1. ELECTROMAGNETIC WAVES

Joint Services Electronics Program (Contract DAAB07-76-C-1400)

Jin Au Kong

We have the following objectives in our studies of electromagnetic waves: examination of subsurface probing and communication with a dipole antenna, study of remote sensing of the earth, and investigation of integrated optics and fiber optics as applied to optical communication systems. Papers on research supported in 1977 by the Joint Services Electronics Program which have been published, accepted for publication, submitted for publication, or presented at meetings are listed in references. The advantages of using horizontal magnetic dipole antennas were explored in detail for both isotropic- and anisotropic-layered earth. We compared field calculations and experimental results for a horizontal electric dipole submerged in lake water. In remote sensing we studied thermal microwave emission from random media and from media containing spherical scatterers. Backscattering coefficients for active sensing have also been investigated. In applied optics we investigated electro-optical modulators and developed theories for spatially modulated periodic media.

References


2. PASSIVE REMOTE SENSING OF THE EARTH WITH MICROWAVES

California Institute of Technology (Contract 953524)

Jin Au Kong, David H. Staelin

In passive remote sensing of the earth we have studied microwave thermal emission from a layered random medium. The model of a medium containing spherical scatterers has also been developed. These theoretical models have been applied to the solid earth, as well as to clouds and rainfall.

References


3. REMOTE SENSING WITH ELECTROMAGNETIC WAVES

National Science Foundation (Grant ENG76-01654)

Jin Au Kong

Active sensing with dipole antennas has been studied with a horizontal magnetic dipole\(^1\) and with a horizontal electric dipole\(^2\). Passive remote sensing of near-surface soil moistures and ice-covered land or water by using a model of a layered medium has been investigated.\(^3\)\(^-\)\(^5\) The theory for thermal microwave emission from a bounded medium containing spherical scatterers has also been developed.\(^6\)\(^,\)\(^7\) With a random medium model, active remote sensing techniques have been investigated.\(^8\)\(^,\)\(^9\)

References


4. ACTIVE AND PASSIVE MICROWAVE REMOTE SENSING

National Aeronautics and Space Administration (Contract NAS5-24139)

Jin Au Kong

With a random medium model, backscattering coefficients for active microwave remote sensing have been studied.\(^1\)\(^,\)\(^2\) The spherical scatterer model\(^3\) has been used to
interpret passive remote sensing data with diurnal changes. Rough surface effects are now being integrated into our theoretical models.

References