

# User's guide for the VTRPE (Variable Terrain Radio Parabolic Equation) computer

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## Abstract

This report is a user's guide to the VTRPE (variable terrain radio parabolic equation)

computer model. It is designed to provide the reader with a summary of the physics and numerical methods used in the VTRPE model, along with detailed instructions on the model's use and operation. The VTRPE computer program is a range-dependent, tropospheric microwave propagation model that is based upon the split-step Fourier parabolic wave equation algorithm. The nominal applicable frequency range of the model is VHF to K-band. The VTRPE program is able to make predictions for microwave propagation over both land and water. The VTRPE code is a full-wave propagation model that solves the electromagnetic wave equations for the complex electric and magnetic radiation fields. The model accounts for the effects of nonuniform atmospheric refractivity fields, variable surface terrain, and varying surface dielectric properties on microwave propagation. The code is written in ANSI-77 FORTRAN with MILSPEC-1753 FORTRAN language extensions. The VTRPE program is currently configured to run under the UNIX operating system on SUN minicomputers and CONVEX supercomputers, and under MS-DOS on 80386/80486-based PC's.

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