RESEARCH FACILITIES AND PROGRAMS

Michigan Space Research Lab

The University of Michigan has announced plans to build a $1.75-million Space Research Laboratory under a grant from the National Aeronautics and Space Administration. Construction of the laboratory, which will begin early next year, will enable the University to house most of its space-research activities in one multi-disciplinary research center.

The University's program of space-related research includes about $5.5 million in NASA-sponsored projects in the fields of propulsion, materials, neutral gas and plasma dynamics, astrophysics, cryogenics, nuclear engineering, aeronomy, meteorology, the ionosphere, radio astronomy, guidance and control, and communications.

The new laboratory will be a two-story, 56 000-square-foot building located on the University's North Campus in Ann Arbor near the Aeronautical Engineering and Fluids Engineering Laboratories, the Cyclotron Building, and the Phoenix Memorial Laboratory. It is expected to be ready for occupancy (by a staff of approximately 200) late next year.

Stanford Radar Astronomy Center

Stanford University and the Stanford Research Institute have established a new Center for Radar Astronomy, which will carry out a combined research program involving staff members of the two institutions and will also be intended for the training of graduate students. The center will employ various antennas and transmitters belonging to the University's "antenna farm", including Stanford's 150-ft parabolic reflector, which is one of three largest fully steerable paraboloids in the United States. The instrument was designed to serve both as a transmitting and a receiving antenna. Coupled to it is a transmitter capable of producing a 400 000-watt radar probe for the exploration of the solar system.

Emphasis in the experimental program will be given to work in "bistatic" radar astronomy. In contrast to ordinary or "monostatic" radar work in which both transmitter and receiver are in the same place, the bistatic procedure calls for a ground-based transmitter at Stanford and a receiver carried in a space probe. The receiver would record direct signals from earth as well as signals reflected from the planet that the probe was passing. Comparison of the two signals would yield information about the characteristics of the planet's surface and atmosphere. Such an experiment is being planned for the flight of Mariner C to Mars, scheduled late in 1964. Other experiments have been proposed for the 1964 Pioneer probe of interplanetary space and for the Surveyor craft which is intended to orbit the moon. The center will also do ground-based studies of the ionosphere, magnetosphere, moon, sun, planets, and meteor trails.

The work will be guided by a directorate consisting of Von R. Eshleman of the University's Radioscience Laboratory, Ray L. Leadabrand of SRI's Radio Physics Laboratory, and Allen M. Peterson of both laboratories. Other senior scientists include Rolf B. Dyce of SRI and Owen K. Garriott and Laurence A. Manning of Stanford. Senior engineers are H. Taylor Howard of Stanford and Lambert T. Dolphin, Ronald I. Presnell, and John C. Schlobohm of SRI. Financial support comes mainly from the Air Force Cambridge Research Laboratories and the National Aeronautics and Space Administration, with additional aid from the National Science Foundation and the Office of Naval Research.

The Boulder Geomagnetic Observatory

The US Department of Commerce has announced the forthcoming establishment in Colorado of a new geomagnetic observatory to be operated as a joint project of two of the Department's bureaus, the Coast and Geodetic Survey and the National Bureau of Standards. It will be located at the NBS Table Mesa field station, north of Boulder.

The Boulder Cooperative Magnetic Observatory will be the fourth such facility in the continental United States; the other three are at Fredericksburg, Va., Tucson, Ariz., and Dallas, Tex. The Coast and Geodetic Survey will have primary responsibility for establishing and operating the observatory, and the Bureau of Standards is in charge of its construction. Specialists in earth physics from the Coast and Geodetic Survey and members of the NBS staff working in atmospheric physics will participate in the scientific program. The new observatory is expected to be completed by October of this year, and the magnetic data it will provide will be made available to the scientific community. The station is expected to contribute to research projects carried out in connection with the International Year of the Quiet Sun, which begins on January 1, 1964. The IQSY is an international cooperative effort to extend the observations begun during the International Geophysical Year into the forthcoming period of minimum solar activity.

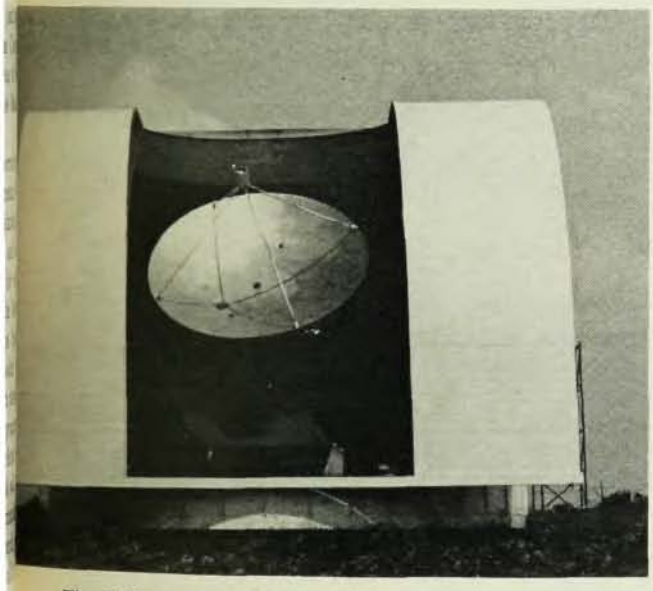
Millimeter-Wavelength Antenna

A new radio telescope, designed for operation at wavelengths previously inaccessible to radio-astronomical observations, was dedicated on June 14 at the University of Texas Electrical Engineering Research Labo-

ratory near Austin. The instrument is a parabolic reflector, 16 feet in diameter, and will normally operate at wavelengths between 30 and 2 millimeters. However, the accuracy of the reflector is great enough to permit observations at frequencies up to 300 Gc. The telescope is housed in a 35-foot dome of the type used to house optical telescopes, and is said to be the only radio telescope so sheltered.

The new instrument is an outgrowth of ten years' work on the characteristics of millimeter-wave radiation at the Electrical Engineering Research Laboratory. In particular, studies of millimeter-wave emissions from the sun and the moon, which were carried out in the past by means of five-foot searchlight paraboloids, convinced the Laboratory's staff that the millimeter portion of the spectrum was a significant field for radio-astronomy observations.

Built with the support of the National Aeronautics and Space Administration, the new reflector will be operated in close cooperation with NASA projects. One of its chief functions will be the determination of the characteristics of the surfaces and atmospheres of the moon and the planets. For the planets, only the nature of the total atmosphere or surface can be measured; however, in the case of the moon, features of areas about one tenth as large as the moon's diameter can be resolved with the mid-range antenna beam of



The 16-foot radio telescope at the University of Texas, designed to operate in the millimeter wavelength region, is housed in dome of type usually associated with optical telescopes.

one milliradian. The information supplied by these observations will be used in planning experiments which may be carried in future space probes.

The Texas Electrical Engineering Research Laboratory is directed by Robert W. Straiton. Its assistant director, Charles W. Tolbert, is director of the radio-astronomy observatory. The facility is part of the Balcones Research Center, located about seven miles north of Austin, Texas.

Atmospheric and Space Physics Lab

The University of Colorado has received a grant of $791 500 from the National Aeronautics and Space Administration for the construction of a new building to house the existing Laboratory for Atmospheric and Space Physics. The NASA grant will finance a 25 000-square-foot structure on the Boulder campus, providing facilities for the study of ultraviolet physics, solar ultraviolet-radiation data from rockets, and the testing of solar-rocket pointing-control mechanisms.

The Laboratory for Atmospheric and Space Physics was organized in 1948 by William B. Pietenpol, former head of the Colorado Physics Department. Its faculty supervisor since 1957 has been William A. Rense, professor of physics at the University. The Laboratory's current projects include the measurement of solar ultraviolet radiation, high-resolution studies of solar ultraviolet lines from rockets and satellites, the measurement of the absolute intensity of far-ultraviolet radiation, studies of the optical behavior of thin films in the ultraviolet spectrum, studies of multiple scattering of light by small spherical particles, the investigation of the causes of ionization in the upper atmosphere, the development of nose-cone pointing devices and telemetry equipment, and the theoretical analysis of rocket data on the spectrum of the sun and the far ultraviolet.

The new laboratory will be the first of a group of new physics facilities which will be erected on the Boulder campus over the next few years at a cost of about $6.7 million. Plans for the complex also include a building to house teaching and research in the Physics and Astrophysics Department, a computer center, and a building for the Joint Institute for Laboratory Astrophysics, which was recently established under a cooperative agreement between the University and the National Bureau of Standards. Both federal and state funds are expected to be applied to various phases of the over-all project.

Neutron Radiation Facility

A 70-inch cyclotron is now under construction at the US Naval Radiological Defense Laboratory at Hunters Point, Calif. Known as the Neutron Radiation Facility, the machine will be used mainly in neutron-damage studies, but proton and deuteron experiments will also be possible. Construction will cost $3 million.

The cyclotron will be housed in a "high-bay" structure, 60 ft by 145 ft. In the center of the building, the accelerator will be contained in a shielded cave with walls varying in thickness from 9½ to 12 feet. Ports in the walls will conduct the particle beam to experimental areas. The building is expected to be complete by the end of October, and the accelerator is expected to be in operation in the latter part of 1965.