RADIOSCIENCE LABORATORY

S T A N F O R D U N I V E R S I T Y

Stanford, California

June 1966

THE STANFORD STUDY OF THE MARINER IV OCCULTATION DATA

Semi-Annual Report no. 3

For the Period 1 October - 31 March 1966

NASA Contract no. NGR-05-020-065

SEL Project no. 3216

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Prepared for:

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
Washington, D. C. 20546

THE STANFORD STUDY OF THE MARINER IV OCCULTATION DATA

Research conducted under NASA contract NGR-05-020-065 involves analysis of data obtained from the Mariner IV-Mars occultation experiment and theoretical studies of models for the Martian atmosphere.

Research Activity

Work is continuing on the data analysis and the atmospheric model studies. Some of the results of this work are presented in a Scientific Report issued jointly under NsG-377 (Sci. Rpt. no. 15) and NGR-05-020-065 (Sci. Rpt. no. 2). This paper has also appeared in the Journal of Geophysical Research.+

Perhaps the most interesting and surprising result derived from the analysis of the data is the large difference in atmospheric surface pressure (actually more than 50 %) between the occultation levels at Electris and Mare Acidalium. Both the higher pressure and the smaller radius determined at Mare Acidalium suggest that this region is at a lower gravitational level than the bright area Electris.

The atmospheric model studies suggest that the ionization peak observed over Electris was either a Bradbury (F_2) layer or a Chapman type (F_1) layer. For either model, the mesosphere would have a temperature close to the saturation temperature for CO_2 vapor. This indicates that some of the haze and particle layers observed with earth-based telescopes and with the Mariner IV TV camera may have been CO_2 particles.