

Chapter 3

ADDITIONAL CONTRIBUTIONS

3.1 RADIO OBSERVATIONS OF TITAN

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Saturn and Titan have been observed at three frequencies (1420, 2695, and 8085 MHz) with the NRAO interferometer. As yet, Titan has not been detected. The observing technique used to separate Titan's signal from that of Saturn requires long baselines. At the highest frequency, where the signal is strongest and detection most likely, the interferometer "resolution" is so great that Titan's position must be known to better than a half second of arc throughout the long integrations needed to reach a low noise level. I have not been able to obtain ephemerides of this accuracy nor to find an opinion on the accuracy of positions calculated from the L, M, Θ , and γ tabulated in the American Ephemeris and Nautical Almanac. At 1420 MHz, where positional accuracy is not a problem, the signal is much weaker and an upper limit of 1500°K can be placed on the brightness temperature of Titan.

Postscript, December 3, 1973: A clear positive detection has now been obtained at 8085 MHz with the NRAO interferometer. Assuming Titan's radius is 2500 km, the radio brightness temperature (i.e. for unit emissivity) is $115 \pm 35^\circ\text{K}$. A complete description will be submitted for publication elsewhere.