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Ionospheric Modification: Its Effects on Radar and Satellite Communication Systems

Authors: [G. F. VanBlaricum](#); [H. S. Ostrowsky](#); [GENERAL RESEARCH CORP SANTA BARBARA CA](#)

Abstract: High-power RF radio transmissions have been used to create significant local disturbances of the temperature and electron density in the F- region of the ionosphere. This artificial modification of the ionosphere can create appreciable levels of amplitude and phase scintillation in radio signals passing through the disturbed region. The report describes and reorganizes some of the PRAIRIE SMOKE experimental data and presents a brief overview of scintillation theory. The experimental data were used to develop a model for predicting scintillation effects along any particular line-of-sight through the disturbed region. That model is presented here and predictions made using it are compared to some of the experimental data. Scintillation can degrade radar detection probability, radar tracking accuracy, and satellite-to-ground communication error rates. These degradation were computed parametrically as functions of the scintillation index.

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