

# Putting a new face on Arecibo

**The first new surface panels for the world's largest radio telescope dish are to be emplaced a month from now**

by Kendrick Frazier

The world's largest radio-radar telescope, the 1,000-foot dish of the Arecibo Observatory, lies nestled in a bowl-shaped valley in the mountains of northwestern Puerto Rico. To the visitor, the observatory's antenna systems, suspended high over the smoothly curved reflector dish, loom suddenly into view after a winding, bumpy ride south from the coastal town of Arecibo.

At the end of January or early February, the first of 38,400 perforated aluminum panels that will eventually form an entirely new, and far superior, surface for the telescope's dish is due to be put into place. The resurfacing of the Arecibo dish, and the modernization of its electronic equipment, will provide a tremendous boost in the telescope's sensitivity and expand the range of frequencies with which it can monitor and probe the solar system and universe.

Congress approved the project in 1971, and the National Science Foundation let a \$3.8 million contract for the resurfacing last November (SN: 12/4/71, p. 374). The entire modernization project is expected to cost about \$7.7 million.

From his office in the headquarters building on the rim of the valley above the dish, Tor Hagfors, the observatory's operations director (astronomer Frank Drake of Cornell University is scientific director), describes the resurfacing operations and reports that they are slightly behind schedule. The delays are not critical though; the resurfacing will be carried out in a way that allows continued operation of the instrument.

To support the heavier aluminum-paneled surface, 29 cables suspended from concrete blocks around the dish's perimeter will have to be added to the 10 presently in place. Hanging the cables started in the last two weeks of December and is expected to take four or five weeks. When they are adjusted, the substitution of the perforated aluminum panels for the present coarse wire mesh can begin. The resurfacing will begin at the center of the dish and work outward to the perimeter.

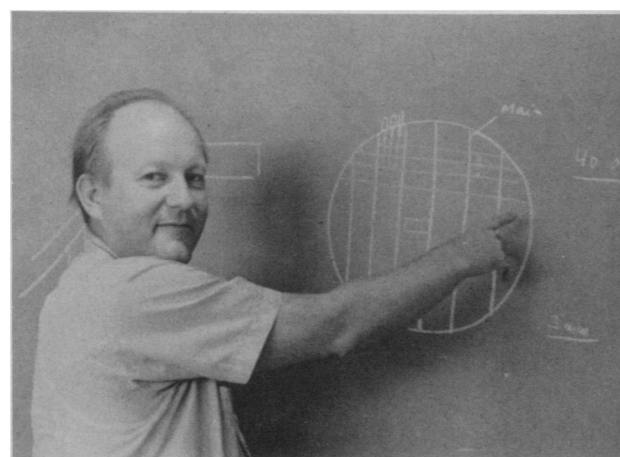
The schedule calls for all panels to be emplaced by about this time next year, but Hagfors says a more realistic estimate for completion is the spring of 1974. Then will come the painstaking process of adjusting the panels to bring the entire dish to within less than 3 millimeters of spherical. (The tolerance for the present surface is several inches.) To aid in this task, lasers will be used to measure precisely the orientation of the panels. Each panel has an adjustment screw which can then be used to bring it to the correct level. The survey work is expected to take six months, so the resurfacing work is not expected to be completed much before the end of 1974.

When the modernization task is finished, the telescope's sensitivity will have been increased 100-fold for radio work and 1,000-fold for radar work, and the minimum wavelength observable will have been reduced from the present 50 centimeters to about 7 centimeters. The improvements will bring a far greater range of astronomical objects and interstellar molecules into Arecibo's reach. The radar upgrading should allow the preparation of maps of the surface of Venus as detailed as those now obtainable by radar of the moon. □

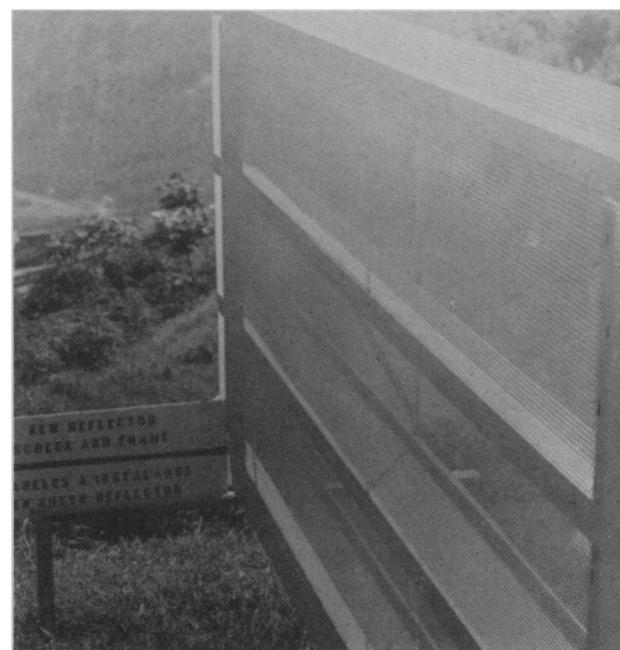


Photos: Kendrick Frazier

*The 1,000-foot dish being readied for task.*



*Hagfors: A new surface by spring of 1974.*



*Sample of one of the new aluminum panels.*

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