

RSSG Newsletter

Association of American Geographers
Remote Sensing Specialty Group

June 1993



From the Chair

A Letter to the Annals

Professor Carville Earle
Department of Geography and
Anthropology
Louisiana State University
Baton Rouge, LA 70803

Dear Professor Earle:

As Chairman of the 412-member Remote Sensing Specialty Group, I am writing to congratulate you on your recent selection as the Editor of the Annals of the Association of American Geographers, to indicate concern as to the breadth of content historically represented in the journal, and to suggest changes that might accommodate a broader representation throughout our discipline.

As our Specialty Group meeting in Atlanta, members were vocal and passionate in expressing their feeling that the area of spatial techniques in general and remote sensing in particular has been vastly under-represented in the Annals. Given that, as of 1992, 2,557 members listed remote sensing, geographic information systems, cartography, and/or quantitative methods as areas of topical proficiency, and 2,263 members were registered as members of these specialty groups, one might expect that one third of the journal would be devoted to spatial techniques.

Continued on page 4...Letter

CALL FOR PROGRAM PARTICIPATION AAG 1994 - San Francisco

The 1994 annual meeting of the Association of American Geographers will be held March 29 - April 2, 1994 in San Francisco, CA. It is not too early to begin planning for the RSSG program. Abstracts are due in the AAG Central Office by September 20, 1993. RSSG program planning must, therefore, be completed by September 10, 1993.

If you are willing to offer a workshop, organize a field trip or a paper session, or present a paper, please let us know your intent by August 1, 1993. Students are especially encouraged to present papers or posters. Plans are being made to offer student paper awards.

Program Chair:

Kevin P. Price
Department of Geography
University of Kansas
213 Lindley Hall
Lawrence, KS 66045
(913) 864-7723 or 5542
FAX: (913) 864-7789

Associate Program Chair:

M. Duane Nellis
Dept. of Geography
Kansas State University
Dickens Hall
Manhattan, KS 66506
(913) 532-6727
FAX: (913) 532-7310

BUSINESS MEETING MINUTES

AAG Remote Sensing Specialty Group

Marriot Marquis Hotel, Atlanta, GA
Wednesday, April 7, 1993, 7:00 p.m.

1. Opening Statement

Tina Cary, RSSG Chair, called the meeting to order.

2. Secretary/Treasurer's Report

Doug Ramsey, RSSG Secretary/Treasurer, distributed copies of last year's business meeting minutes. A motion was made to accept these minutes. The motion was seconded and approved.

Doug reported the financial standing of the RSSG. All bills to-date have been paid leaving a balance of \$1,473.69. Expenditures, which consisted of printing and mailing four issues of the newsletters, totaled \$1,284.61. Newsletters have been the only expenditure this year. The major source of revenue has been from membership dues collected by the AAG and transferred to the RSSG account. In 1992, the RSSG received approximately \$1,311.75 in membership dues, \$238.84 from the AVHRR workshop held in San Diego last year, and \$15.71 in interest from May to December. In 1993 (January-March) membership dues provided the only income consisting of \$1,192.00.

Discussion on the disposition of the budget for the coming year was debated. It was suggested that student paper awards be initiated and that monetary awards be made to the top two papers presented. First and second place prizes of \$250.00 and \$150.00 respectively were suggested. A motion to accept the treasurers report was seconded and approved.

3. RSSG Newsletter Editor's Report

Jim Merchant reported that the current mailing list for the RSSG newsletter was 445 which includes extra issues for the AAG. Plans for publishing future newsletters would basically remain the same

Continued on page 3...Business Meeting

RSSG OFFICERS 1993-1994

Chair

Tina K. Cary
Earth Observation Satellite Company
4300 Forbes Boulevard
Lanham, MD 20706
Telephone: 301-552-0542
FAX: 301-552-5476

Vice Chair

Stephen J. Walsh
Department of Geography
University of North Carolina
Chapel Hill, NC 27599-3220
Telephone: 919-962-8901
FAX: 919-962-5604

Secretary-Treasurer

R. Douglas Ramsey
Department of Geography
Utah State University
Logan, UT 84322-5240
Telephone: 801-750-1790
FAX: 801-750-3798

Director

Daniel G. Brown
Department of Geography
Michigan State University
East Lansing, MI 48824-1115
Telephone: 517-353-9055
FAX: 517-336-1076 (Geography)

Student Director

Thomas Allen
Department of Geography
Spatial Analysis Laboratory
203 Saunders Hall
University of North Carolina
Chapel Hill, NC 27599-3220
Telephone: (919) 962-0569
FAX: (919) 962-1537

Business Meeting...Continued from page 2.

as in past years. Some discussion followed on the possibility of publishing the newsletter in electronic format. Action was deferred for lack of consensus on the idea.

4. Regional Councilors for the RSSG

The regional councilors for the RSSG remained the same as in the past year. However, Mike Hodgson's term will expire on June 1993. Duane Nellis will take over Mike's position as the Great Plains - Rocky Mountains regional councilor. Discussion about appointing a Southeast Region councilor ended in the appointment of Dale Quattrochi (NASA). It was proposed that papers presented at AAG be coordinated by the regional councilors to facilitate their inclusion in RSSG sessions.

5. Sessions for the 1994 AAG Meetings

A number of items were discussed relative to the San Francisco meeting in 1994. There has been concern that papers submitted to the AAG have not been filtered to the RSSG program chair for inclusion in RSSG sessions. The importance of sending abstracts directly to the program chair was stressed noting that checking the RSSG box in the abstract application and sending it directly to the AAG did not guarantee placement in an RSSG-sponsored session. Kevin P. Price was appointed program chair for the San Francisco meeting. Duane Nellis will be associate program chair. The program chair will contact AAG to identify submitted abstracts intended for the RSSG so more papers can be included in sessions.

6. NCGIA Core Curriculum in Remote Sensing

NCGIA Research Initiative #12 proposes a core curriculum in remote sensing. Discussion of this initiative included whether the curriculum would emphasize the integration of remote sensing and GIS, or just focus on remote sensing. It was proposed that GIS should be included in such a curriculum, and that it should include an applications section complete with "real" datasets and case studies. It was suggested that the RSSG

meet in an open forum (devote a session) in San Francisco to talk about the contents of the NCGIA curriculum in remote sensing.

7. Other Business

Results of recent elections were announced. Daniel Brown of Michigan State University was elected a director of RSSG. Thomas Allen of the University of North Carolina will be the new student director.

Much discussion centered around the topic of peer-reviewed journals, their style, trends and the acceptance of remote sensing articles. The format changes in Photogrammetric Engineering and Remote Sensing, and inclusion of non-peer reviewed articles, met with dissatisfaction in the meeting. Some felt that this change diminished the scholarly nature of the journal. Further, the de-emphasis of author names on the front page of each article does not give proper recognition. Those individuals feeling strongly about this change should write to ASPRS.

The trend of the AAG's Annals to de-emphasize remote sensing articles given the percentage of members active in remote sensing activities was also a point of discussion. There is a tendency in traditional geography departments to emphasize publication in the Annals for promotion evaluation. This puts some geographers who conduct research in remote sensing at a disadvantage. Discussion by two RSSG members who noted that they had reviewed and accepted with minor revisions a paper submitted to the Annals which was rejected by the editor gave support to the notion that the editorial staff have a hard time accepting technical papers. Further discussion showed that the Annals is not meeting the needs of the remote sensing population of the AAG.

A motion was presented to draft a letter to the new editor of the Annals to petition for inclusion of more remote sensing, GIS and cartography articles. RSSG Chair Tina Cary will ask the chairs of the Cartography and GIS Specialty Groups, respectively, to co-sign a letter.

Doug Ramsey
Utah State University
RSSG Secretary/Treasurer

Letter...Continued from page 1.

A review of manuscripts published in the Annals from 1988 to the present indicates that only two papers out of a total of 132 published manuscripts could be classified as remote sensing articles. The Remote Sensing Specialty Group has as members very distinguished and highly productive scholars; their lack of visibility in the pages of the Annals underscores a problem which we recommend to your attention. The lack of representation is extremely frustrating and is perceived as exclusionary to a significant number of AAG members.

When our concerns have been raised in the past, one response has been to claim that remote sensing manuscripts are not being submitted to the Annals for consideration. Since the perception is widespread among members of the Remote Sensing Specialty Group that such manuscripts are not truly welcome, some indication that such manuscripts are welcome will be required to change the submission pattern. The membership agreed to submit manuscripts if there was reason to think they would be welcome.

The suggestion we have to offer for broadening the representation in the Annals involves the appointment of associate editors representing a social/cultural, physical, and techniques dichotomy; each sub-group would be represented in each issue of the Annals. The associate editors would work closely with the editor, and could solicit manuscripts and consider special issues as well as accept and reject manuscripts. Our desire is to contribute to the level of representation and scholarship of our discipline by participating in the Annals, but historical attitudes and perspectives as to what constitutes scholarship have made that contribution extremely difficult to achieve. We hope that as the new editor of the Annals, you will be sensitive to our concerns and take steps to facilitate our participation in the Annals so it will truly represent the scholarship of all geographers.

Sincerely,

Tina Cary
Chairman, RSSG



RSSG MEMBERSHIP DROPS IN 1992

According to the April 1993 issues of the AAG Newsletter, the Remote Sensing Specialty Group (RSSG) membership stood at 412 persons at the end of 1992, down from 492 in 1991. It is interesting to note that 506 AAG members claimed a proficiency in remote sensing in 1992, up from 491 who claimed such a proficiency in 1991.

Last year the GIS Specialty Group (SG) was the largest of AAG's 41 specialty groups, having 1007 members. GIS was followed by the Urban Geography SG (637), Cartography SG (546), Historical Geography SG (433), and RSSG.

USE YOUR NEWSLETTER

The RSSG Newsletter is your vehicle for communicating with colleagues interested in remote sensing. You are invited to send news regarding publications, awards, honors, academic programs, research activities, commercial ventures, students, jobs and other announcements to:

James W. Merchant
Conservation and Survey Division
University of Nebraska-Lincoln
113 Nebraska Hall
Lincoln, NE 68588-0517
Telephone: (402) 472-7531
FAX: (402) 472-2410
Internet: JM1000@CALMIT.UNL.EDU

If possible, please submit contributions on a disk in Wordperfect or ASCII format.

NOT FOR STUDENTS ONLY

by Tom Allen, RSSG Student Director

SCHOLARSHIP SOURCES FOR REMOTE SENSING STUDENTS

A number of scholarships and fellowships are available for students specializing in remote sensing. The following list provides brief descriptions and references to some of the awards. Readers are encouraged to submit information on other awards to the newsletter editor for future announcements.

NSF DOCTORAL DISSERTATION

IMPROVEMENT GRANTS: Geography and Regional Science Division. Funding for basic research and fundamental scientific advancements. A single award up to \$10,000. 1991 proposals had a 50% success rate for geography students. Money is good for travel, data, and some equipment. **DEADLINE DECEMBER 1.** You must submit a research proposal and budget as well as academic information. For more information write to:

National Science Foundation
Forms and Publications Unit
1800 G Street, NW - Room 232
Washington, DC 20550

**STUDENT SCHOLARSHIPS FROM THE
AMERICAN SOCIETY FOR
PHOTOGRAMMETRY AND REMOTE SENSING:**
Awards available through ASPRS include:

Robert E. Altenhofen Memorial Scholarship -
Theoretical photogrammetry - \$500.

Analytical Surveys Photogrammetric Scholarship -
Photogrammetry - \$4,000.

EOSAT Landsat TM Application Award - Grant for
Landsat TM data - up to \$4,000.

William A. Fischer Memorial Scholarship - General
remote sensing - \$2,000.

Leica, Inc. Photogrammetric Fellowships -
Photogrammetry - \$1,000.



Ta Liang Memorial Awards - Travel related to
remote sensing - \$500+.

For further information and an application
write to:

ASPRS Awards Program
5410 Grosvenor Lane, Suite 210
Bethesda, MD 20814-2160

NASA GLOBAL CHANGE FELLOWSHIP

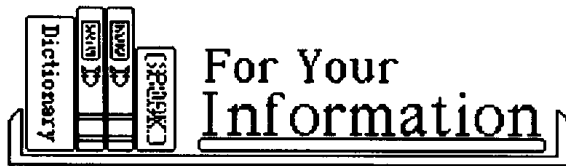
PROGRAM: Fellowships for doctoral students doing
research related to global environmental change,
ecosystems, and data and information processing.
Good for \$15,000+/year for up to three years.
Enrolled students must submit a research proposal.
Write to:

NASA Global Change
Fellowship Program
Code SE-44
NASA Headquarters
Washington, DC 20546

RSSG STUDENT PAPER COMPETITION

1994 AAG MEETING: At the recent RSSG
business meeting at the Atlanta AAG meeting, the
RSSG decided to sponsor a student paper completion
at the 1994 AAG national meeting in San Francisco.
Monetary awards will be presented.

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SATELLITE IMAGES OF AUSTRALIA

A new book produced by CSIRO uses a 20-year sequence of satellite images to explore changes in soils and vegetation cover of Australia. The book, *Looking Back: The Changing Face of the Australian Continent, 1972-1992*, was authored by Dean Graetz. Hundreds of satellite images cover all of Australia's major cities, and important land use and land cover. The book is available for \$50.00 (AUS).

Accompanying the book is a companion compact disk containing over 160 of the LANDSAT images used in the volume. Included on the disk is software to enable users to enlarge, select, scan and manipulate the satellite data. The disk, costing \$30.00 (AUS), can be used on IBM or Apple Macintosh computers.

Inquiries regarding the book or CD should be forwarded to:

Jeff Kingwell
CSIRO, Office of Space Science and Applications
POB 225, Dickson ACT
AUSTRALIA 2602
Telephone: (06) 279-0824
FAX: (06) 279-0812

Source: Spatial Edition



Note: RSSG members interested in Australia may wish to request a free subscription to Spatial Edition, a newsletter published by the Secretariat of the Commonwealth Spatial Data Committee, P.O. Box 2, Belconnen ACT 2616, Australia; FAX: (06) 201-4366, Internet: anzlic@peg.pegasus.oz.au

EARTH OBSERVING SYSTEM (EOS) PROGRAM REFERENCE HANDBOOK

The National Aeronautics and Space Administration has published the 1993 EOS Reference Handbook. The 145-page book covers major EOS programs, instruments and sensors, intergovernmental cooperators, data distribution issues, points-of-contact, acronyms and other aspects of the Earth Observing System.

Copies of the handbook may be obtained from:

NASA Headquarters
Earth Science Support Office
Document Resource Facility
300 D Street, SW, Suite 840
Washington, D.C. 20024
Telephone: (202)479-0360
FAX: (202) 554-6499

MANUAL OF FEDERAL GEOGRAPHIC DATA PRODUCTS

The Manual of Federal Geographic Data Products was recently published by the Federal Geographic Data Committee (FGDC). The book describes over 150 federal geographic data products that are national in scope and are commonly distributed to the public by 21 Federal agencies.

Geographic data products include maps, computer-compatible (digital) data, aerial photography and multi-spectral imagery, and other geographically-referenced data sets. Data products are described in a standardized format and grouped by producing agency. The descriptions include information on the content of the product, available coverage, and ordering. A cross-reference is provided to help readers find products that contain information about different data categories.

Copies of the Manual are available free, while supplies last, from:

Geographic Data Committee Secretariat
U.S. Geological Survey
590 National Center
Reston, Virginia 22092
FAX: (703) 648-5755
Internet: gdc@usgs.gov

NASA EDUCATIONAL HORIZONS **NEWSLETTER**

RSSG members involved in teaching remote sensing will be interested in subscribing to NASA's Educational Horizons newsletter. The Spring 1993 issue contains articles on NASA's 5-Year Education Plan, a variety of NASA projects, the National Space Grant Conference, internship programs, teaching materials (e.g., slides, videos, brochures, kits, books), NASA teacher resource centers, and a broad variety of other items. The newsletter is published three times per year. To obtain a free subscription to NASA Educational Horizons contact:

Elsie Weigel
NASA Education Division
Educational Publications Branch
Code FEP, Room 2-J34
300 E Street, Sw
Washington, D.C. 20546
202-358-1533

DIGITAL ORTHOPHOTO CD **AVAILABLE**

The U.S. Geological Survey (USGS) has prepared a CD-ROM containing sample digital orthophoto data covering Olmstead County, MN. The data are provided as part of a survey to evaluate digital orthophoto products and to identify applications. The demonstration disc comes complete with image display software and documentation. The CD is available free upon request from USGS. For details contact:

James Mauck
Product Generation Standards Section
U.S. Geological Survey
510 National Center
Reston, VA 22092
Telephone (703) 648-5561

RADARSAT PUBLISHES **EDUCATIONAL MATERIALS**

RADARSAT International, Inc. (RSI) has announced the initiation of an education program. The program will include a set of "slide packs" providing information about RADARSAT and its applications. The first, entitled RADARSAT: Canada's Earth Observation Satellite, contains 24 35mm slides and a booklet which describes the unique features of the satellite, its sensors and prospective applications.

The company is also considering a series of applications workshops and additional educational events and publications.

RSSG members interested in microwave remote sensing may also wish to request a free subscription to the newsletter REFLECTIONS. For additional details, contact:

Education Division
RADARSAT International, Inc.
275 Slater Street, Suite 1203
Ottawa, Ontario
CANADA K1P 5H9
FAX: (613) 238-5425

UNESCO MODULES FOR TEACHING **REMOTE SENSING**

Three training modules from the Training and Education in the Marine Sciences (TREDMAR) Program of the United Nations' Educational, Scientific, and Cultural Organization (UNESCO) offer persons with personal computers an opportunity to learn how to use and interpret remote-sensing data on the oceans and coastal waters. The modules are written for PCs using the MSDOS operating system. They require a computer with 640 kilobytes of memory, a floppy disk drive, and enhanced graphics adapter capability.

The modules contain lessons based on data from satellites including the U.S. Landsat, Geosat, the Indian satellite IRS-1A, and others. The first module

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UNESCO...Continued from page 7.

is limited to the Northeast Atlantic. The second module includes lessons by local scientists on phenomena in the South American and Australian coastal seas and the Indian Ocean. Module 3 covers applications of marine and coastal image data, including a lesson on interpreting data from a numerical model. In future modules, other disciplines such as hydrology and ecology, will be covered.

The modules are available free of charge and may be duplicated; the software is not copy-protected. The material is in English, with Spanish versions of the first two modules also available. To obtain a copy of the modules and manuals contact:

Dirk Troost
TREDMAR\UNESCO
1, rue Miollis
75732 Paris cedex 15
France
FAX: 33-1-47-83-59-40

A bit of computer humor from the GIS-L electronic bulletin board:

WHAT DRIVING TO THE STORE WOULD BE LIKE IF OPERATING SYSTEMS RAN YOUR CAR

MS-DOS: You get in the car and try to remember where you put your keys.

WINDOWS: You get in the car and drive to the store very slowly because attached to the back of the car is a freight train.

MACINTOSH SYSTEM 7: You get in the car to go to the store and the car drives you to the church.

UNIX: You get in the car and type GREP STORE. After reaching speeds of 200 miles per hour en route, you arrive at the barber shop.

OS/2: After fueling up with 6000 gallons of gas you get in the car and drive to the store with a motorcycle escort and a marching band in procession. Halfway there the car blows up, killing everybody in town.

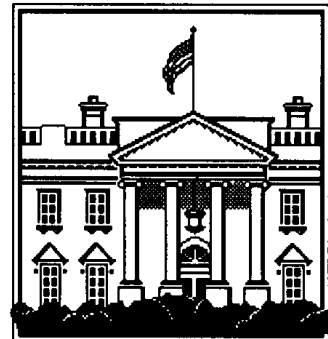
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WHITE HOUSE ADOPTS EMAIL

RSSG members wishing to contact President Clinton or Vice President Gore regarding the U.S. space program, Landsat or other satellites, and related matters may now do so through email. The White House has been connected to Internet as well as to several on-line commercial email vendors. Congress may soon follow suit. All email messages will be read and receipt immediately acknowledged. A count will be taken of the number of messages received and the subject of each message. The White House warns that it will not, however, be able to return an email message bearing a tailored reply. It is hoped that such individual responses will be forthcoming in late 1993. In the interim, several response-based programs that facilitate email interchange of messages in a timely manner will be tested. Internet users are urged to provide suggestions for using email to the White House.

President Clinton
PRESIDENT@WHITEHOUSE.GOV

Vice President Gore
VICE.PRESIDENT@WHITEHOUSE.GOV



Remote Sensing/GIS at the University of Colorado

by
Michael E. Hodgson
Department of Geography
University of Colorado

Remote sensing and geographic information system teaching and research activities at the University of Colorado are addressed by faculty in Geography, Geology, and Aerospace Engineering.

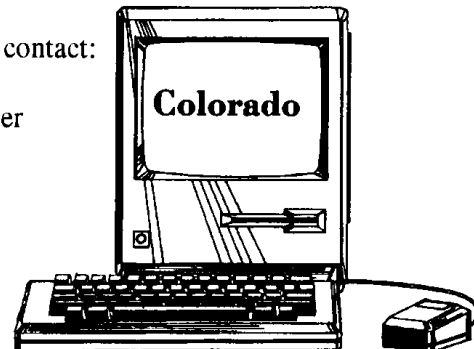
FACILITIES. There are a number of different facilities that play a role in the remote sensing and GIS subfield of the Geography program at the University of Colorado. The geographic information system, remote sensing, and cartographic laboratory (GISRSC) is housed in the Department of Geography and presently contains 10 IBM RS 6000 workstations and small-format digitizing tablets with ERDAS, Arc/Info, AutoCAD, and Corel Draw software (an additional 10 workstations will be added in the summer of '93). The Geographic Information Processing Laboratory (GIP) is also housed in the Department and contains SUN Sparcstations and '386 computers with ERDAS image processing and Nexpert Object software. The Snow and Ice Data Center and Center for the Study of Earth from Space (CSES), located within another institute on campus but available for student/faculty research, contain a wide assortment of Sun Sparcstations, DECstations, and Vaxstations with color output devices using Arc/Info, LAS, ERDAS, and IDL software. Another campus institute, the Colorado Center for Astrodynamic Research (CCAR), has Sun Sparcstations and HRPT and DOMSAT antenna systems for GOES and AVHRR reception. All of the facilities are linked via internet.

STUDIES. Research in the GIP laboratory is focussed on the development of image processing and GIS algorithms, including the understanding of visual image interpretation processes (via cognitive experiments, knowledge engineering, and subsequent implementation using expert system shells), monitoring of hurricane wind induced impacts, and mapping of alpine snow distribution. The GISRSC laboratory serves a dual teaching and research role. A number of research projects are using remote sensing and GIS capabilities in the GISRSC lab to examine natural and anthropogenic induced vegetation disturbances, stream channel changes, monitoring coastal and inland wetlands, and human attitudes/behavior toward natural hazards. The activities within the Snow and Ice Data Center and geography component of CSES have focused on the atmosphere-ice interaction in the polar regions using visible, thermal infrared, passive microwave and active microwave space-borne measurements. CCAR activities include mapping sea ice motion and sea-ice concentrations, dust storm, and sea surface temperatures. Research projects are supported through grants from NASA, NSF, and USFWS, and others.

COURSES. There are presently eight remote sensing courses that are specifically oriented toward earth resource applications offered through Geography, Geology, and Aerospace Engineering. These courses cover the visual interpretation, aerial photography, physics, image processing, mapping, and system design aspects of remote sensing. Two additional phenomenon specific courses examine the use of remote sensing for the atmosphere/ocean and planetary surfaces. Four cartography and two GIS courses are also available.

For additional information about the geography component please contact:

Dr. Michael E. Hodgson, Dr. Konrad Steffen, or Dr. Mark Kumler
Department of Geography
University of Colorado
Boulder, CO 80309-0260
Telephone: 303-492-8312
FAX: 303-492-7501



CLOUD COVER PROBABILITY OVER THE CONTINENTAL U.S.

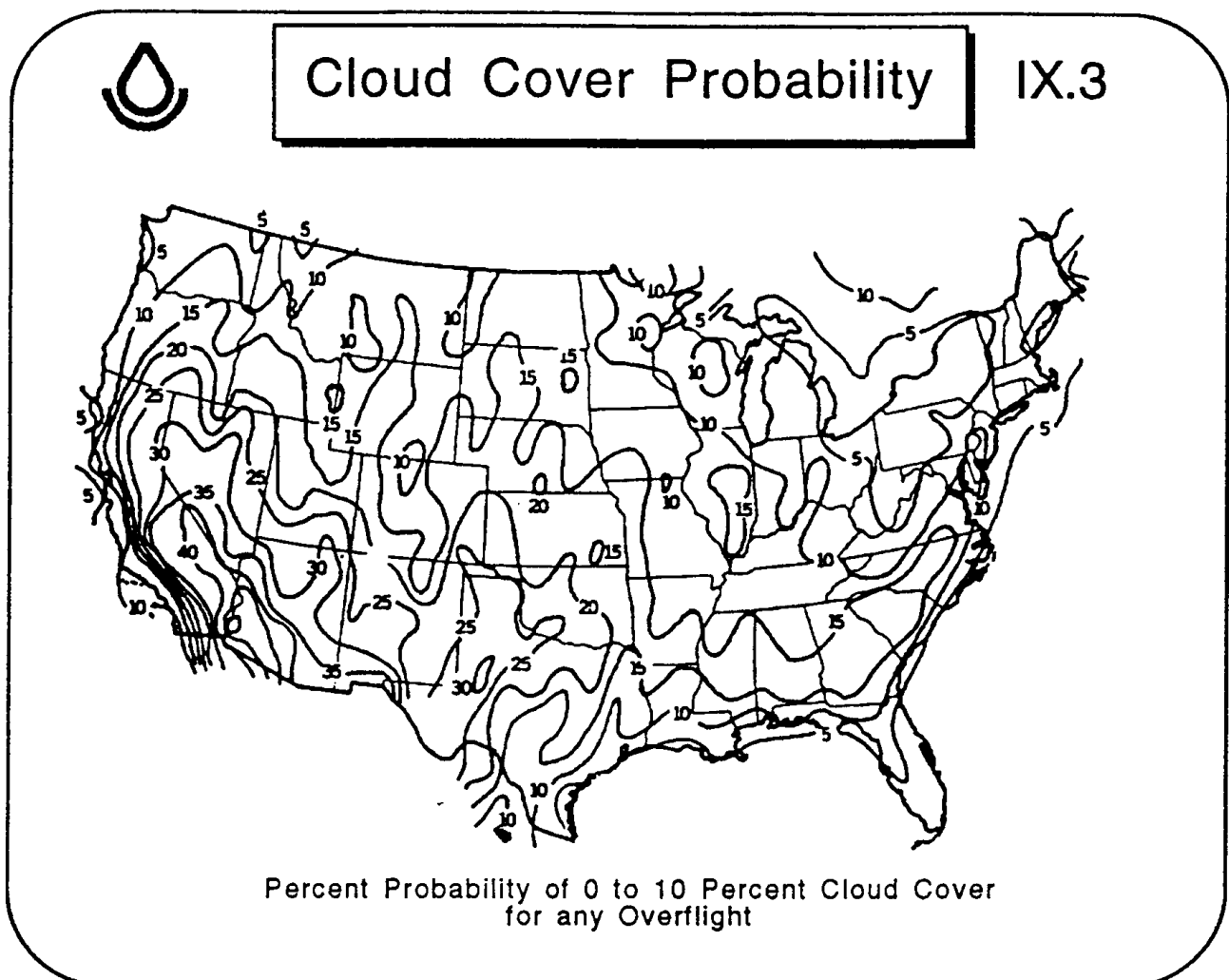
The USDA/Soil Conservation Service has prepared a very useful map portraying probability of cloud-free conditions over the conterminous U.S. It is suggested that it be used as in the following example:

Landsat passes over a specific site once every 16 days, so, in a year, it is possible to obtain 22 images over any location in the continental U.S. Suppose we are interested in imagery of Detroit, MI. The map indicates that there is only a 5 percent probability of acquiring a cloud-free scene over Detroit on any given day. Therefore,

$$22 \text{ (scenes)} \times 0.05 = 1.1$$

That is, in any given year, only one cloud-free image will likely be acquired over Detroit. In southwestern Arizona, on the other hand, the probability of obtaining cloud-free conditions rises to 45 percent, or about 10 cloud-free Landsat images per year.

Source: USDA/Soil Conservation Service
National Cartography and GIS Center



SATELLITE SYSTEMS NEWS

THE SCHOLAR SERIES

EOSAT's New Educational Product Offering

The Scholar Series is a special set of Landsat Thematic Mapper imagery designed for classroom use. Each data set covers an area of 512 x 512 pixels and includes all 7 TM bands. The four images currently available include:

1. Yellowstone National Park's devastating fires
2. Hurricane Hugo's effect on Charleston, SC
3. Chernobyl's nuclear accident
4. The Persian Gulf oil spill and the effect on Kuwait

The data sets are provided on two standard floppy disks for use with MS-DOS software. The images are priced at \$50.00 per scene not including shipping and handling. For additional details contact:

EOSAT Customer Services Department
4300 Forbes Boulevard
Lanham, MD 20706-9954
Telephone: (301) 552-0537
FAX: (301) 552-3762

EOSAT ANNOUNCES GLOBAL CHANGE SUPPORT PROGRAM

EOSAT has announced a Global Change Support Program designed to make Landsat data more readily available to federal government scientists involved in environmental change research. Key points include the following:

- EOSAT will sell Landsat data at a cost of \$2,500 per scene directly to federal agencies affiliated with the Committee on Earth and Environmental Sciences (CEES).

- The data will be used in non-commercial global change research projects.

- Participating government agencies will be permitted to copy Landsat scenes they purchase and provide them to their affiliated global change researchers.

- EOSAT will meet and deal directly with CEES agencies to determine their data needs and fulfill their requirements.

The Global Change Support Program is the second program enacted by EOSAT in the past year to facilitate environmental research with Landsat data. Last summer, EOSAT and NASA announced a Data Grant Program whereby EOSAT sold 500 Landsat scenes to NASA at reduced rates.

The Announcement of Opportunity for the EOSAT grant program was formally issued in April 1993. More than 100 researchers have expressed interest in submitting applications for the grants, which will be awarded this summer. For additional details contact:

EOSAT
4300 Forbes Boulevard
Lanham, MD 20706-9954
Telephone: (301) 552-0547
FAX: (301) 794-4243

EOSAT DISCOUNTS SATELLITE IMAGERY FOR SCHOOLS

EOSAT has announced a special pricing program that will make Landsat data more readily available to educational institutions.

Under the plan, EOSAT has reduced the price of archived Landsat Thematic Mapper (TM) image data for educators from \$4,400 to \$750 per scene. This 83% discount applies to nearly 8,000 Landsat TM scenes dating from 1985 to 1989. Non-academic users may purchase the archived scenes at a reduced rate of \$1,500 per scene. These special prices are effective until September 1993. For more information contact:

EOSAT
4300 Forbes Boulevard
Lanham, MD 20706-9954
Telephone: (301) 552-0547
FAX: (301) 794-4243

SPOT IMAGE CORPORATION SUPPORTS REMOTE SENSING EDUCATION

SPOT Image Corporation has implemented several programs to support remote sensing and GIS educational activities throughout the U.S. Special educational support pricing and other programs are described below.

SPOT Image Corporation Academic Advisory Council

In 1990, SPOT Image Corporation formed an Academic Advisory Council (AAC) to assist SPOT in working with the academic community. The AAC works cooperatively with SPOT to develop educational data sets, establish educational and research agendas, and to address resource information management issues. With input from the AAC, SPOT has established a "change detection data set" (see below), which is customized to every university's local area. In addition, there is a university discount program which provides archived scenes (over 3 million!) at non-commercial rates for educational/research purposes.

SPOT would like to welcome Dr. M. Duane Nellis of Kansas State University as its newest member of the AAC. Other members include:

1. Dr. Allan Falconer, Utah State University
2. Dr. Ernest Fish, Texas Tech
3. Dr. John Jensen, University of South Carolina
4. Dr. Chris Johannsen, Purdue University
5. Dr. Vic Klemas, University of Delaware
6. Dr. Thomas Lillesand, University of Wisconsin
7. Dr. James Merchant, University of Nebraska
8. Dr. Stanley Morain, University of New Mexico
9. Dr. Christine Nielsen, University of Ottawa
10. Dr. Sot Smith, University of Florida
11. Dr. Douglas Stow, San Diego State University
12. Dr. James Taranik, University of Nevada
13. Dr. Roy Welch, University of Georgia

Change Detection Data Sets

SPOT will provide up to 4 Level 1 digital images of your local area for \$700 per scene (\$800 for photo products). This archived imagery can be any combination of P and/or XS to encourage multirate change detection analysis, land use classification, data merging, mapping and other processes.

The images must cover the same area in the vicinity of your institution so that:

1. they have common value for the greatest number of students;
2. they can be used with local area field work and other information sources;
3. they can support your interaction with the local community.

Standard Educational Discounts

The following Education Support Program (ESP) discounts are offered for the purchase of additional SPOT image products.

Product Type	SP Price	Standard Fee
Level 1 digital imagery	\$1000	\$2450
Level 1 film product	\$1000	\$1800
SPOTViews - digital or prints		
Full Scene	\$2000	\$3000
15 minute area	\$1400	\$2000
7.5 minute area	\$ 750	\$ 950

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NEW CD-ROMS PROVIDE WEALTH OF DATA

Kilauea Volcano Data on CD-ROM

by George Karas, PLDS/JPL Node Manager, Jet Propulsion Laboratory

The Pilot Land Data System (PLDS) project at NASA's Jet Propulsion Laboratory (JPL), in conjunction with the U.S. Geological Survey at the Hawaiian Volcano Observatory (HVO), is about to release a six CD-ROM set of data of Kilauea volcano on the island of Hawaii. Kilauea is one of the most active volcanoes in the world and has been monitored by HVO geologists since 1924. During most of Kilauea's eruption period, between 1985 and present, scientists at JPL have carried out a variety of NASA-sponsored observations throughout Hawaii. Principal among the JPL campaigns have been several deployments of the NASA Earth Survey Aircraft, a heavily instrumented Lockheed C-130B Hercules, operated by the Ames Research Center. In addition, HVO scientists have been monitoring the activity of Kilauea and have conducted field investigations of and mapped the extent and growth of the current eruption since it began.

The CD-ROM set provides as comprehensive a set of data as possible, containing a variety of satellite and aircraft observations as well as ground data, laboratory spectra, atmospheric conditions and maps. The image and spectral data represent a wide region of the spectrum, from radar to visible wavelengths. The satellite data include Landsat Thematic Mapper (TM) and Advanced Very High Resolution Radiometer (AVHRR) images provided by the Planetary Geosciences Division of the University of Hawaii at Manoa, as well as a Landsat Multi-Spectral Scanner (MSS) image of the entire island of Hawaii.

The aircraft data on the CD-ROM set are from a suite of instruments, including Aircraft Synthetic Aperture Radar (AIRSAR), Thermal Infrared Multispectral Scanner (TIMS), NS001 Thematic Mapper Simulator (TMS), and a large number of digitized photographs. Browse images have been provided for all of these aircraft images at a resolution of 1:5. In addition, one image of each of these data types has been registered to a digital elevation model, which is also provided on the CD-ROM set. Also included are a set of image location maps that show the location of each aircraft image on the ground.

Finally, the CD-ROM set contains a wide array of ground and atmospheric measurements. Radiosonde data collected during each of the aircraft deployments have been provided as well as thermal infrared laboratory spectra of lava samples collected from various areas of the volcano. HVO has provided a number of flow maps that have been digitized and included along with several other digitized geologic maps.

The CD-ROM set was designed to work on PCs, VAXs, Macs, and Unix workstations. Various software tools have been provided for DOS, VMS, Mac, and Sun Unix systems. Because the raw data on the CD-ROM set are in compressed format, decompression software has been provided. In addition, software for calibrating TIMS and NS001 images and for synthesizing AIRSAR images of different polarizations have been included. Image display software for Macs and PCs has also been provided.

For more information on the Kilauea CD-ROM set contact the author at: (818) 354-6363; Internet: george@pldsj2.jpl.nasa.gov.

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OTTER Data Could Advance Forest Ecosystem Studies

by Gary Angelici and Lidia Popovici (Sterling Software) and Jay Skiles (Johnson Controls World Services), Ames Research Center

The first of a set of four CD-ROMs of data collected by the Oregon Transect Ecosystem Research (OTTER) project has been completed. The disc contains a coordinated set of satellite, aircraft, field, and laboratory measurements that were gathered during data collection campaigns and applied in the ecosystem research and modeling studies of OTTER project investigators. The principal objective of the OTTER project was to estimate major fluxes of carbon, nitrogen, and water through forest ecosystems using remotely sensed image data. More than 20 scientists from over 10 research institutions across the United States and in Canada participated in the testing and validation of the predicted fluxes and their biological regulation as simulated by ecosystem process models. Most data were collected in 1990 at six separate sites along an elevational and climatic gradient in west central Oregon to coincide with pre-budbreak (March), maximum growth (June), water stress (August), and senescence (October). Additional data were collected in the spring of 1991.

The bulk of the data collected for the OTTER sites consisted of remotely sensed imagery from instruments flown on satellites and on high-altitude and medium-level aircraft, such as NASA's ER-2, C-130, and DC-8. In addition, light and ultralight aircraft returned spatial, spectral, and video data. Satellite images for the project were registered composite Advanced Very High Resolution Radiometer (AVHRR) data generated by the EROS Data Center. The hundreds of aircraft flight lines and scenes collected included data from the Advanced Solid-state Array Spectrometer (ASAS), Airborne Visible InfraRed Imaging Spectrometer (AVIRIS), Daedalus Thematic Mapper Simulator (TMS), NS001 TMS, and Thermal Infrared Multispectral Scanner (TIMS) instruments.

OTTER investigators used a variety of spectroradiometers to collect spectral reflectance measurements as ground truth for remotely sensed data. Other ground data collected include base station meteorological, soils, field sunphotometer, and ceptometer data. Data produced in the laboratory included various biochemistry, biophysical, physiological, and nutrient cycling measurements. Results from several simulation runs of a forest ecosystem model were retained, as well as data derived from mathematical calculations on raw data and from combinations of bands of raw data and from combinations of bands of raw data, such as leaf area index. The datasets collected from the entire project total nearly 16 gigabytes in volume.

The image data collected from the C-130 aircraft (ASAS, NS001, and TIMS) on this and subsequent CD-ROMs were chosen to correspond to four times during the data collection periods. These times were 1) high sun, parallel to the plane of the path of the sun; 2) high sun, perpendicular to the plane of the path of the sun; 3) low sun, parallel to the plane of the path of the sun; and 4) low sun, perpendicular to the plane of the path of the sun. First, specific ASAS scenes with specific flight lines were chosen for inclusion on CD-ROM. Then, NS001 TMS and TIMS scenes were chosen so that they would have the same flight lines with the same sun angles.

Data for the aircraft imagery are provided for each of the six sites for the five data collection periods in 1990 and 1991. The disc contains one geo-registered AVHRR scene covering all sites for each month of 1990.

The OTTER imagery are provided in separate files in byte format for each individual spectral band with no header (except for the AVIRIS and ASAS scenes, which are stored in the format as distributed by the data providers). For example, there are 8 files of imagery for each NS001 TMS flight line, one for each band.

In addition to the image files of Daedalus TMS, NS001 TMS, and TMS, a file of housekeeping information is provided for each band with a summary file of calibration and other ancillary information for each scene.

OTTER tabular files of field and laboratory data, stored in ASCII format and containing mainly numerical data, were prepared for easy import into spreadsheet and database programs. The sunphotometer measurements can be used to correct the image data for atmospheric effects. The base station meteorological data, collected continually from 1989 to 1991, contain hourly measurements and daily summaries. Concentrations of several chemicals, such as sugar and starch, are given for several species on selected data collection days (during periods of aircraft overflights) for all sites. The data for one site, in which a portion was fertilized, is summarized over a monthly period in another file of chemistry data.

The data files on the CD-ROM follow many of the conventions and structures developed by the Planetary Data System (PDS). Each data file is accompanied by a descriptive PDS label file, which in the case of image data, permits easy display on personal computer systems. The public domain software package, "Imdisp," is provided on the disc for image display on IBM PCs (and compatible machines). The popular shareware program, "Stuffit," is necessary to extract the execution file for the Macintosh display program, "Image4PDS." All imagery, except for AVIRIS and ASAS data, can be displayed using the software on the disc. Complete documentation on PDS file formats as they relate to the OTTER data is provided on the disc.

General project documents on the CD-ROM describe the OTTER project, the precise location of the sites, the data collection campaigns, and each of the instruments/datasets. The disc includes files offering assistance in using the disc, such as a file describing the disc file naming conventions and an image index listing image files on the CD-ROM according to site, date and dataset name.

The remaining three CD-ROMs are scheduled to include the following datasets: Airborne SAR (Synthetic Aperture Radar), ASAS, AVIRIS, Compact Airborne Spectrographic Imager (CASI), Field Spectrometer Measurements, Derived Data (such as Leaf Area Index), and Forest-BioGeochemical Cycling Model Simulation Runs. The imagery selected for these discs will conform to the rules adopted for the first disc. Sampler images from the large format instruments, such as Airborne SAR, ASAS, AVIRIS and CASI will be generated to enable easy display of selected bands. The remaining discs are scheduled to be available in late 1993.

It is anticipated that the coordinated datasets on these discs will be useful for studies of seasonal forest ecosystem dynamics, in studies of carbon and water fluxes in temperate coniferous forests, and in the application of remote-sensing technology to help answer ecological questions. While a number of analyses of these data are to be published in special issues of two journals, the data comprise a valuable baseline for future studies of forest ecosystems.

Pilot Land Data System staff members at the Ames Research Center, under sponsorship of the Ecosystem Dynamics and Biogeochemical Cycling Branch of NASA's Earth System and Applications Division, produced the disc as one of the services of the ongoing support of the OTTER project. The PLDS staff prepared the data, documentation and all supporting files for publication and premastered the disc on the PLDS/Ames Sun server using Makedisc premastering software.

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