

ATMOSPHERIC CALIBRATION FOR CASSINI RADIO SCIENCE

by

G. Resch, S. Keihm, P. Kroger, R. Linfield,
M. Mahoney, A. Tanner, and L. Teitelbaum,
Jet Propulsion Laboratory

ABSTRACT

The microwave signals from the Cassini spacecraft that will be used to do radio science will be corrupted by delay fluctuations in the Earth's atmosphere, due primarily to water vapor in the troposphere. In the case of the Gravitational Wave Experiment (GWE), the fluctuations due to water vapor are likely to be a limiting error source. A passive remote sensing system, centered around an advanced water vapor radiometer (AWVR), has been developed in order to provide calibrations of water vapor fluctuations during radio science experiments. During the past two years, most of the technical challenges involved in the design of this instrument have been overcome and we are ready to begin implementation. We will discuss the performance that has been demonstrated with the current generation of WVR instrumentation and the general design of the package that we intend to install at the Goldstone tracking site. In addition, recent results obtained for a comparison of co-located WVRs and Global Positioning System receivers will be presented and the possibility of estimating delay variations due to gradients in the dry atmosphere will be discussed.