

Reprinted from

**Symposium on  
Machine Processing of  
Remotely Sensed Data**

**June 21 - 23, 1977**

The Laboratory for Applications of  
Remote Sensing

Purdue University  
West Lafayette  
Indiana

IEEE Catalog No.  
77CH1218-7 MPRSD

Copyright © 1977 IEEE  
The Institute of Electrical and Electronics Engineers, Inc.

Copyright © 2004 IEEE. This material is provided with permission of the IEEE. Such permission of the IEEE does not in any way imply IEEE endorsement of any of the products or services of the Purdue Research Foundation/University. Internal or personal use of this material is permitted. However, permission to reprint/republish this material for advertising or promotional purposes or for creating new collective works for resale or redistribution must be obtained from the IEEE by writing to [pubs-permissions@ieee.org](mailto:pubs-permissions@ieee.org).

By choosing to view this document, you agree to all provisions of the copyright laws protecting it.

# A METHOD FOR THE DETERMINATION OF SURFACE EMISSIVITIES OF MULTISPECTRAL DATA IN THE 8 $\mu\text{m}$ - 13 $\mu\text{m}$ REGION

W. H. CARNAHAN AND S. N. GOWARD  
Indiana State University, Terre Haute,  
Indiana

The authors have developed a method to determine emissivities and kinetic temperatures of land cover materials through analysis of multispectral remote sensor measurements in the 8 - 13  $\mu\text{m}$  spectral regions. Simultaneous measurements from two spectral regions of the 8 - 13  $\mu\text{m}$  thermal infrared spectral region are ratioed to determine surface emissivities following the method proposed by Vincent and Thomson<sup>1</sup>. Assuming that emissivity is constant in the 8 - 13  $\mu\text{m}$  region, surface emissivities and kinetic temperatures may be computed. A zero band width approximation of the integrated gray-body radiance is evaluated to facilitate computer processing. The authors discuss the method and demonstrate its application to aircraft scanner data for the study of heat radiation from urban buildings.

---

<sup>1</sup>R. K. Vincent and Fred Thomson, Journal Geophy. Res. 77, 14, 1972.