Abstracts

Computer-aided design of reflector antennas: The Green Bank Radio Telescope

M.A.B. Terada and W.L. Stutzman. "Computer-aided design of reflector antennas: The Green Bank Radio Telescope." 1998 Transactions on Microwave Theory and Techniques 46.3 (Mar. 1998 [T-MTT]): 250-253.

This paper presents an evaluation of the electrical performance of the Green Bank Telescope (GBT) reflector antenna, operating as single- and dual-offset configurations, as well as a general overview of the GBT system. The GBT dual-offset Gregorian configuration is designed for low cross polarization (XPOL) using the dual-offset reflector antenna (DORA) synthesis package code developed by the authors. The procedure implemented in DORA to upgrade an existing main reflector to a low cross-polarized dual-offset Gregorian reflector antenna is also described in this paper. All computed patterns were obtained with the parabolic reflector analysis code (PRAC) program, also developed by the authors, and with the commercial code GRASP7. The GBT radiation patterns and performance values, which include original data not available anywhere else as far as the authors know, indicate that low XPOL performance can be achieved with a dual-offset configuration, provided that a low XPOL feed is used. The GBT configuration is employed as a case example for the aforementioned procedure. However, an effort is made to present the main conclusions as generically as possible.

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