

1.2 km long. Combining the signals from each of the fixed antennas with those from each of the movable antennas gives 16 antenna pairs for an observation at any one time. If the movable antennas are repositioned to a number of other viewing stations, a total of 128 pairs becomes available. Additional cable is switched in and out of the circuits that receive and transmit the radio signals, so that when different antennas are used there is no timing error caused by their positions. This design will produce a map about 5 arc min across at a wavelength of 6 cm.

The design of the dish antennas is based on a design used for communication-satellite station antennas. The surfaces are finished to provide accurate operation from 3 to 21 cm, with an angular resolution of from 1 to 7.5 arc sec.

Directional control of the antennas, switching of the compensating transmission lines, rotation of the antenna feed horns (for polarization measurements) and sampling of the signals being received during observation are all controlled by an on-line computer, a Marconi Myriad II. The same computer also performs all data processing on a timesharing basis and can draw maps on a graph plotter.

The Cambridge 5-km radiotelescope will remain the highest resolution instrument for making radio maps until the Very Large Array is completed in New Mexico in the late 1970's.

Proposals requested for Large Space Telescope

The deadline for submission of proposals for participation in the definition and preliminary design of the scientific instruments to be carried on the Large Space Telescope is 23 February. The 3-meter LST, which will have diffraction-limited performance, is being planned for launch into earth orbit by NASA in the early 1980's.

Those researchers whose proposals are selected will work on instrument definition teams under contract to NASA and will prepare the specifications of the instruments to be carried on the LST. The teams will play a large part in determining what information the LST will gather.

The telescope will have a Ritchey-Chretien optical system that will give a wide field of view at the focal plane where the image of a point source will be about 0.04 arc sec. Since the telescope is large and will be outside the earth's atmosphere, it will be able to image details about 10 times finer and to detect point sources about 100 times fainter than is now possible, according to C. R. O'Dell, project scientist, and Nancy Roman, program scientist.

The telescope is expected to open up a new class of astronomical problems and to provide greater capabilities in areas of current research, both in ultraviolet astronomy and in diffraction-limited imagery. In the area of faint-object investigation, for example spectroscopy, photography and photometry of stars and galaxies, the small image size and dark sky will permit investigation of objects up to five magnitudes fainter than presently possible. The high angular resolution of the telescope will permit the study of the structure of astronomical sources with much greater detail than from the ground.

The main instruments planned for inclusion in the LST program, and the ones that will be of greatest concern to the instrument definition teams, are a diffraction-limited camera, a low-dispersion spectrograph and a high-dispersion spectrograph. Other instruments will also be included.

The diffraction-limited camera will be a camera that reads out a small field matched to the resolution of the telescope optics. The camera will include means to enlarge the image from the principal focus to a scale compatible with the image detector finally adopted. Integration times of many hours should be possible, with limiting magnitudes as faint as +28.

The low-dispersion spectrograph is an optical ultraviolet instrument with wavelength resolution of about $\lambda/\Delta\lambda = 1000$ capable of quantitative spectroscopy down to 1000 Å. It will be constructed to operate over a wide range of light levels including those from the faintest sources. Those working on definition of this instrument will also have to propose techniques for signal acquisition and recording.

The other main instrument to be carried on the LST is the high-dispersion spectrograph. It will also operate in the optical ultraviolet, but will have wavelength resolution of about $\lambda/\Delta\lambda = 30\,000$. The major design areas that will have to be studied are the type of spectral dispersion element to be employed, problems of object acquisition and also signal recording.

Other instruments that may be proposed for the telescope are not yet completely determined and will depend in part on what proposals are submitted. Those that NASA has suggested as compatible with the spacecraft and the scientific mission of the LST are photometers, polarimeters, astrometric instruments, infrared instruments and very-high-dispersion spectrographs. The instruments eventually sent on the LST will be chosen from those defined at this stage.

Each instrument definition team will meet monthly between April and March 1974, and the members will work closely with NASA personnel from either George C. Marshall Space



Large Space Telescope with 3-m optical telescope is planned for earth orbit in the early 1980's. NASA seeks proposals for the definition and preliminary design stage.

Flight Center, which is the center responsible for overall LST project management or Goddard Space Flight Center, which is the center responsible for the scientific instruments, data management and orbital operations. An initial instrument definition will be due on 1 November and a final definition will be expected on 1 March 1974.

When the detailed design study is over in late 1974, NASA will request applications for participation in the construction and operational phases of each instrument for inclusion in the final payload. This is, of course, contingent on further funding of the LST program, which has so far been funded only through 1974.

A series of briefings for those who want to propose participation in instrument definition was held during January covering the design of the LST and the financial constraints of the program as well as information about submitting proposals. According to O'Dell, proposals should include a conceptual definition of the instrument, a statement of the proposed scientific goals of the instrument, and the role that the proposer would like to take in the instrument definition team—that is, his special interests and level of effort and an estimated budget.

Anyone interested in submitting a proposal for participation in the LST instrument definition should contact C. R. O'Dell, George C. Marshall Space Flight Center, Alabama 35812, attn: PD-LST, or phone (205) 453-0162.