

Foreword

This Second Edition of the NASA Handbook for Propagation Effects on Satellite Systems at Frequencies Below 10 GHz was prepared by Dr. Warren L. Flock of the Department of Electrical and Computer Engineering of the University of Colorado, under contract to The NASA Jet Propulsion Laboratory. Dr. Flock was also the author of the first edition of the Handbook, NASA Reference Publication 1108, which was published in December 1983 with the same title as this present one.

Both editions of these Handbooks were developed under NASA's Propagation Measurements and **Studies Program**, which has been involved for two decades in the study of radiowave propagation over earth-space paths. The need for this handbook, as a companion to the earlier handbook for frequencies of 10 - 100 GHz (NASA Reference Publication 1082(03) published in 1983) has become more evident as the eighties have progressed and more and more of the work of the program has been redirected from above 10 GHz to frequencies in the 500 to 2,000 MHz region of the spectrum as interest in mobile-satellite propagation problems has increased.

Dr. Ernest K. Smith, the predecessor of Dr. Faramaz Davarian as Jet Propulsion Laboratory Program Manager, was instrumental in the **initial definition and structure of both Handbooks** and has coordinated the development and review process.

A second NASA Handbook, published earlier, presents a summary of propagation effects above 10 GHz ("Propagation Effects Handbook for Satellite System Design - A Summary of Propagation Impairments on 10 to 100 GHz Satellite Links with Techniques for System Design", NASA Reference Publication 1082(03), 1983). Together these two documents provide a comprehensive description of propagation factors affecting telecommunications systems involving earth-space links.

A NASA review panel, meeting in September 1986, praised these handbooks and suggested that they be updated every four years, in synchronization with the **CCIR** cycle. As of this writing about half of the 1986 **CCIR** Green Books are available, and these include Volume V of Study Group 5, Propagation in Non-ionized Media. This Handbook has been further updated, beyond the originally prepared version of a Second Edition, to better reflect the material of the latest available **CCIR** Green Books, especially Volume V.

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