Abstracts

The Ultra Cone: An Ultra-Low-Noise Space Communication Ground Radio-Frequency System

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Maximum sensitivity was required for the reception of Mariner V signals as it was occulted by the planet Venus. To meet this requirement, an ultra-low-noise radio-frequency system (ultra cone) was developed for the JPL/NASA Deep Space Instrumentation Facility (DSIF). The system consisted of an 85-foot antenna with a Cassegrain feed, low-noise transmission line components, and closed-cycle refrigerated maser amplifier. The antenna (at zenith), transmission line, and maser contributed about 9°K, 2°K, and 5°K, respectively, for a total operating noise temperature of approximately 16°K. The antenna feed, maser system, and calibration techniques are described in detail.

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