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Optics Accuracy and Gravity Deformation Measurements on a Large Diameter Reflector Antenna System

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ABSTRACT

Optics Accuracy and Gravity Deformation Measurements on a Large Diameter Reflector Antenna System

The optics components of a 90-foot (27.4-meter) diameter tracking reflector antenna assembly were surveyed for surface and alignment accuracy, and for gravity-induced distortions over the full elevation travel range. Partly because the antenna is enclosed within a radome, total station theodolites were selected as the best measurement tools, and more than 1000 tape retro-targets were placed on the structure for measurements. Instruments from two measurement stations close to the center of the primary reflector surface were employed, taking nearly simultaneous measurements of common and non-common targets, in order to avoid interference from a large, permanent, center feed structure. One of the theodolites was augmented with a custom automated video system, which speeded up and simplified the measurements. An excellent record of the reflector system optics accuracy and gravity deformations was collected, and will be the basis of a possible future antenna upgrade.

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