

# PE&RS

Photogrammetric Engineering Remote Sensing

Volume LVIII

February 1992

Number 2

**The New Camera Calibration System at the U.S. Geological Survey**

The new system will allow determination of radial and decentering distortions.

*Donald L. Light* ..... 185

**Misclassification Bias in Areal Estimates**

Misclassification error biases estimates of area, but areal bias can be corrected with statistical calibration.

*Raymond L. Czaplewski* ..... 189

**Soil Classification Using Mid-Infrared Off-Normal Active Differential Reflectance Characteristics**

Measurements indicate that the 18 benchmark soil samples have unique reflectance signatures in the 9- to 11- $\mu$ m mid-infrared region.

*Ram M. Narayanan, Steven E. Green, and Dennis R. Alexander* ..... 193

**Inclusion of Prior Probabilities Derived from a Nonparametric Process into the Maximum-Likelihood Classifier**

A particular method for estimating prior probabilities to be inserted into a maximum-likelihood classification process in order to merge the advantages of parametric and nonparametric classifiers is described and examined.

*Fabio Maselli, Claudio Conese, Ljiljana Petkov, and Raffaello Resti* ..... 201

**Remote Sensing of Alluvial Terrain in a Humid, Technically Active Setting: The New Madrid Seismic Zone**

A number of geologic features, including the northeast trending, 80-km-long Bootheel lineament, are revealed.

*Ronald T. Marple and Eugene S. Schweig, III* ..... 209

**A Fuzzy Sets Approach to the Representation of Vegetation Continua from Remotely Sensed Data: An Example from Lowland Heath**

A fuzzy sets algorithm was able to discriminate accurately between the end points of a set of continua and could model the continuous character of heathland more appropriately than a classification.

*G. M. Foody* ..... 221

**Slope-Line Detection in a Vector-Based GIS**

Given any location as the origin of gravity flow in a surface, the method identifies consecutive segments of steepest descent according to the Cauchy-Schwarz theorem.

*Yue Hong Chou* ..... 227

**JOURNAL AFFAIRS**

Permission to Photocopy ..... 138  
 Journal Staff ..... 139  
 What *Photogrammetric Engineering & Remote Sensing* is ..... 139  
 Forthcoming Articles ..... 192  
 Instructions to Authors ..... 200  
 Erratum ..... 219

**PE&RS**

*PE&RS (Photogrammetric Engineering & Remote Sensing)* (ISSN 0099-1112) is published monthly by the American Society for Photogrammetry and Remote Sensing, 5410 Grosvenor Lane, Suite 210, Bethesda, MD 20814-2160. Second-class postage paid at Bethesda, Maryland and at additional mailing offices.

**SUBSCRIPTIONS**

Subscription rate for nonmembers is \$120.00 per calendar year (add \$25.00 for international subscriptions). Membership dues include annual subscription to *PE&RS (Photogrammetric Engineering & Remote Sensing)* (\$34 members and \$15 student member). This subscription price is part of membership benefits and cannot be deducted from annual dues. Foreign Airmail subscription is \$215.00, US First Class Mail subscription is \$160.00. POSTMASTER: Send address changes to *PE&RS*, ASPRS Headquarters, 5410 Grosvenor Lane, Suite 210, Bethesda, MD 20814-2160

**MEMBERSHIP**

Membership in the Society is open to any person actively engaged in the practice of photogrammetry, photointerpretation, remote sensing, and geographic information systems; or who by means of education or profession is interested in the application or development of these arts and sciences. The annual dues for Regular members are \$65.00. Annual dues for accredited Student members are \$25.00. Add \$20.00 for all international memberships to cover cost of postage. (All memberships are on a calendar year basis.) Printed in the United States of America.

Copyright 1992 by the American Society for Photogrammetry and Remote Sensing. Reproduction of this issue or any part thereof (except short quotations for use in preparing technical and scientific papers) may be made only after obtaining the specific approval of the Editor. The society is not responsible for any statements made or opinions expressed in technical

papers, advertisements, or other portions of this publication.

**PERMISSION TO PHOTOCOPY**

The appearance of the code at the bottom of the first page of an article in this journal indicates the copyright owner's consent that copies of the article may be made for personal or internal use or for the personal or internal use of specific clients. This consent is given on the condition, however, that the copier pay the stated per copy fee of \$3.00 through the Copyright Clearance Center, Inc., 27 Congress Street, Salem, MA 01970, for copying beyond that permitted by Sections 107 or 108 of the US Copyright Law. This consent does not extend to other kinds of copying, such as copying for general distribution, for advertising or promotional purposes, for creating new collective works, or for resale.



COVER IMAGE: A detail of Pierre Charles L'Enfant's original plans, presented to George Washington in 1791 for Washington D.C., is shown in the newly digitized version created by the U.S. Geological Survey for the Library of Congress, the National Geographic Society, and the National Park Service. Without these computer-generated enhancements and the work of cartographers, this early map would have been lost forever.

It is fitting that this early map should converge with the exciting technology available today and thus represent the upcoming XVII ISPRS Congress. The International Society for Photogrammetry and Remote Sensing Congress will bring together professionals from the geographic, machine vision, mapping, photogrammetric, remote sensing, and surveying communities.

The XVII ISPRS Congress will convene in Washington D.C. August 2-14, 1992, along with the 27th International Geographical Congress and the ASPRS/ACSM/RT92 Conference on Global Change.

## FEATURES

|  |     |
|--|-----|
| GIS News .....                           | 170 |
| GIS Observer .....                       | 173 |
| Engineering Reports .....                | 178 |
| ISPRS News .....                         | 181 |
| Newsletter .....                         | 182 |
| Student News .....                       | 184 |
| Selected RESORS Publications .....       | 208 |
| Sustaining Members Exhibit Preview ..... | 235 |
| Calendar .....                           | 240 |
| Index to Advertisers .....               | 242 |
| Classifieds .....                        | 244 |
| Professional Directory .....             | 248 |
| ASPRS Store .....                        | 252 |
| Membership Application .....             | 255 |

PHOTOGRAMMETRIC ENGINEERING & REMOTE SENSING is the official journal of the American Society for Photogrammetry and Remote Sensing. It is devoted to the exchange of ideas and information about the applications of photogrammetry, remote sensing, and geographic information systems. The technical activities of the Society are conducted through the following Technical Divisions: Geographic Information Systems, Photogrammetric Applications, Primary Data Acquisition, Professional Practice, and Remote Sensing Applications. Additional information on the functioning of the Technical Divisions and the Society can be found in the July Yearbook issue of PE&RS.

## JOURNAL STAFF

**Publisher:** *William D. French*

**Editor-in-Chief:** *James B. Case*

**Executive Editor:** *Donald F. Hemenway, Jr.*

**Staff Editor/GIS News Editor:** *Joann H. Treadwell*

**Newsletter Editor:** *William D. Lynn*

**Engineering Reports Editor:** *Willard A. Kuncis*

**Advertising Sales Manager:** *Cheryl A. Stratos*

**Manuscript Coordinator:** *Lisa Campanella*

**Circulation Managers:** *Sokhan Hing, Anne Ryan*

## ASSOCIATE EDITORS

**Forestry, Plant Sciences:** *William J. Ripple*

**Geology, Water Resources, Hydrology:**  
*Michael Abrams*

**Geography, Land Use:** *John R. Jensen*

**Professional Practice-Practical Papers:**  
*John Grimson Lyon*

**Geographic Information Systems:**  
*James W. Merchant*

**Primary Data Acquisition:** *William J. Campbell*

**Theoretical & Applied Photogrammetry:**  
*Riadh H. Munjy*

**Book Review Editor:** *James B. Campbell*

**Software Review Editor:** *Daniel L. Civco*

Correspondence relating to all business and editorial matters pertaining to this and other Society publications should be directed to the American Society for Photogrammetry and Remote Sensing, 5410 Grosvenor Lane, Suite 210, Bethesda, Maryland 20814-2160, including inquiries, memberships, subscriptions, changes in address, manuscripts for publication, advertising, back issues, and the MANUALS OF PHOTOGRAMMETRY AND REMOTE SENSING. The telephone number of the Society Headquarters is 301-493-0290; the fax number is 301-493-0208.

## SOCIETY AFFAIRS

|   |     |
|---|-----|
| Board of Directors .....                    | 142 |
| New Sustaining Member .....                 | 174 |
| Sustaining Members .....                    | 175 |
| Building Fund .....                         | 177 |
| 1992 ASPRS/ACSM/RT 92 Convention:           |     |
| Monitoring & Mapping Global Change .....    | 220 |
| Notice to Certified Photogrammetrists ..... | 225 |
| 1992 ASPRS/ACSM Annual Convention .....     | 239 |

## ANNOUNCEMENTS

|   |     |
|---|-----|
| XVII ISPRS Congress .....   | 144 |
| 1st Australian Conference on Mapping<br>and Charting .....            | 199 |
| Remote Sensing for Arctic Environments .....                          | 207 |
| GIS '92 .....   | 219 |
| 4th International GIS Conference .....                                | 219 |
| U.S. Naval Aerial Photographic<br>Interpretation Center Reunion ..... | 233 |