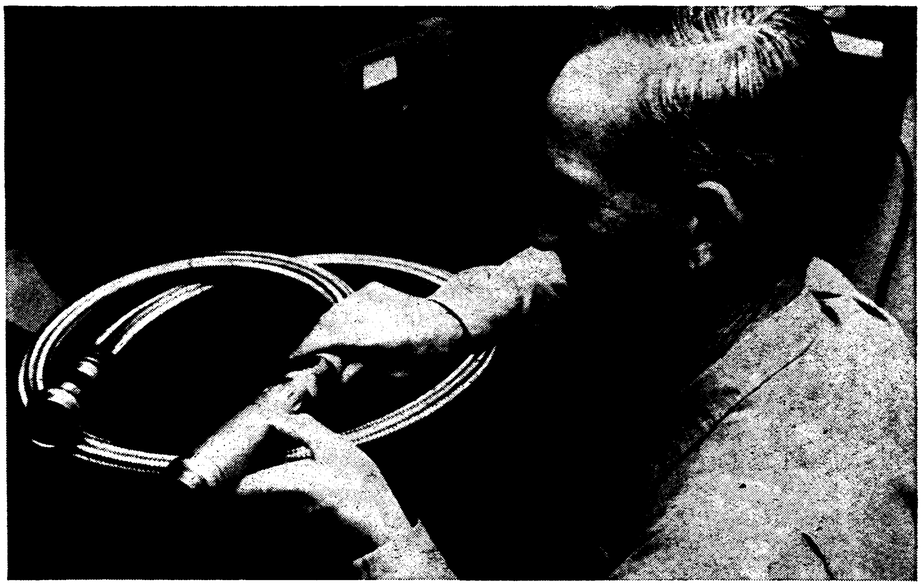

NASA

SEE AROUND CORNERS—Two technical marvels developed for the space program are displayed by Carl T. Huggins, an engineer at the National Aeronautics and Space Administration's Marshall Space Flight Center, Huntsville, Ala. In his left hand is one of the smallest television cameras yet made, attached to a fiber-optics "bundle" that allows the camera to literally see around corners.

TECHNOLOGY

Two-Mile Beam Pulsed

➤ THE WORLD'S biggest linear accelerator flashed a pulsating beam of electrons through its full two-mile length, marking a milestone on its way toward completion as the nation's newest research facility for high energy physics.

The $114 million atom smasher is being built by Stanford University under contract with the Atomic Energy Commission.

The accelerator produced electrons with energies of 10 Bev (billion electron volts), operating at reduced power.

"The accelerator's performance in its first full-length turn-on is better than we had any right to expect," Prof. Wolfgang K. H. Panofsky, director of the Stanford Linear Accelerator Center said. "We had assumed we might need as much as another year for readjustments and tune-up before using the beam in experiments. Now it looks as though we might begin research operations within six months."

This event climaxed 10 years of study, design work and construction begun by Stanford scientists in 1956.

Between now and the time of full research capability much work remains to be done. The installation of magnets and other components to direct the beam to research areas is now under way. The analytical devices to perform the experiments in the research areas are now being manufactured.

At full energy the accelerator is expected to generate up to 20 Bev and beam currents (number of electrons accelerated) as high as 30 microamperes. This would be nearly 20 times the energy and 30 times the current of the largest existing linear accelerator in the U.S., Stanford's Mark III Accelerator.

More energy means greater ability to "see" into the atomic nucleus. Higher current means more electrons in the beam to bombard nuclear targets, hence more reactions yielding more information.

The accelerator sends a beam about the size of a pencil in cross-section in an absolutely straight line. The pipe along which the beam travels has to be straight within one millimeter or about 1/25th of an inch, over its entire 10,000-foot length.

• *Science News, 89:439 June 4, 1966*

TECHNOLOGY

Plastic Fibers Can Transmit Light

➤ PLASTIC FIBERS can now transmit light just as small copper wires conduct electricity.

The new light transmitting media, developed by the Du Pont Company and trademarked "Crofon" light guides, are a tough and flexible form of fiber optics. Until now, glass has been the primary material used for this purpose.

Applications of the plastic light guides include illuminating relatively inaccessible areas and lighting many locations from a single source, such as the instrument panel on an automobile or aircraft. The system also permits confining light to a small area, and may be used to conduct light to photocells for various sensing and control systems.

In fiber optics, light travels a zigzag pattern in a transparent core by internal reflections from a surrounding medium. Each plastic fiber in a Crofon light guide has a core of Lucite polymethyl methacrylate sheathed with a special plastic of a lower refractive index. These fibers are made up in bundles and the number of strands in each bundle determines the amount of light that will be transmitted.

Unlike glass fiber optics, the plastic material can be manufactured in almost unlimited lengths.

The new plastic light guides are extremely tough and flexible. An individual 10-mil (0.010 inch) fiber, for example, can be tied tightly in an overhand knot without breaking. This allows the light guides to be readily bent around a small radius and subjected to repeated flexing and vibration safely.

• *Science News, 89:439 June 4, 1966*

TECHNOLOGY

Fiber-Optics Camera Looks Around Corners

➤ A WINDING COIL that looks like a segment of garden hose allows a camera to literally see around corners, over obstructions and even twist itself back to see the camera itself. This can be done using fiber-optics, a technology that will be used in spacecraft in combination with television to check on the operation of the vehicles after launch.

A fiber-optics tube containing thousands of optical fibers can be twisted into places inside a rocket between a TV camera and the area being watched. Small numbers of tiny optical-quality glass fibers are fused into blocks from which "bundles" containing hundreds of thousands of fibers are made. They are then placed into the bundles made of flexible, stainless steel, hydraulic hose. A TV camera is set at one end and an optically clear, heavy quartz window at the other holds it nearest the section of the spacecraft being observed.

A TV system using a fiber-optics viewing system designed by the Boeing Co. will be used to transmit four views of the operation of the first stage of the Saturn V booster from the beginning of ground fueling until separation of the S-IC stage about 40 miles above the earth after launch from the Marshall Space Flight Center, Huntsville, Ala. Four fiber-optics viewing systems will send images to two remote cameras located in the rocket's thrust structure. The output of the cameras will be transmitted to a ground station at the NASA-Kennedy Space Center.

• *Science News, 89:439 June 4, 1966*