Almucantar Radio Telescopes.

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The 300-foot radio telescope at Green Bank, WV, was a transit telescope steerable in altitude. Its recent collapse raises anew the question of whether steerability in azimuth might not be better suited to the construction of large radio telescopes. Azimuth steerability ensures the constancy of the gravity vector relative to all structural elements at all times. Pointing and tracking is achieved without working against gravity, and without significant loss of sky coverage. The reduction of structural stress promotes inexpensive construction of larger reflectors to a given tolerance. Any source on an almucantar (i.e. a parallel of altitude) is accessible to the beam, while the Earth's rotation sweeps the almucantar across the sky. Sources are accessible on both sides of the meridian, and a modicum of tracking is afforded by azimuth steerability and movable feeds. The burden of feed support may be displaced from the reflecting surface and its infrastructure, and borne entirely by the ground.

As early as 1961, Bracewell and Drake had considered azimuth-steerable telescopes with segmented surfaces (1). In 1963, an azimuth-steerable paraboloid was proposed in order to rescue the 600-foot radio-telescope at Sugar Grove, WV from the feared collapse of its infrastructure (2). In the same year, North American Aviation Inc. studied the feasibility of such a telescope (3). By 1967, further studies had been made by Talen (4), and several designs had been developed by the Largest Feasible Steerable Telescope group at the National Radio Astronomy Observatory (5).

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