

Update

Laboratory for Applications of Remote Sensing

Volume 47

January 10, 1972

Happenings and Items of Interest

*LARS Program Leader *Dr. M. F. Baumgardner* has recently been honored by the Agricultural Institute of Canada. He was awarded the 1972 Klinck Lectureship and in this capacity will lecture throughout Canada, at least once in each of the Provinces. He is tentatively scheduled to lecture in the Western Provinces from January 24-28 and in the Eastern Provinces, March 13-17. The topic for the 1972 Klinck Lectureship will be "Aerospace Science and Agricultural Development."

Previous Klinck Lectureships have been held by:

- 1966 - Dr. Norman Borlaug, 1970 recipient of the Nobel Peace Prize.
- 1968 - Dr. Glenn Burton, U. S. Department of Agriculture.
- 1970 - Dr. Ralph Phillips, U. S. Department of Agriculture.
- 1971 - Dr. C.R.W. Spedding, Hurley, England.

*The Fourth Annual Earth Resources Program Review will be held January 17-21, 1972, in Houston, Texas. The Corn Blight Watch Experiment will be reviewed on January 17, from 1:00-2:45 pm, with the presentation of the following papers:

- Experiment Overview* - R.B. MacDonald, NASA/MSC
- Corn Blight Situation: 1970 and 1971* - M.E. Bauer, LARS
- Sampling Model and Ground Data Measurements Program* - R. Allen, USDA/SRS
- Aircraft Data Acquisition* - A. Watkins, NASA/MSC
- Data Processing Analysis and Interpretation* - T.L. Phillips, LARS
- Experiment Results* - C. Johannsen, LARS
- Machine Analysis Results* - WRL/University of Michigan
- Experiment Summary* - J. Clifton, USDA/ASCS

Earth resources research conducted at Purdue University will be represented by the following papers:

- Measurements Program in Remote Sensing at Purdue University - L.F. Silva, LARS*
- Data Processing I: Advancements in Machine Analysis of Multispectral Data - P.H. Swain, LARS*
- Data Processing II: Advancements in Large-Scale Data Processing Systems for Remote Sensing - D.A. Landgrebe, LARS*
- Differentiating Elements of the Soil-Vegetation Complex - M.F. Baumgardner and Staff, LARS*
- Land Utilization and Water Resources Inventories over Extended Test Sites - R.M. Hoffer and Staff, LARS*

*Congratulations to *Bob MacDonald*, who has been appointed Chief of Earth Observations of the NASA Manned Spacecraft Center, Houston, effective January 1, 1972. This position was formerly held by M.R. Holter, who has returned to the University of Michigan.

Special Notices

- *Several "bugs" have been removed from LARSYSAA. A complete listing is included in S.K. Hunt's memorandum of January 4, 1972.
- *A general review of work done on the Corn Blight Watch Experiment is planned for Tuesday, February 8, 1972, in Room 214 of the Memorial Center. The all-day meeting will start at 9:00 am and is open to all interested LARS or Purdue staff members and students. Chris Johannsen is in charge of the program.
- **Chris Johannsen* will appear on Channel 13 TV on Sunday, January 16, 1972, at 2:30 pm (opposite the Superbowl, we're sorry to report). He will discuss the content of his course Agronomy 490: Contamination of Air, Soil and Water and some of special projects pertaining to environmental problems completed by his students. Two sessions of the course will be aired over Channel 13, on January 22, 1972, at 7:00 am and on January 27, 1972, at 7:30 am.
- *The *Corn Blight Watch Experiment Final Report* is progressing under the editorial efforts of David Nelson. As of December 21, 1971, the Volume 1 rough draft was 95% in, the Volume 2 rough draft 70% in, and the Volume 3 rough draft 20% in.
- *With the hesitant cooperation of Rufus, one of our resident *Mus musculi*, LARS researchers have demonstrated the feasibility of an operational remote Mouse Detection and Monitoring System

(MDMS). Using the PRT-5, the researchers were able to monitor the movement of Rufus around the office. They caution at this time, however, that they can detect Rufus with the PRT-5 only when they can see him or her, as the case may be, and therefore foresee no early replacement for *Felis catus*, a current operational MDMS.

(Editor's note: To insure job security, the researchers wish to remain anonymous.)

Travel

*On January 10 and 12, *Chris Johannsen* will be spreading the word on LARS work. He will be the banquet speaker at the College Corner Community Club, College Corner, Indiana, on January 10, when he will speak on *Applications of Remote Sensing*. His January 12 address as a Farm Science Day speaker is entitled *Corn Blight Watch- Implications Regarding Future Corn Disease and Growth Problems* and will be given at 9:00 am as part of the Crop Production Program.

**Howard Grams* was in Boston January 10, 1972, to attend a CP-67/CMS SHARE meeting.

**Terry West* will present a paper at the 51st Annual Meeting of the Highway Research Board, January 17-21, 1972, in Washington, D. C. The paper, entitled *Engineering Soils Mapping from Multispectral Imagery Using Automatic Classification Techniques*, will be a part of Session 23, Remote Sensing for Highway Engineering.

Coming Attractions

*The interdisciplinary Remote Sensing Seminar, in which many of the LARS graduate students have been participating, will be offered again during the spring semester. Catalogued as Forestry and Conservation 579, it will be held Tuesday afternoons at 3:30 pm and can be taken for either 0 or 1 credit. It is hoped that most of the LARS graduate students will be able to participate in the weekly meetings whether they actually give a seminar paper or not. Roger Hoffer is the professor-in-charge.

*There have been extended discussions concerning the annual reports. Volume 5 will report work done during the period from October, 1968, through December, 1969. Volumes 6 and 7 will report the work during 1970 and 1971, respectively.

Rough drafts will be completed for Volume 5 by February 2; Volume 6 by March 15; and Volume 7 by May 1.

Visitors

*Mr. H.R.H. Cleghorn-Brown of the Economist Intelligence Unit (E.I.U.), Ltd., London, was a visitor to LARS on January 5. Mr. Cleghorn-Brown, Director EIU's Industrial Market Research Division, is particularly interested in future development of an international program of, in his words, "Physical Resource Identification, Monitoring, Evaluation and Reporting" (PRIMER).

*Charles E. Clause, Houston, Lockheed, visiting Terry Phillips, December 10, 1971.

*R.A. Porter, University of Alaska Geological Institute, visiting Terry Phillips, December 13, 1971.

*Mr. & Mrs. J.W. Clifton, Washington, D. C., U.S.D.A., took a brief tour of Flex II while meeting with LARS staff, December 20, 1971.

*Mr. Stuart Haley of Ambionics, discussing the Earth Resources Survey program with D.A. Landgrebe and J.B. Peterson, January 10, 1972.

Articles

*Sinclair, T.R., R.M. Hoffer and M.M. Schreiber. "Reflectance and Internal Structure of Leaves from Several Crops During a Growing Season," *Agronomy Journal*, Volume 63, Number 6 (November-December, 1971).

Library Acquisitions and Publications

**IBM Systems Journal*, Volume 10, Number 4.
-A large-scale interactive administrative system
-Analysis of free-storage algorithms
-Modeling for computing center planning

**Functional Description of Multispectral Scanner Data Analysis Station*. NASA, February, 1971.

**Water Resources Research*. American Geophysical Union, Volume 7, Number 6, December, 1971.

**Purdue Agricultural Reports*. Volume 1, Number 1, November, 1971.

**Water Resource Abstracts*. Volume 4, Number 22, November 15, 1971.

**Water Resource Abstracts*. Volume 4, Number 23, December 1, 1971.

Seminars

*Forestry and Conservation 579: Remote Sensing Seminar. "A User's View of Remote Sensing: Applications of ERTS-A Data to Research Problems in the Gulf of California," by *Chris Flanagan*, graduate student in forestry and conservation. Tuesday, January 11, 1972, 3:30 pm. Room 225, Horticulture Building.

*"Use of Spatial Information in Automatic Data Processing," by *Jim Wilson*, graduate student in electrical engineering. (Date to be set during the examination period.)

Miscellaneous

**Sue Taylor* will become D.A. Landgrebe's secretary and clerical supervisor when *Elaine Schebo* leaves.

*Best wishes to *Chris Flanagan* who will be married at the end of January to Dr. Russ Gum, associate professor of hydrology and water resources administration at the University of Arizona. They will live in Tucson and Chris plans to continue her research on the U. of A. ERTS-A project involving the Gulf of California.

*Best wishes also - though belated - to *Clara Woodall Becker* who married John Becker on December 21, 1971.

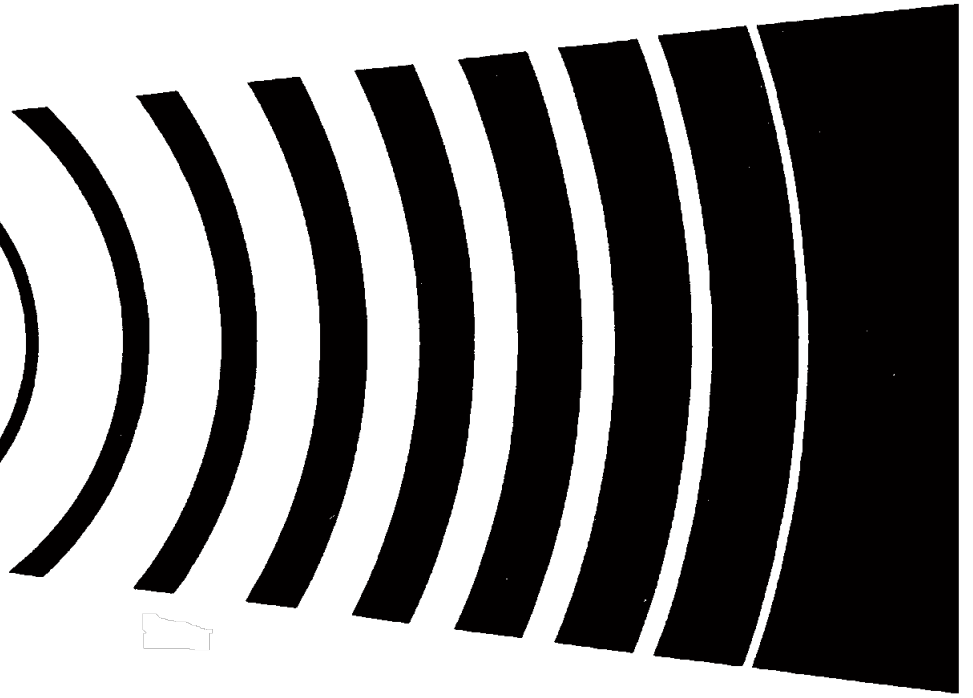
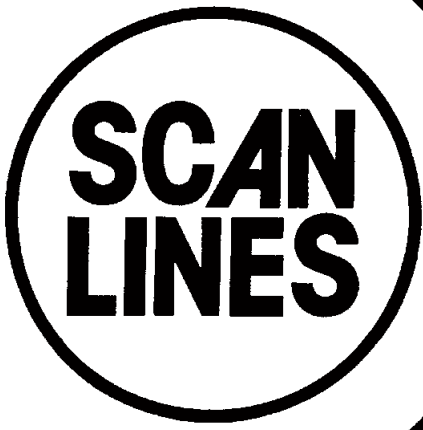
*Belated congratulations also to *Mr. & Mrs. Stan Yao* on the birth of a daughter, Faith, November 29, 1971.

*Still haven't decided on your New Year's Resolutions?? It's not too late if you act quickly and put your plans into *action* now. (Your supervisor may just think it took you a while to develop your new attitudes to the point that they were apparent to others.)

The following chart, stolen from *Soil Survey Horizons*, Vol. 12, No. 3 (Autumn, 1971), may help you in deciding where to begin your self-evaluation.

GUIDE FOR EVALUATING EMPLOYEE PERFORMANCE

Performance Factor	Far Exceeds Job Requirement	Exceeds Job Requirement	Meets Job Requirement	Needs Some Improvement	Does Not Meet Minimum Requirement
Quality	Leaps tall buildings with a single bound	Must take a running start to leap tall buildings	Can leap over short buildings only	Crashes into buildings when attempting to jump over them	Cannot recognize buildings at a glance
Timeliness	Is faster than a speeding bullet	Fast as a speeding bullet	Not quite as fast as a speeding bullet	Would you believe a slow bullet	Wounds self when attempting to shoot
Initiative	Is stronger than a locomotive	Is stronger than a bull elephant	Is stronger than a bull	Shoots the bull	Smells like a bull
Adaptability	Walks on water consistently	Walks on water in emergencies	Washes with water	Drinks water	Passes water in emergencies
Communications	Talks with God	Talks with the Angels	Walks with himself	Argues with himself	Loses these arguments



Update

Volume 48

January 31, 1972

Happenings and Items of Interest

*The big news for the coming two weeks is LARS first annual review: *The 1971 LARS Program Review*. It will be held February 9, 10 and 11. A memo and schedule is being distributed to the LARS staff so you will be fully informed. All LARSians are asked to attend.

*Plaudits for LARS' efforts this summer keep coming in. Dean of Agriculture Kohl's report to the faculty, *Agriculture at Purdue - The Year Past and the Road Ahead*, contains the following citation:

The world's largest agricultural research project, "The Corn Blight Watch," carried out during this past year, continually amazed us all. Here was a coordinated effort between multitudinous federal agencies, the research and extension people of several states, and the Purdue inter-school team of research workers at LARS. The work required detailed plans and precise scheduling of activities of hundreds of people. These people received no extra pay, but reallocated their time from already heavy schedules. It was carried out successfully! Truly, this is an example of the best in a task force; an inter-disciplinary, coordinated research effort.

*Ken Martin, a February graduate from Civil Engineering at Purdue has recently accepted a position with the Earth Satellite Corporation in Washington, D.C. Ken served LARS and the Corn Blight Watch Experiment as an area coordinator with the Photo-Analysis Group this summer. Our congratulations, Ken. Have the best of luck in the future.

Special Notices

*LARS' computer will be shut down during the Program Review (see page 1) from:

12:01 am to 5:00 pm, Wednesday
12:01 am to 5:00 pm, Thursday
12:01 am to 5:00 pm, Friday

*The NASA Manned Spacecraft Center have developed a Resident Research Program in Engineering and Science. This particular program is unique in that certain specific research problems are advertised and interested faculty members are invited to respond with research proposals.

We are posting an official announcement of the program with abbreviated descriptions of each research topic in Flex Labs I and II.

Visitors

**Mario C. Lima* of UFR Pernambuco, Recife, Brazil visited Dr. Hoffer.

**Robert Bizzell, James L. Hall, Johnny L. Parker, Gerry De Vezin, and Alan Wylie*, all of NASA/MSFC in Houston, and *Michael R. Felix* of IBM visited Terry Phillips on January 31.

**Larry R. Butts*, of Hewitt-Packard, Indianapolis, visited Barrett Robinson.

*One hundred and twenty attendees of the 20th Annual Indiana Land Surveyors Conference visited LARS on January 21.

Articles

**Cipra, J.E., M.F. Baumgardner, E.R. Stoner and R.B. MacDonald.* "Measuring Radiance Characteristics of Soil With a Field Spectroradiometer," *Soil Science Society of America Proceedings*, Volume 35, Number 6 (November-December, 1971). Reprints will soon be available.

*Looking for a LARS publication or reprint? Copies are available on the pegboard next to Chris Johannsen's office. If an issue is missing, see Tom Bulta or Beth Altenkirch.

Travel

**Dr. D.A. Landgrebe* was in Washington, D.C., January 25-27, 1972, to attend the Thirteenth Meeting of the Panel on Science and Technology before the Committee on Science and Astronautics, U.S. House of Representatives. The theme of the meeting was "Remote Sensing of Earth Resources" and drew panel speakers from government

and industry in this country as well as from Australia, India, and Italy. Among those testifying were H. Guyford Stever, President of Carnegie-Mellon University and to become the new director of the National Science Foundation; Dr. James C. Fletcher, Administrator of NASA; Dr. William T. Pecora, Under Secretary in the Department of Interior and Director of the U.S. Geological Survey and Dr. E.E. David, Jr., Science Advisor to the President. Copies of the testimony are available at Flex Lab I; see Elaine.

*U.S. Secretary of Agriculture *Earl Butz* has asked our own *Dr. Jahn Peterson* to take his place at the winter (January 27) meeting of the Mississippi Section of the American Society of Agronomy in Jackson. His address is titled "The Potential Value of Remote Sensing in Agriculture."

He will also present a talk entitled "Managing a Dynamic Teaching Program" at the Mississippi State University Faculty Convocation.

Library Acquisitions and Publications

Texas A & M: *Laboratory Measurement of the Complex Dielectric Constant of Soils*, M.L. Wiebe, October, 1971. Remote Sensing Center, College Station, Texas. Tech. Rpt. RSC-23

**Selected Applications of Microwave Radiometric Techniques*, B.R. Jean, August, 1971. Technical Report RSC-30

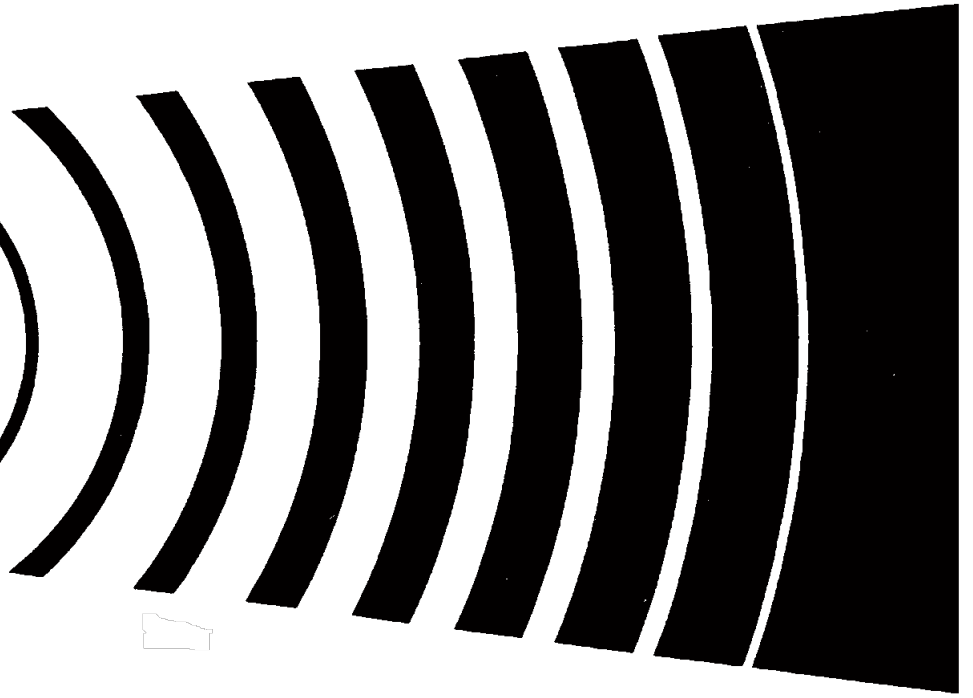
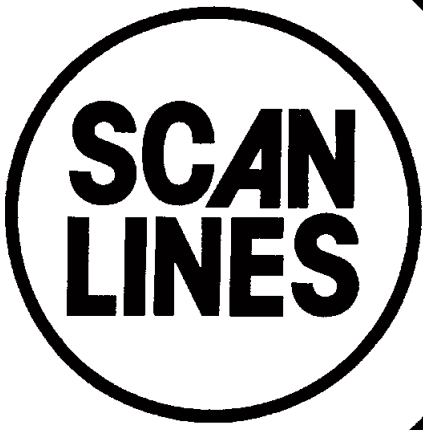
**An Experimental Evaluation of a Theoretical Model of the Microwave Emission of a Natural Surface*, J.A. Richerson, August, 1971. Technical Report RSC-27

New Faces

**Lela Thomas*, who prefers to be called Lee, began work as Rex James' secretary on January 17. *Sharon Howard* has taken Diane's position as the Flex Lab I receptionist. LARS welcomes these charming ladies to its staff.

Birthdays

- *January 28 - Chris Stohr
- *February 1 - Debbie Remsburg
- *February 7 - Dr. Baumgardner
- *February 13 - Clara Becker



Update

Laboratory for Applications of Remote Sensing

Volume 49

March 7, 1972

Happenings and Items of Interest

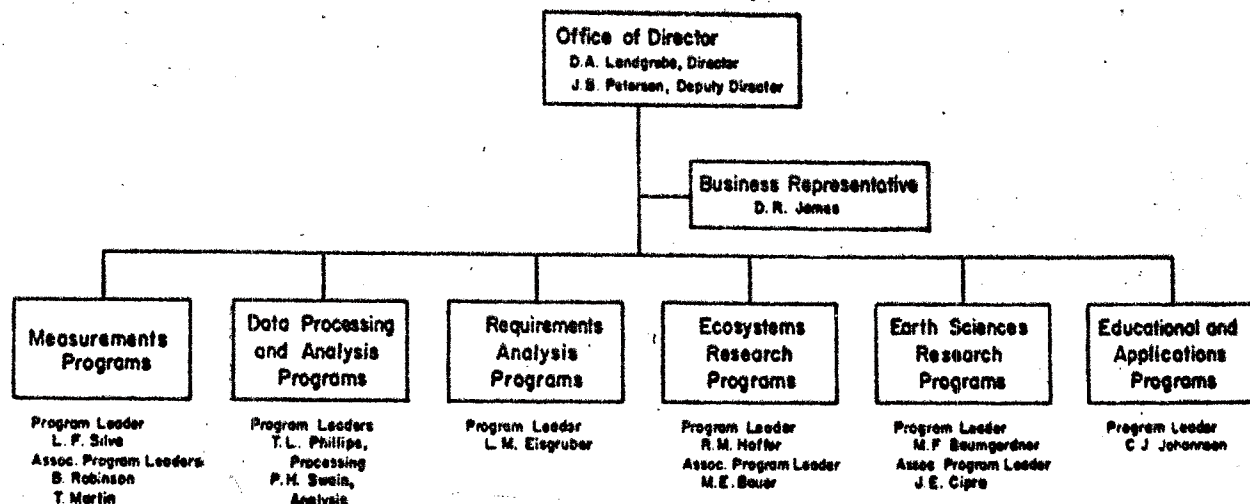
*The *Visiting Scientist Program* at LARS was officially initiated with the arrival on February 21, 1972, of Dr. M. S. Dhanju from the India Space Research Organization, Ahmedabad, India. Three scientists from Canada, Dr. A. McQuillon, Mr. C. Tarnocai, and Mr. J. Thie, arrived on February 28, 1972.

LARS is offering this new international educational program to provide training in (1) aerospace remote sensor technology, (2) computer-implemented analysis of multi-spectral data and digitized multichannel photography, and (3) the applications of these techniques to the development and management of agricultural and other earth resources. This program is available to a limited number of scientists who are established professionally in research institutes, universities, government agencies, and international development organizations and who desire to become more knowledgeable in the field of remote sensing.

Negotiations are now under way with Thailand, Jamaica, Greece, Columbia, Netherlands, Spain and Indiana State University for future visits of scientists. The Canadian scientists now here will be at LARS until March 31 and Dr. Dhanju will remain until mid-April. The recommended time for the training is eight weeks. A new group of visiting scientists is expected around May 8, 1972.

*LARS reorganization, effective February 14, 1972 was designed to take into consideration new developments in the work of the lab and to handle them in the most efficient manner. Major staff changes brought about by this reorganization were the promotion of Terry Phillips and Phil Swain from associate program leaders to program leaders of the Data Processing and Analysis Programs, and the appointments of Mary Bauer and Jan Cipra as associate program leaders in the Ecosystems Research and Earth Sciences Research Programs, respectively. The new organization chart follows.

Organization of the Laboratory for Applications of Remote Sensing



*LARS has recently received a list of publications available from the Remote Sensing Program of the University of Wisconsin's Institute for Environmental Studies. The bibliography, which lists 23 publications completed from 1968 to the present, is in the LARS library.

*The papers delivered at the NASA Annual Review in January and again on February 9, 1972, for the LARS 1971 Program Review have been completed in final form and will be available as LARS Information Notes within a few weeks.

*The proposal to NASA for the fiscal year 1972-73 is now in progress and will be completed within a week.

*The film *Corn Blight Watch* has been added to the University Film Library and is available at the Audio-Visual Center for students and staff to check out without cost.

*Chris Johannsen and Marion Baumgardner presented a review on February 29, 1972, of LARS' contributions to soils research. The occasion was the Soils Research Review held at Purdue by the Cooperative State Research Service under the direction of Dr. Arthur Newman, reviewer for USDA.

*Ex-LARSian Art Wacker presented a paper co-authored by D. A. Landgrebe, "Minimum Distance Classification in Remote Sensing" at the first Canadian Symposium on Remote Sensing, Ottawa, Canada, February 7-9, 1972. Art sends his regards to all.

Travel

*David A. Landgrebe presented a paper entitled "Systems Approach to the Use of Remote Sensing" at the March 2-3, 1972, Conference on Parallel Image Processing for Earth Observation Systems. The conference, sponsored by NASA and held at Goddard Space Flight Center, Greenbelt, Maryland, brought together those involved in optical and digital image data processing technology and those in the earth resources field.

*Phil Swain presented a paper "Pattern Recognition and Earth-Observational Data" at the 1972 Workshop on Pattern Recognition (IEEE Computer Society), Hot Springs, Virginia, February 23, 1972.

*Phil Swain and Terry Phillips spent February 24-25, 1972, in Houston briefing NASA scientists on the use of LARSYS for analyzing remote sensing data from multispectral sensors.

*Marion Baumgardner will be off on the second leg of his Klinck Lectureship from March 12-18. He will be lecturing throughout the Eastern Provinces of Canada on "Aerospace Science and Agricultural Development." He made a similar trip through the western Provinces in January, under the auspices of the Agricultural Institute of Canada.

*Chris Johannsen was the speaker February 15, 1972, at a special luncheon in Rushville, Indiana, honoring Rush County farmers who had high yields in the State Ten-Acre Corn Contest. On February 23, 1972, he spoke to the Adult Farmer Class at Lowell, Indiana, on "Remote Sensing and the Corn Blight Watch."

*The highlights of Roger Hoffer's South American trip, October through December, 1971, are summarized in the following statement he prepared.

"The trip was sponsored primarily by the U.S. AID Program and centered around a six-week stay in Brazil. Most of the work in Brazil was carried out at Vicosa, which is about an eight hour drive inland from Rio de Janeiro. Purdue has had permanent staff personnel at the Federal University of Vicosa (UFV) for approximately ten years, as part of a "university building" program whereby Purdue is aiding U. F. V. in developing their teaching and research capabilities, particularly in the areas of agronomy, agricultural economics, agricultural engineering, forestry, and animal sciences.

"My assignments in Brazil were to assist the staff at the University in the development of their teaching program, both at the undergraduate and graduate levels, in the areas of photo-interpretation and remote sensing, and secondly, to help in developing a cooperative research program between the University of Vicosa and the National Institute for Space Research (INPE) at Sao Jose dos Campos, with possible participation by Purdue University.

"On the way to Vicosa, I stopped in Manaus (on the Amazon River), in Brasilia (Capital of Brazil), and in Belo Horizonte to be briefed on the information requirements to which remote sensing technology in Brazil could be applied. While in Vicosa, I held intensive training sessions, seminars, and discussions concerning remote sensing techniques, training procedures, and research programs which could be carried out in Brazil and used the 1971 Corn Blight Watch film a number of times. I also spent a week in Sao Jose dos Campos working on the cooperative research agreement with INPE, and, during my last week in Brazil, attended the second in a series of United Nations "Panel Meetings." The objective of the meeting was to inform personnel of other developing countries about the remote sensing programs being carried out in Brazil and hence the use of remote sensing and its potential for their countries. I was invited to present a paper entitled "The Importance of 'Ground Truth' Data in Remote Sensing." The 1971 Corn Blight Watch film was also shown and was well received.

"In Brazil, one of the more interesting discussions concerned Project RADAM, involving almost all of the Amazon in which radar data is currently being collected and compiled. Other sensors are also being utilized, and approximately 200 people are involved in this massive, operational remote sensing program.

"In summary, my stay in Brazil was extremely interesting but also very busy. There are many challenges present in Brazil and many opportunities in which remote sensing technology could play an important part in development of the natural resources with which Brazil is so richly blessed.

"Following my departure from Brazil on December 3rd, I took a week's vacation and then spent one and a half days working with InterAmerican Geodetic Survey (IAGS) personnel in Lima, Peru, discussing remote sensing problems and programs there. I also spent a week at the InterAmerican Center for Photo-interpretation (CIAF) in Bogota, Colombia, visited the ERTS Test Site in the eastern plains of Colombia, and participated in a national "Seminar on Remote Sensing of Natural Resources" held in Bogota. My last stop was in Panama, where I received a thorough briefing by IAGS personnel on a program for developing remote sensing programs in 16 countries throughout Central and South America."

Visitors

*Peter N. Street, Optronics International, February 3, 1972, to see Terry Phillips.

*R. P. Bukata, University of Manitoba, Winnipeg; Boon Indrambarya, Applied Scientific Research Corp. of Thailand; Samarn Panichapong and P. Vijarnsorn, Soil Survey Division of Land Development Department, Thailand; Chumni Boonyobhas, Royal Forest Department, Thailand, visiting M. F. Baumgardner and Chris Johannsen, February 10, 1972.

*Mr. Eboe Almquist, of the Swedish Remote Sensing Committee, was at LARS at the end of February to get ideas on aircraft equipment and processing equipment available to support their new remote sensing activities.

*Prof. John H. Baumgardner, Texas Technical University.

*Mr. K. P. Sinclair and Mr. E. M. VanVleck, Ames Research Center, February 29, 1972.

*Dr. H. B. Chaney, head of the department of soils, Oregon State University, and president-elect of the American Society of Agronomy, February 29, 1972.

*Mr. Robert Richards, vice president of International Corn Products, Thursday, March 2, 1972.

Seminars

**Instrumentation in Astrology*, sponsored by Society of Photo-optical Instrumentation Engineers and American Astronomical Society, March 13-15, 1972, Tuscon, Arizona.

**Interdisciplinary Remote Sensing Seminar*: Room 225, Horticulture Building at 3:30 Tuesdays.

March 7: "Remote Sensing Programs in India," by Dr. M. S. Dhanju, visiting scientist from the India Space Research Organization, Ahmedabad, India.

March 14: "Use of color panels to calibrate scanner data in determining reflectance spectra of corn canopies," by Eric Stoner, graduate student in agronomy.

Library Acquisitions and Publications

**Selected Water Resources Abstracts*, Vol. 5, No. 1, January 1, 1972.

**Ibid.*, Vol. 5, No. 2, January 15, 1972.

**A Collection of Technical Papers, Land and Water Joint Conference on Sensing of Environmental Pollulants*, November 8-10, 1971.

**Hewlett-Packard Electronics Instruments and Systems for Measurement, Analysis, Computations*, 1972.

**IBM Journal of Research and Development*, Vol. 16, No. 1, January, 1972.

**Publication List for Universities*, General Electric, 1971-1972.

Birthdays

*A belated "happy birthday" to:

John Clevenger - February 17
Bud Goodrick - February 19

*Best wishes also to:

Tom Martin - March 8
Eric Stoner - March 11
Jack Halsema - March 18

*Congratulations to *Dr. Stanton Yao* on his new position at Lockheed Electronics Company, Houston, Texas. We are sorry to see him leave LARS but happy he is continuing his efforts in remote sensing.

*Congratulations also to *Verle Hughes*, who welcomed a third grandchild into the world: Timothy Hughes-February 2, 1972.

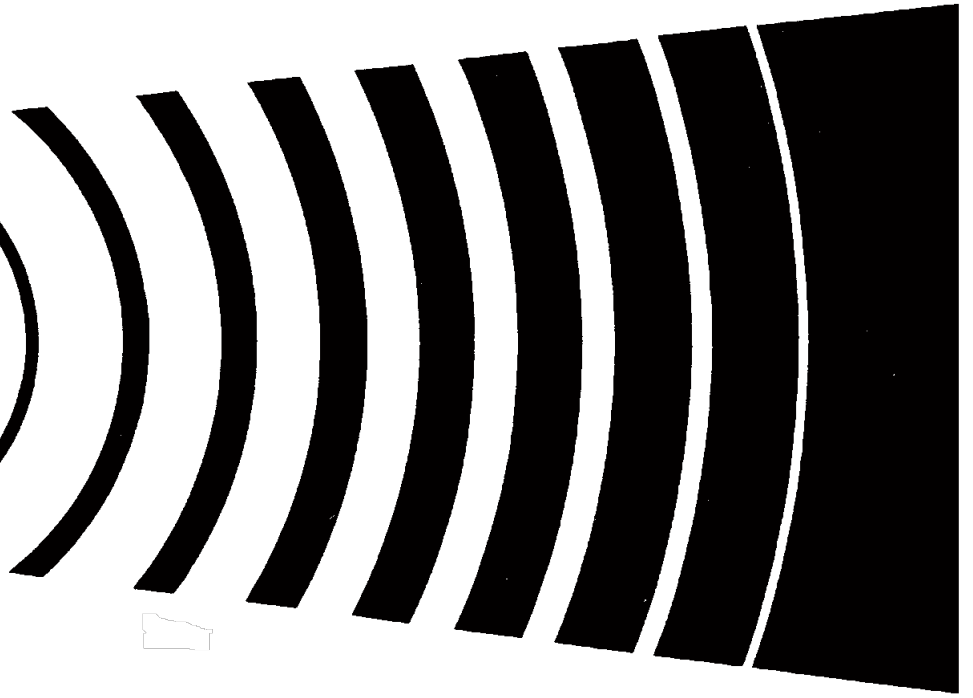
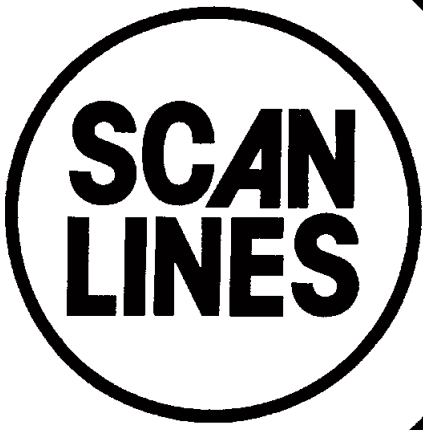
*The following contribution from Dave Nelson is included for your edification:

Stilt-Mongering Spore Searches Stalk Simple Solution (Seriously!)

The 1971 Corn Blight Hunt was a masterpiece of interinstitutional cooperation. Initial field sample selection was performed by the Nonrandom Sampling Association, whose experts used a pair of Smythe-Jones noncalibrated random generator cubes (dice) to lay out strips of nonarable land across the Midwest. Actual remote sensing overruns were performed by a stilt-mounted team of 10 volunteers trained at nearby Wabash Valley Laboratory for those without a Remote Sign of Sense (WVLRSS) and equipped with handheld Japanese Cheepolenso two mm wideangle photometers. Corn Blight Hunt walklines were established as 12 feet wide and 100 miles long except when such length was made impracticable by low hanging power lines, unbridged drainage ditches or uncharted quicksand beds. In cases where unforeseen disaster occurred or equipment malfunctioned, volunteers, who had been urged to commit collected data to memory, were trained to transcribe their information on the nearest corn leaf not infected with SCLB lesions.

Approximately 95% of the data collected had to be, therefore, decoded from leaves since of the 10 original volunteers, 6 disappeared forever, one was shot down by a patrolling squadron of F-4C's, two lost their segment maps in Burger Chef and one came back babbling about "man-eating spores and corny jokes."

Dispite this, computers are even now attempting to simulate the missing data and plans are in the works to mount next growing season's Remote Sensors on hydrogen-filled skateboards.



Update

Laboratory for Applications of Remote Sensing

Volume 50

March 22, 1972

Happenings and Items of Interest

*Congratulations to *John Lindenlaub* on his promotion to the rank of professor of electrical engineering.

*Volume 2, Number 2 (February 1972) of the journal *Remote Sensing of Environment* is now available. The only copy in the lab currently is Dave Landgrebe's personal copy. Articles included in this issue are:

"Oceanographic Applications of Color-enhanced Satellite Imageries," K.-H. Szekiels and W. F. Mitchell, LCDR, USN (Greenbelt, Maryland).

"Reflectance Studies of Healthy, Maize Dwarf Mosaic Virus-Infected, and *Helminthosporium maydis*-Infected Corn Leaves," Beverly S. Ausmus and James W. Hilty (Knoxville, Tennessee).

"Low Altitude Gamma-Spectrometric Surveys from Helicopters in Puerto Rico as an Example of the Remote Sensing of Thorium, Uranium, and Potassium in Soils and Rocks," Theresa Flynn Schwarzer, Beverly Gatlin Cook, and John A. S. Adams (Houston, Texas).

"Spectral Reflectance and Photometric Properties of Selected Rocks," Robert D. Watson (Denver, Colorado).

"Atmospheric Water Vapor Measurement by Raman Lidar," R. G. Strauch, V. E. Derr and R. E. Cupp (Boulder, Colorado).

"An Observation of the Gulf Stream Surface Front Structure by Ship, Aircraft, and Satellite," George A. Maul and Donald V. Hansen (Miami, Florida).

"The Calculation of the Directional Reflectance of a Vegetative Canopy," Gwynn H. Suits (Ann Arbor, Michigan).

**Debbie Remsburg* will be away from LARS for several weeks for medical reasons. No art work will be done at the lab while she is away although Sharon Howard will fill out work orders and get duplicate slides as needed. *During Debbie's absence none of the drafting equipment may be used without the approval of Chris Johannsen.* She expects to return toward the end of April.

**Dr. Paul Mausel*, associate professor of geography and geology at Indiana State University, has joined the LARS staff to work with Chris Johannsen and others on land use. Dr. Mausel, an agricultural geographer, will be at LARS 4 days a week until August.

*Dave Landgrebe's personal copy of the January, 1972, issue of *IEEE Transactions on Geoscience Electronics* is now in the lab and available. This special issue based on the Third Annual International Geoscience Electronics Symposium contains the following papers:

- "Experimental Measurements of 2.25-cm Backscatter from Sea Surfaces," R. W. Newton and J. W. Rouse, Jr.
- "The Use of Lasers-Pollution Monitoring," I. Melngailis.
- "Design of a Symoptic Water Quality Monitoring System for Narragansett Bay," R. Pitchai and R. F. Hill.
- "A Wave Follower for Field Study of Air-Sea Interactions," M. Peep.
- "Doppler Radar Return from Two-Dimensional Random Rough Surfaces," M. S. Sohel and H. S. Hayre.
- "Hydrologic Data Collection Via Geostationary Satellite," A. F. Flanders and J. W. Schiesl.
- "Analysis and Optical Processing of Sea Photography for Energy Spectra," R. S. Kasevich, C.-H. Tang, and S. W. Henricksen.
- "The Design and Operation of an Acoustic Radar," H. D. Parry and M. J. Sanderé, Jr.
- "A Traverse Gravimeter for the Lunar Surface," G. Mamon.
- "Objectives and Capabilities of the Skylab S-193 Altimeter Experiment," L. S. Miller and D. L. Hammond.

Coming Attractions

*March 23 is the deadline for final approval of Volume I of the *Corn Blight Watch Experiment Report* (Experiment Planning) by the contributing writers. Dave Nelson will then complete the final editing of the volume.

*Chris Johansen will be heard over WBAA on March 28, 1972, in an interview with Horace Tyler, Agricultural Information, on the results of the Corn Blight Watch Experiment. The interview will be a part of Mark Twelve, the noon news and feature program.

Visitors

*Bob Ray, M. L. Graham, and Michael S. Sher, from the University of Illinois, were at LARS March 14, 1972, to discuss the possible use of the ILLIAC/IV computer for earth resources data analysis.

*William G. Weist, Jr., and J. E. Heisel, both from U.S. Geological Survey, Indianapolis, to see Roger Hoffer.

Travel

*Roger Hoffer, Chris Johansen, and LeRoy Silva will be at the Manned Spacecraft Center, Houston, on March 23-34, 1972, to discuss matters relating to Skylab.

*Roger Hoffer spent the week of March 13, 1972, in Washington, D. C., attending the annual meeting of the American Society of Photogrammetry. He is chairman of the Forestry and Agriculture Committee of the Remote Sensing Division.

Seminars

*LeRoy Silva spoke at the General Colloquium of the department of physics on February 17, 1972. His topic was "Applications of Remote Sensing."

*Interdisciplinary Remote Sensing Seminar: Room 225, Horticulture Building, 3:30 p.m., Tuesdays.

March 21: "Remote Sensing Activities in Canada" by Dr. A. McQuillan, J. Thie, and C. Tarnocai, visiting scientists from Canada.

Library Acquisitions and Publications

Silverman, H. F. *An Optimizing Fourier Domain Compression Method for ERTS Data*, March 8, 1971, RC 3277, IBM Research.

Mardam-Bey, O. *Analog to Digital Converter to Digital Magnetic Recorder Interface*, Tech. Rpt. 133-16, May, 1971, Univ. of Kansas.

Haralick, R. and I. Dinstein, *An Iterative Clustering Procedure*, Tech. Rpt. 166-2, June 1970, Univ. of Kansas.

Purdue University Agricultural Experiment Station Annual Report, July 1, 1970 - June 30, 1971 (2 copies).

REPRINT: "A Comparison of Film Type and the Importance of Season for Interpretation of Coastal Marshland Vegetation," B. H. Grimes and J. C. E. Hubbard. The Nature Conservancy, London and Norwich.

REPRINT: "An Electronic Multi-stage Processor," J. E. Estes and L. W. Senger. Reprinted from *Photogrammetric Engineering*, June, 1971.

REPRINT: "Vegetation Penetration with K-Band Imaging Radars," W. P. Waite and H. C. MacDonald, January, 1971.

Heinemann, L., V. Myers, and D. Moore. *Snow and Ice Melt as Indicators of Hydrologic Conditions: Exploratory Study*. RSI-72-01, Interim Tech. Rpt., Remote Sensing Institute of South Dakota State University.

THESIS: *Remote Detection of Moisture Stress: Field and Laboratory Experiments*, Richard E. Carlson, Ph. D. Thesis, Iowa State Univ., 1971.

USDA: *Spectral Survey of Irrigated Region Crops and Soils, 1971 Annual Report*. Oct. 1, 1970-Sept. 30, 1971, Weslaco, Texas.

Water Resources Research, Vol. 8, No. 1, February, 1972.

Selected Water Resources Abstracts, Vol. 5, No. 3, Feb. 1, 1972.

Selected Water Resources Abstracts, Vol. 5, No. 4, Feb. 15, 1972.

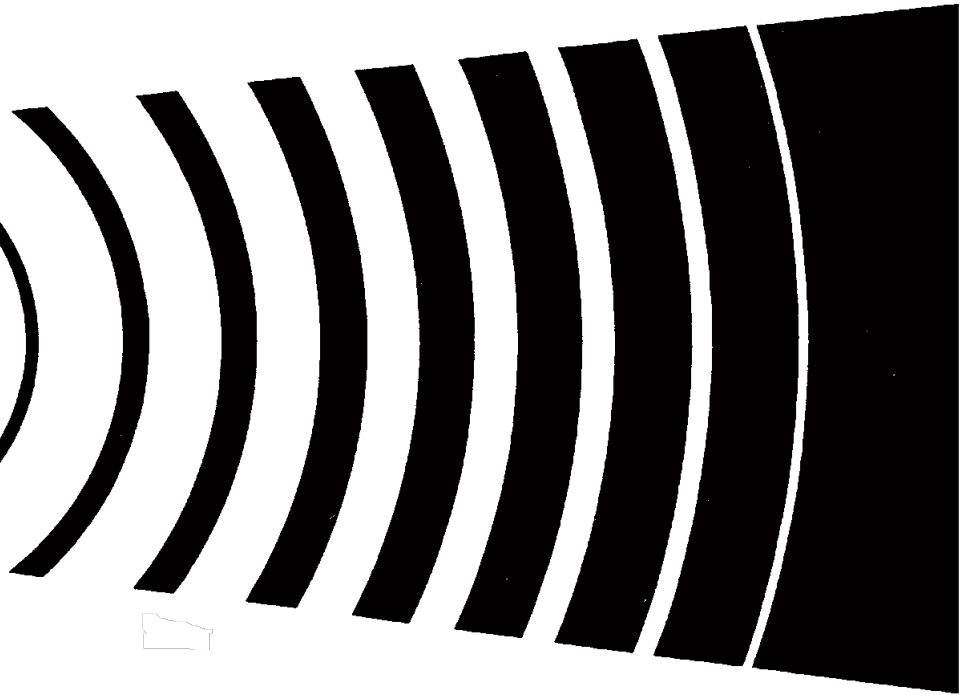
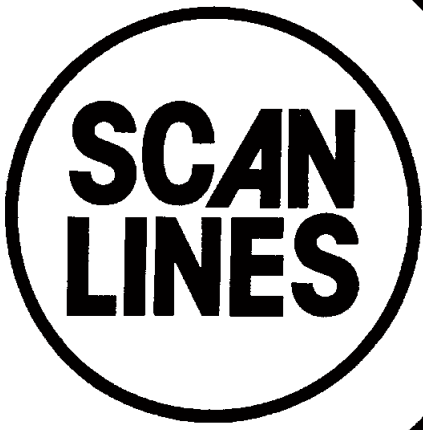
Sierra Club pamphlet including articles about air, water and noise pollution, pesticides and camping.

Call for Papers

*A call for papers for the *1972 Fall Joint Computer Conference* has been issued with a deadline of April 3, 1972, for draft manuscripts. Only new unpublished papers may be submitted; the text should not exceed 6,000 words. Subject area suggestions are listed in the flier posted on the library bulletin board.

Birthdays

March 27 - Phil Swain



UPDATE

Laboratory for Applications of Remote Sensing

Volume 51

April 10, 1972

Happenings and Items of Interest

**John Peterson* spent March 30-31, 1972, in Washington, D. C., as a member of a special Task Force on Spatial Heterogeneity in Agriculture. The purpose of the task force, organized by Dr. Ned Bayley, Director of Science and Education for the Secretary of Agriculture, is to analyze the current trend in agriculture toward single-cropping systems, such as continuous corn, and to determine their effects on the environment. If some systems are judged to be harmful, alternative systems will be sought. The twelve-member task force was selected to provide a broad geographic representation and to encompass the relevant areas of research. As one of the four people in agriculture, Dr. Peterson represents both agronomy and remote sensing; other committee members are in ecology, biological sciences, and system analysis. The committee will meet twice this summer.

*At the annual meetings of the American Society of Photogrammetry, *Roger Hoffer* was elected chairman of the newly formed Education Committee for the Remote Sensing Division of the society.

**Thomas M. Sullivan, Jr.*, an electrical engineering student, started working as an undergraduate programmer with Paul Anuta on March 23, 1972. He will also be at LARS for two summers as part of the E. E. honors program.

Travel

**Terry West* and *Stan Woodring* visited the Kansas Highway Commission, Topeka, Kansas, on March 13-15, 1972. They spent one day in the field looking over the Kansas flightline that Stan is analyzing at LARS.

**Paul Anuta* and *Terry Phillips* were in Minneapolis, Minnesota, on March 22, 1972, to discuss registration techniques with Mr. Robert Lillestrand of Control Data Corporation and NASA personnel.

Visitors

*On Wednesday, April 12, 1972, three visitors from Silba Geigy Chemical Company are expected at LARS: *Mr. Schubert* and *Mr. Jermann* from the New York office and *Mr. Gubler* from Basel, Switzerland.

**Elvin E. Bath*, Helenwood, Tennessee, to see Roger Hoffer.

*Ravi D. Sharma, Willow Run Lab and Indian Space Research Organization, to visit Dave Landgrebe and M. S. Dhanju.

Seminars

*Interdisciplinary Remote Sensing Seminar: Room 225, Horticulture Building, 3:30 p.m. Tuesdays.

April 11 - "Machine Processing-Analog and Digital," by Paul Anuta.

April 18 - "The LARS Multispectral Image Data Base," by Bill Simmons.

Library Acquisitions and Publications

*Ravindra Kumar. "Radiation from Plants-Reflection and Emission: A Review." Report A. A. & E. S. 72-2-2, Purdue University, February, 1972. (4 copies)
Mr. Kumar asks that he be notified of any errors.

*TAB Quarterly Indexes, First Quarter, 1969.

*IBM Systems Journal, Vol. 11, No. 1, 1972.

*EMR-The Model 285 Data Processor.

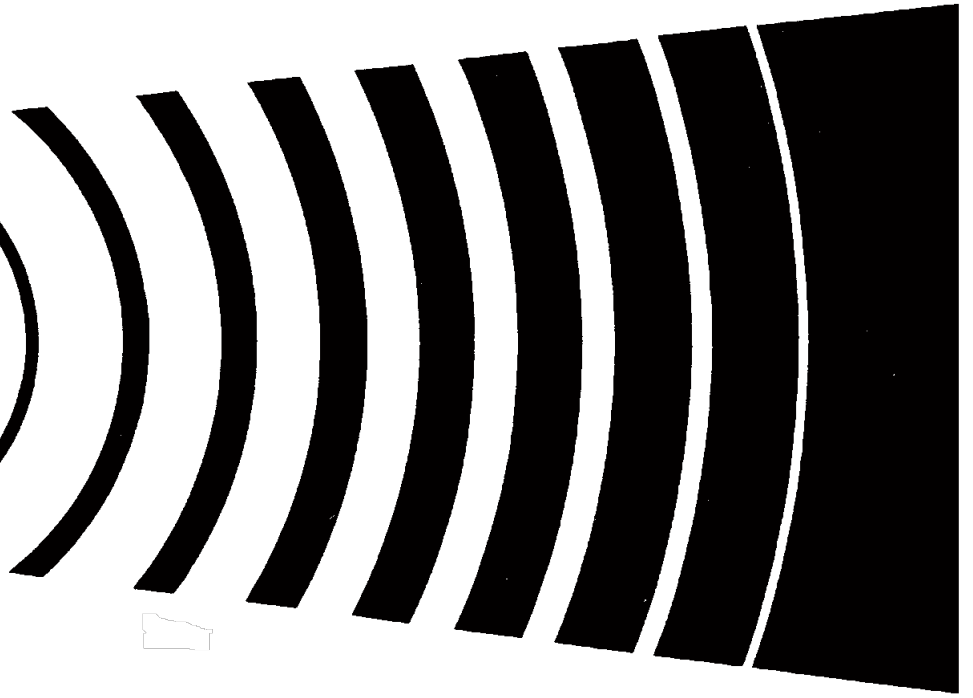
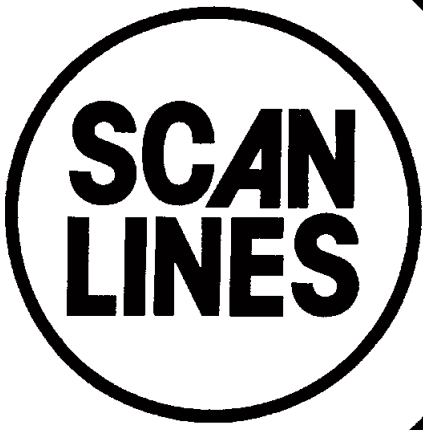
Birthdays

April 10 - Stan Woodring

April 12 - Dave Landgrebe

April 13 - Jan Cipra

April 19 - Gail Santner



UPDATE

Laboratory for Applications of Remote Sensing

Volume 52

April 19, 1972

Items of Interest

*A briefing about remote sensing and LARS, accompanied by a display, was held at the electrical engineering building on Thursday evening, April 13, 1972, as part of an open house for members of the Central Indiana section of the Institute of Electrical and Electronic Engineers in conjunction with their monthly meeting. Thanks to *LeRoy Silva*, *Barrett Robinson* and *Fred Phillips* for setting up and manning the display.

*On March 31, 1972, the last of our Canadian Visiting Scientists left LARS. They were very appreciative of all the guidance given them while they were here. Both *Archie McQuillon* and *Jean Thie* sent thank you letters after their return.

**Jack Martin*, *Larry England*, and *Earl Rodd*, all of IBM have been at LARS since April 3, 1972, to work on the redesign, modification and documentation of the LARSYS programming system. Phase I, expected to last about four months, includes analysis, design and standards activities.

*At the annual meeting of the American Society of Photogrammetry, *Dick Mroczynski* was elected Second Deputy Chairman in forestry for the Forestry and Agricultural Committee of the society's Remote Sensing Division. In this position he is in charge of reviewing articles in the area of forestry and agriculture for the society's journal, *Photogrammetric Engineering*.

Special Notices

- ★ Spring Housecleaning Note: MSS Data Analysts for the Corn Blight Watch Experiment may now discard the punched cards and computer printouts generated last summer
- ★ EXCEPT FOR DECKS OF TEST FIELD COORDINATES. These test field decks should be clearly marked with segment number and mission number and be turned over to Phil Swain. If you have any questions concerning what may be discarded, please check with Phil. ★

*When you throw away large quantities of punched cards, leave them in boxes if possible. It makes recycling work much easier, according to Mr. Hughes.

*Users of the remote terminal at Flex Lab I are invited to submit to Phil Swain their suggestions for floor plans to make room for a second key punch.

Travel

**Dave Landgrebe* is in Cocoa Beach, Florida, April 19-21, 1972, to speak at the Ninth Space Congress on "Applications for Quantitative Remote Sensing Systems."

**Jan Cipra* was in Rapid City, South Dakota, April 19, 1972, to address a workshop for North Central Region Three soil scientists, sponsored by USDA and the Agricultural Experiment Station. After speaking on remote sensing, he participated in a panel discussion.

**Jack Halsema* will attend an Industrial Photographic Seminar at Eastman Kodak Co. Rochester, New York, from April 24-28, 1972. He will take part in a laboratory program for advanced work in color photography.

Visitors

*The Lafayette Navel Reserve Unit visited LARS for a briefing and tour on Tuesday evening, April 4, 1972.

**Dr. Shunil Roy*, FAO consultant in Peru, is visiting LARS on Thursday, April 20, 1971, to explore the possibilities of a cooperative program in remote sensing involving Purdue University, Pennsylvania State University, FAO, and the government of Peru.

Seminars

*A seminar on the use of the NSCLAS clustering program was held on Monday afternoon, April 18, 1972. Attendance of approximately 35 persons exceeded expectations. Follow-up discussion sessions will be held if interest is sufficient. Thanks to *Steve Kristof* for providing refreshments at the seminar.

**Interdisciplinary Remote Sensing Seminar*, Tuesdays, 3:30 p.m., Room 225, Horticulture Building.

April 25-"Image Enhancement" by Larry Goldstein, graduate student in civil engineering.

May 2-"Thermal Infrared Mapping of Rock Outcrops," by Chris Stohr, graduate student in engineering geology.

New Publications

*Bauer, Marvin E. "Remote Sensing as a Means of Detecting Crop Disease," *LARS Information Note 010672*. Paper was originally presented at the Twenty-Sixth Corn and Sorghum Research Conference on December 15, 1971.

Articles

**Current Science*, a weekly science newspaper for grade school students, has an article in the March 15, 1972, issue entitled "Electronic Eyes to Inspect Earth from Outer Space." A LARS illustration from the corn blight was used as an example of the type of survey which can be conducted from space.

*The current issue of *Notes on Agriculture*, University of Guelph, Ontario, Canada, features a series of articles on remote sensing. The feature article, by the 1972 Klinck lecturer, *Marion Baumgardner*, is entitled "Can Aerospace Technology Assist in the Management of Earth Resources?"

Library Acquisitions

*Have you read a good article lately that others might be interested in? If it appears in a journal not taken by the LARS library, please use *Update* to call it to the attention of others.

**Successful Farming*, Vol. 70, No. 6 (April, 1972) Sample copy.

*Heinemann, Leonard R., Victor I. Myers, Donald G. Moore, *Snow and Ice Melt as Indicators of Hydrologic Conditions: Exploratory Study*. Remote Sensing Institute, South Dakota State University, January, 1972.

**Research: Volume V*. University of Kansas Center for Research, Inc., Spring, 1972.

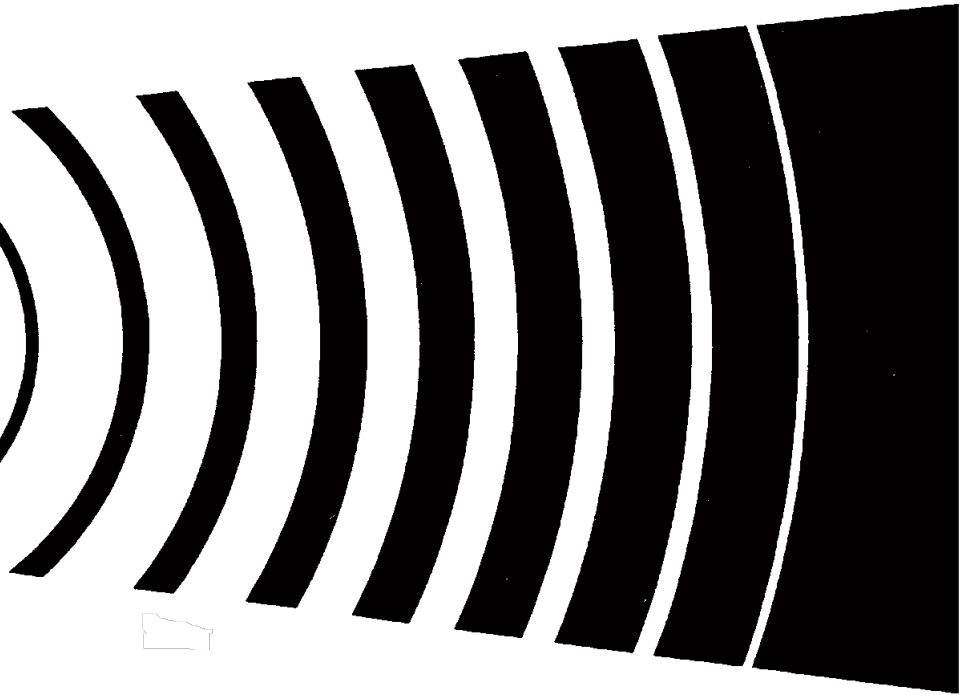
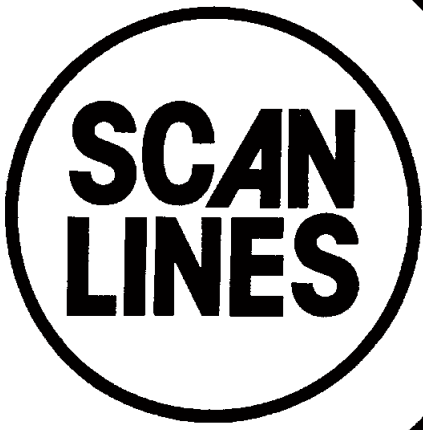
Miscellaneous

*Our sympathy to *Terry and Lynne Phillips* on the death of her mother over the Easter weekend.

*Happy Birthday to:
Sid McAhren - April 25

Emphasis on ERTS

- ◇ Word has been received that the three LARS proposals for work with Earth Resources Technology Satellite data have been moved to a "negotiate and fund immediately" category. Funds are expected to be available prior to launch.
- ◇ ERTS-A launch is scheduled for mid-June. After a 10 day tune-up, data will be collected that should be available beginning July 5.
- ◇ The ERTS administrative committee at LARS is composed of *Chris Johannsen, Terry Phillips, Marv Bauer, and Jan Cipra.*
- ◇ *Dr. Nicholas Yassoglov*, director of agriculture and geology research at the Greek Nuclear Research Center and professor at the Agricultural University, Athens, Greece, was at LARS on April 11-13, 1972, working out details for cooperation between LARS and the Greek Nuclear Research Center in the ERTS experiment.



UPDATE

Laboratory for Applications of Remote Sensing

Volume 53

May 9, 1972

Items of Interest

*LARS conference on May 11 at Krannert Auditorium to review ERTS Program and discuss LARS participation. All LARS staff are asked to attend as details of our anticipated research will be discussed.

*Seven scientists have arrived this week to participate in the LARS Visiting Scientist Program. They are scheduled to spend eight weeks in training at LARS on remote sensing techniques and applications. We welcome the following scientists to LARS:

- Mr. *Manu Omakupt*, Chief Investigator-Land Development Dept., Bangkok, Thailand
- Mr. *Suvat Saguanwongse*, Hydraulic Engineer-National Energy Authority, Bangkok, Thailand
- Mr. *Pengpit Piyapongse*, Agricultural Officer-Tech. Div., Rice Department, Bangkok, Thailand
- Mr. *Suvit Vibulstresth*, Electrical Engineer-Applied Scientific Research Corp., Bangkok, Thailand
- Mr. *Nantit Supamongkon*, Statistician-National Statistics Office, Bangkok, Thailand
- Mr. *Boonhana Klankameorn*, Technical Forest Officer-Royal Forest Department, Bangkok, Thailand
- Mr. *Rufino L. Santos*, Soil Scientists-Bureau of Soils, Manila, Republic of Phillipines

**Pat Ready* successfully completed his Ph. D. final exam on Friday, May 5. Pat is to be married latter this month and has accepted a position with TRW in California.

*The space formerly occupied by Arvin Industries in Flex Lab I has been obtained for use by LARS. The area will be used for office space for the Visiting Scientist Program, classroom area and for analysis of ERTS data.

Special Notices

*A short course on remote sensing will be offered by LARS during July 31 to August 11, 1972. The course will stress principles and techniques of remote sensing. Anticipated enrollees are university, industry and government personnel. The enrollment is limited to 35 people. Look for a program listing or see *Dr. Peterson* for more details.

Travel

**Phil Swain* and *Dave Landgrebe* will be in Washington, D. C., May 9 and 10 for discussions with the Dept. of Interior concerning a proposed LARSYS-type system utilizing the Illiac IV parallel computer.

**Terry Phillips* will participate in a remote sensing short course "Applied Remote Sensing" sponsored by the Iowa Remote Sensing Laboratory, Iowa Geological Survey on May 9, 1972 at Des Moines, Iowa. His topic will be Techniques in Data Handling.

Seminars

**LeRoy Silva* gave a seminar on "Engineering Aspects of Remote Sensing" to the Electrical Engineering Honors Group on April 13, 1972.

**Chris Johannsen* spoke to Prof. Leon Trachman's Science Writing course on May 4, 1972 discussing the applications of remote sensing. The students were asked to write articles covering the presentation.

**Dave Landgrebe* gave a seminar entitled: "The Analysis of Earth Resource Data Acquired from Space" at the Notre Dame University, Department of EE Colloquium Series and Workshop of Image Processing was held Thursday, May 4.

Visitors

April 20-*Dr. James Hoesfall*, Conn. Experiment Station, *Dr. Greg Shaner* and *Dr. Don Huber*, Botany and Plant Pathology, Purdue.

April 21-*Dr. J. Clouse*, Agricultural Education, Purdue and eleven staff members and students from the University of Kentucky.

April 25-*Dr. Shimmil E. Roy*, FAO-Peru

April 25-*Dallas Evans*, *Jim Dragg*, *Joe Garcia*, *Lewis Wade*, *F. G. Hall*, *J. D. Droppleman* and *Andrew Potter* from NASA-Houston reviewed research activities and future plans.

May 1 -*Harold Huddleston* of Statistical Reporting Service (USDA), Washington discussed ERTS experimentation.

May 3 -*B. D. Laughlin*, Vice President for Research and *R. K. Hellman*, Chief Consultant, Hazeltine Corp.

- May 4 -Dr. William Cottingham, Head, Mechanical Engineering, Professor R. Carrell, Mechanical Engineering and Professor J. Modrey, Mechanical Engineering.
- May 4 -Dr. Ron Sanders and Dr. David Arnold, DMI Electronic Inc., United Kingdom to assess remote sensing techniques and instrumentation.
- May 5 -Dr. Philip Watson, University of Rhodesia, Professor James Thorp, Earlham College, Richmond, Indiana and Professor Harry Galloway, Agronomy Department, Purdue.
- May 5 -Mr. Eric Risley from South Africa accompanied by Mr. Maurice Knoy, Chairman of the Board of Trustees, Purdue University.
- May 5 -Professor H. M. Karara, Civil Engineering, University of Illinois and Professor G. W. Marks, Civil Engineering, Purdue University.

Library Acquisitions

*"Proceedings before the Committee on Science and Astronautics, House of Representatives," 92nd Congress, 2nd Session, Jan. 25, 26, 27, 1972, Panel on Science and Technology, 13th Meeting, R. S. of Earth Resources.

**Remote Sensing of Earth Resources*, a compilation of papers prepared for the 13th meeting of the panel on Science and Technology, Comm. of Science and Astronautics, U.S. House of Rep., 1972.

**Water Resource Research*, Vol. 8, No. 2, April, 1972.

*March, 1972 issue of *Applied Optics*.

**Electronic Design*, Direct Inquiry Cards.

**Research*, Vol. V., Center for Research, Inc., Uni. of Kansas.

*"Location of Flowing Artesian Wells Using Thermal Infrared Scanner Imagery." R. S. Instit. South Dakota State Uni., February, 1972, D. G. Moore, V. I. Myers, and W. H. Giles.

**Selected Water Resources Abstracts*, Vol. 5, No. 7, April 1, 1972.

*Uni. of California, *Quarterly Progress Report for NASA*, Sept. 30, 1971 to Dec. 31, 1971.

Miscellaneous

*A LARS mailing list is being developed to receive announcements of the LARS short course. Please turn in names of anyone that you think might be interested in attending to *Dr. Peterson*.

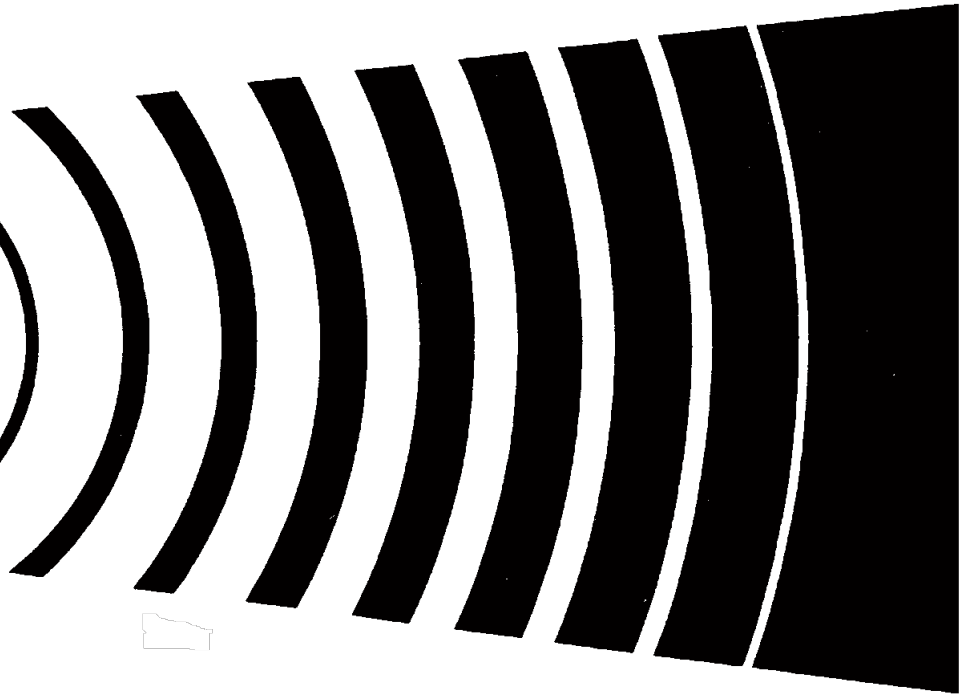
*A belated "happy birthday" to:

Bill Simmons - May 8

*Best wishes also to:

Lea Thomas - May 15

Dave Strahorn - May 17



UPDATE

Laboratory for Applications of Remote Sensing

Volume 54

May, 26 1972

Items of Interest

*For those of you who have lost contact with campus, classes end tomorrow (Saturday, May 27) and Finals begin Monday (May 29) even though it is a University holiday. Finals and the semester end Wednesday, June 7. Advanced registration is over, but Delayed Registration for Summer School (June 19-Aug. 11) will be held June 14, 15, 16 and 17 (in the morning).

*Purdue's School of Electrical Engineering has scheduled a Short Course on Image Processing, Coding and Transmission for June 5-9. Chairman for the Course will be *Paul Wints* and Faculty includes *Dave Landgrebe*. Further information is available from the Division of Conferences and Continuation Services.

**Ted Sheets* recently operated LARS' Hi-Ranger as part of a project headed by Dr. Walter Beineke of the Department of Forestry. Doctor Beineke and his students are producing hybrid walnuts by bagging and pollinating walnut blossoms in the area. According to Beineke, the projects is an attempt to "improve the growth rate for timber purposes since walnut is the most valuable timber in Indiana."

Special Notices

*Due to a malfunctioning shutter on the ERTS television camera, the launch data has been changed to July 15.

Seminars

**John Brown*, a graduate student in Psychology, will speak Monday (room 225, Horticulture Bldg., 10:30 a.m.) on "Remote Sensing of Marine Mammals with special emphasis on Migration and Social Structure."

**Dave Nelson* chaired an Anthropology Linguistics panel last Monday on "Special Languages and Taboo Words." Among the special languages Dave discussed was the Language of Science. The following quote was an example of how not to scientifically communicate, "In the current stages of the on-going post-attack productivity study, the identification of the enervating effects of a decreased caloric diet upon physical productivity indicates the need to plan post-attack programming to include adequate caloric food stockpiles." Dave's translation: "Soldiers returning from a battle should have a good meal waiting for them."

Coming Attractions

*J. B. Peterson reports that he is beginning to receive inquiries and expressions of interest in the Remote Sensing Short Course slated for July 31 through August 11. The first flyer has already been distributed and a brochure is now in preparation. "Pete" encourages all who correspond with potential participants to include a copy of the flyer (sample attached).

One of the scheduled guest speakers is Dr. William A. Fischer, Program Manager for Earth Resource Observational Systems, U. S. Geological Survey.

Visitors

- May 5 Dr. Lee Guernsey, Indiana State University, to discuss ERTS Wabash Valley Proposal with Chris Johannsen.
- May 11 Dr. J. Ronald Eyton, University of Illinois Geography Department, and 12 students.
- May 11 Dr. Wolfgang Flaig, Institute of Soil Biochemistry, Braunschweig, West Germany, to discuss soils organic matter studied with Marion Baumgardner and Steve Kristof.
- May 16 J. Wood, Russell Miller and Gene Waltz, Indiana Division of Planning, to discuss Wabash Valley Proposal and ERTS with Chris Johannsen.
- May 16 Drs. Robert D. and Hortense M. Parr, U. S. Bureau of Census, to discuss applications of Remote Sensing to census work with Marion Baumgardner.
- May 17 Dr. Bevan M. French, Chevy Chase, Md.
- May 17 Dr. Madan L. Dewan, Poushkarov Institute of Soils Science, Sofia, Bulgaria, to see Marion Baumgardner.
- May 17-18 Dr. Jim Fortner, Kansas State University, to see Jan Cipra.
- June 7-8 Dr. Frank Hansing, Director of NASA's Office of University Affairs (OUA) and Joe Vitale, Chief of OUA's Engineering Systems Design Branch, will be visiting Dave Landgrebe to review LARS programs NASA is sponsoring.

Birthdays

*Melissa Jean Schebo, six pounds and 10 ounces, celebrated her 0th birthday May 13 at Home Hospital. Congratulations to proud parents Jack and Elaine Schebo.

*Paul Spencer--May 28

*Shirley Davis--May 29

Miscellaneous

*Susan "Spike" Henderson has moved to Flex I full-time as secretary to Marion Baumgardner and Roger Hoffer. She replaces Karen Cantwell who left for other employment on May 19. New to the LARS secretarial staff is Lorraine Van Meter who comes to us from Monticello, Indiana where she was a recent graduate of Frontier High School.

*LARS Engineering Quote of the week: "Well it works, but I don't know what I did to it."--Phil Swain

*LARSight: LARS latest group of Visiting Scientists is rapidly becoming involved in American culture as well as American technology. Proof positive was exhibited on Tuesday as two of our Thai friends spent lunch hour playing an active game of that fine old sport--FRISBEE.



Mal

"Of course it's doggerel! . . . What do you expect!"

LARStoon of the Week (Contributions Welcome)

PURDUE UNIVERSITY
CONTINUING EDUCATION ADMINISTRATION
LAFAYETTE, INDIANA 47907

PRELIMINARY ANNOUNCEMENT

DIVISION OF CONFERENCES
AND CONTINUATION SERVICES

INTRODUCTORY SHORT COURSE IN
ACQUISITION, INTERPRETATION AND
QUANTITATIVE ANALYSIS OF REMOTE SENSING DATA

JULY 31 THROUGH AUGUST 11, 1972

SPONSORED BY THE PURDUE LABORATORY FOR APPLICATIONS OF REMOTE SENSING (LARS)

Objective:

The purpose of this course is to provide an opportunity for technically oriented people to gain an understanding of remote sensing technology. The program is designed for those who plan to teach remote sensing technology or use it in either operations or research. It will be useful both to those who may wish to use the techniques in their own specialized fields and those who wish to explore the possibility of developing careers in remote sensing. It will be especially helpful to anyone planning to use ERTS or EREP data.

Description:

The course will include the various techniques available for remote sensing, their physical bases and their application to the study of natural resources. The capability developed at LARS to acquire data on radiant energy and to process and analyze it automatically and quantitatively will be emphasized.

It will provide an appreciation of the potential of remote sensing as a tool in many research and/or operational areas such as land use, area planning, transportation, hydrology, geography, geology, soil classification and conservation, plant science, crop production, ecology, forestry, pollution control, meteorology, etc.

Schedule:

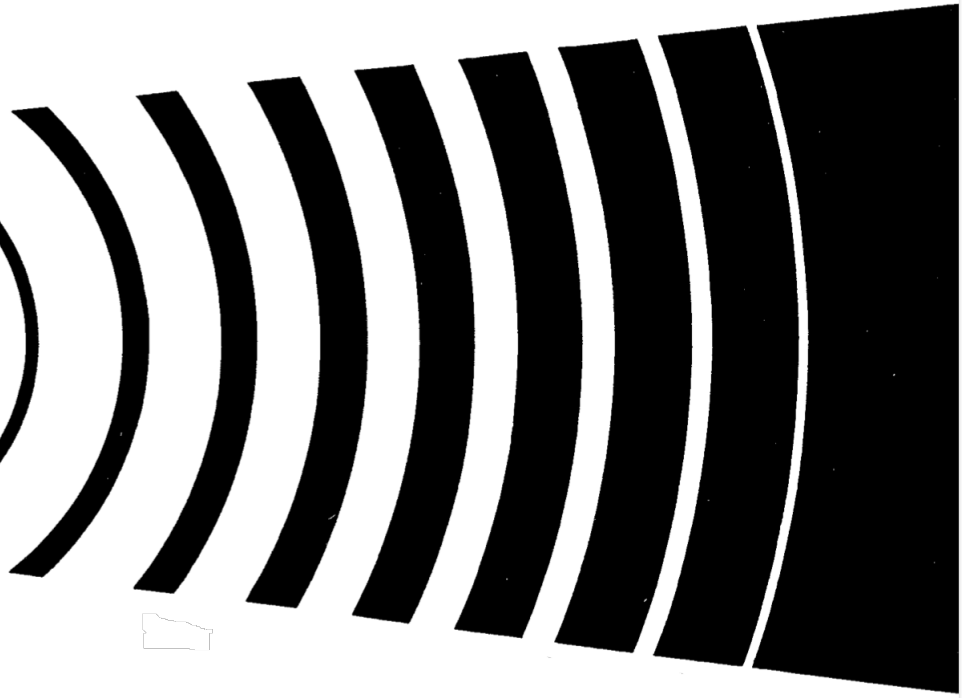
The course will run for two five-day weeks, Monday through Friday. Enrollment will be accepted for the two week course or for either week. Emphasis the first week will be on the Physical Basis of Remote Sensing, Data Acquisition and Interpretation and in the second week on the Quantitative Analyses of Remote Sensing Data by Automatic Techniques.

Fee:

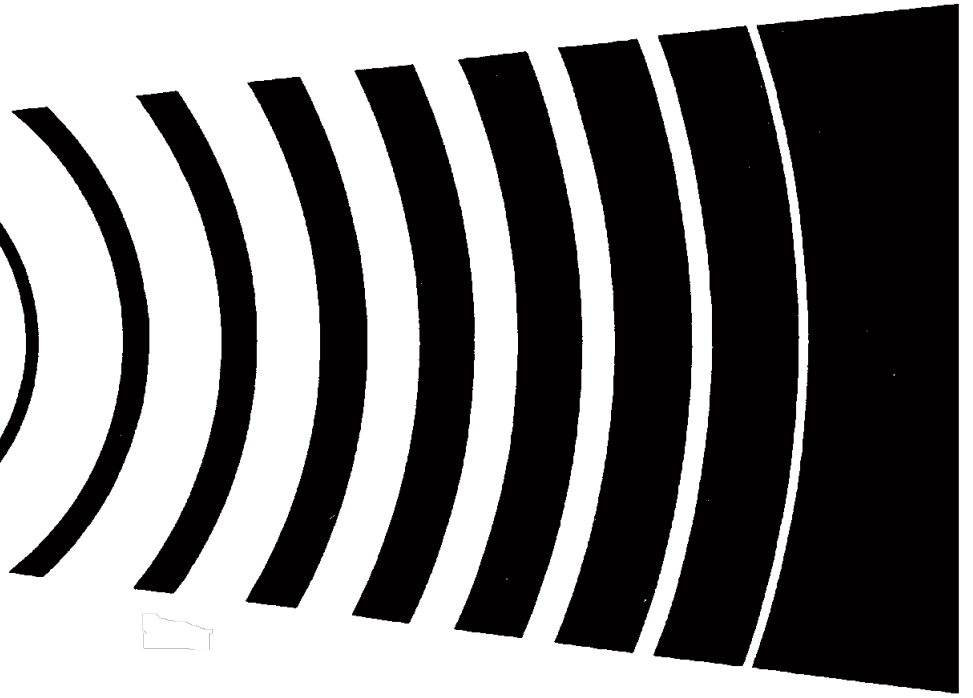
The fee is \$500 for two weeks or \$300 for one week only.

Please note these dates in your calendar. Registration, housing and program details will be sent within the next month.

If you have any questions, please contact David A. Landgrebe, Director, LARS, 1220 Potter Drive, West Lafayette, Indiana 47906. Phone 317/749-2052.



Newsletter 55 is missing in the archives.



UPDATE

Laboratory for Applications of Remote Sensing

Volume 56

August 3, 1972

ITEMS OF INTEREST

*Once again "Roy" ends up as interim (I hope) editor of Update, although this time there does seem to be a shade of an excuse for the regular compiler. After all, becoming nauseous 1,500 feet over Kaw City, Oklahoma while preparing Short Course lecture notes and translating Corn Blight Final Report appendix references is enough to keep even *Chris Johannsen* busy. *Bud Goodrich* reports, by the way, that the inflight digestive irregularities are a part of official taped record.

*Chris and Bud's aerial exploits are only part of a week suddenly turned busy for LARS because, for those of you who have been on vacation, ERTS IS UP! The satellite was successfully launched into orbit on Sunday, July 23. The sensors were turned on for the first time the following evening and, after sensor adjustment pass over Nova Scotia and the Atlantic, the first data was gathered over the U.S. on Tuesday, July 25. The first productive pass extended from Duluth, Minn. to Corpus Christi, Tex. and a second pass, an hour and a half later, covered portions of California and the west coast.

Bill Simmons of LARS was permitted to be present as the first data was being received and processed at the ERTS Ground Station, Goddard Spaceflight Center, Md. A single frame from the multispectral scanner was selected and processed through the Ground Station to provide us with data in digital tape form. Bill returned this data to LARS on Wednesday (July 26). The next day, a final orbit adjustment was made and the ERTS orbit is now precisely as desired. Further adjustments of the sensors and the Ground Station are now taking place.

In the meantime, preliminary processing of the data received began on Thursday and is continuing. Watch the bulletin board in Flex I for examples of the results as they are obtained.

Meanwhile, *Dave Landgrebe* encourages all dedicated LARSians to pray for clear cerulean blue skies (the kind that are so common expect when you want them) on August 7 because on that date (next Monday), ERTS will be passing over the Lafayette area for the first time.

*Also keeping LARS' researchers and teachers hopping is the Short Course, "Remote Sensing Technology and Applications," which will last until August 11. Among the 50 students who are signed up for at least some portion of the course are representatives from Canada, Brazil, France, Italy, Japan and the Netherlands. LARS' secretaries have a schedule of speakers for the sessions which are being held in Room 170, Electrical Engineering building. Nonacademic events include a steak barbeque held Wednesday evening at The Hills, and a banquet at Morris Bryant scheduled for Thursday, August 10. Attached is a (hopefully) complete list of students in the course.

*As most of you probably know by now, LARS will be losing one of its "veterans", *Chris Johannsen*, September 1 when he leaves for the University of Missouri and an associate professorship in agronomy extension work. Chris, who first became associated with the Lab as a graduate student in 1966, has been serving as program leader of Educational and Application Programs. No decision has been made yet as to reorganization plans in this area. If you haven't yet wished Chris good luck, drop by his office and do it informally, or attend the special LARS Open House being hosted by the Landgrebes for Chris and his wife Jo on August 6. Susie Taylor has the information.

*Among those participating in the Institute of Electrical and Electronics Engineers International Conference on Communications in Philadelphia in June was LARS' *Paul Anuta* who presented a paper entitled "Processing Earth Resources Data."

**Archie K. McQuillen* of the Canada Center for Remote Sensing, who spent some time at LARS earlier this year as part of the Visiting Scientist program, sends his regards to all. He also indicates that there are three major conferences in Ottawa and Montreal this summer and extends an open invitation to any LARS staff who may be up that way, to visit the Center's facilities. Archie's phone number is 993-3350 and, if he should happen to be away, ask for Dr. Vhattacharyya at the same number.

**Terry Phillips* read Weslaco's SWC Research Report 431 entitled "Final Report: Bendix 9 Channel Scanner, 1969 Seasonal Flight and dated June 1972. He notes the Report was laid out in an extremely logical sequence which made it very easy to follow the work reported. The summary on pages vii to ix, says Terry, appeared to be an accurate representation of the information in the Report, and the data used at arrive at their conclusions is accurately described. Terry urges that LARS personnel familiar with the LARS use of words such as temporal data, scanner data, etc., should read the body of the report to understand that data used to arrive at the conclusions reported as it is quite different from LARS data.

SPECIAL NOTICES

*To all of you who have made use of one of our new Sony TC-100 cassette tape recorders: THERE SHOULD BE NO NEED TO RUN THEM ON BATTERIES UNLESS YOU ARE QUITE LITERALLY "OUT IN THE FIELD." Each recorder comes equipped with a cord which enables it to be plugged in. Please try it--you'd be surprised how much longer AC lasts than DC (if we pay our electric bill, that is).

*LARS welcomes *Brenda Kessinger*, new typist for Data Processing in Flex II. Brenda, a graduate of Harrison High School, comes to us from National Homes. A welcome also to another name, if not a new face. *Sharon Mayo*, secretary to *Chris Johannsen* and *Phil Swain* looks remarkable like their former secretary Sharon Howard. "It can't be the same one," says Chris. "This one doesn't mark off the days on her calendar." Anyway, congratulations to Sharon on being a July bride, her new husband is a graduate student in Purdue's Psychological Sciences Department.

VISITORS

- *June 22-23 B. Ratti, E. Fariello and G. Bressanin of Rome, Italy to see *Dave Landgrebe*.
- June 26-30 Andy Potter, Forrest Hall, John Dietrich, Joe Garcia, Jim Bragg of NASA/MSD and J. D. Droppleman of Lockheed-Houston to see *Dave Landgrebe* and spend the week receiving hands-on experience in LARS' computer programs.
- *July 12 Paul Seevers of the University of Nebraska to see *Chris Johannsen*
- *July 13 Mr. and Mrs. Wesley James of Texas A&M University
- *July 17 Charles C. Burner of the Indiana Bureau of Sport Fisheries and Wildlife
- *July 18 Donald J. Hurd and Ronald K. Mitovka of ESL, Inc., Sunnyvale, Calif.
- *July 21 A campus church group (Ken Ewing, United Campus Ministry Assoc.; Evan Snodgrass and Max Hale, Wesley Foundation; and David Brenchley); to be given tour by *Marion Baumgardner*
- *July 25 Bob Williams of WASK Radio to receive ERTS briefing from *Chris Johannsen*
- *July 22 45 National Science Foundation high school students and counselors from across U.S. to receive LARS briefing from *Marion Baumgardner* and *Chris Johannsen*
- *July 26 George W. Bailey of the University of Georgia to see *Marion Baumgardner*
- *July 27 Craig P. Falls of the Federal Highway Administration, Washington, to see *Terry Phillips*
- *July 31 Bob MacDonald, MSC/Houston to attend Short Course and serve as guest speaker at August 2, steak barbeque.

BIRTHS AND BIRTHDAYS

*A new terminal has been added to the Grams household as of June 24. The input/output device is male and has been named Christopher. Congratulations to proud programmers *Howard* and *Pat Grams*.

Happy Birthdays to:

(Belated) July 24--Chris Johannsen
Marv Bauer
July 25--Dick Mroczynski
July 27--Terry Phillips
August 2-- Susie Taylor

(In time) August 15--Terry West
August 31--Steve Kristof

MISCELLANEOUS

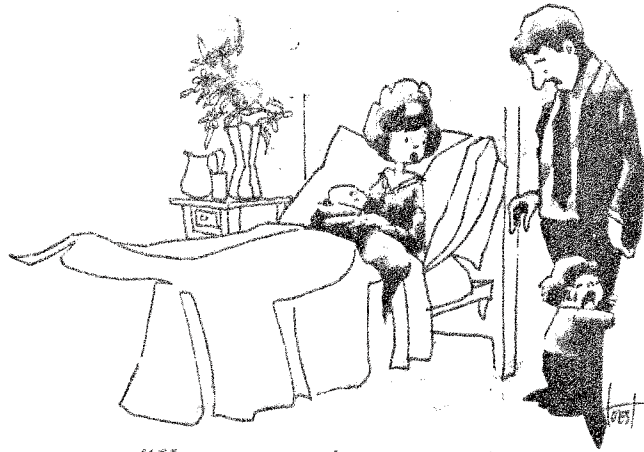
*It turns out there's not that much distance between Thailand and the United States after all, as technical editor, *Tom Builta* and visiting Thai scientist Pongpit Piyapongse found out this summer. Pongpit knows a missionary in Thailand named Adeline Satterthwaite just happens to be Tom's sister Betsy's mother-in-law. The small world hypothesis strikes again!

*LARS Quote of the Week:

At least one of the visiting scientists who left for home last week is taking with him some marginally acceptable knowledge; he's sure that *John Lindenlaub* told him the principal LARSYS control cards were of two types: "Monster control cards and Superwizard control cards."

*LARS-ERTS ABBREVIATED WEATHER PROGNOSTICATION FOR AUGUST 7:

Light, followed by darkness.



"He was expecting a puppy."

LARSTOON OF THE WEEK

LIBRARY ACQUISITIONS

*July's library acquisitions include a number of materials from the personal libraries of both *Kent Ellis*, who retired from Purdue earlier this month, and *John Peterson*.

American Society of Photogrammetry, Papers from the 34th Annual Meeting, March 10-15, 1968.

Meteorological Data Catalog for the Applications Technology Satellite, Goddard Spaceflight Center, Vol. 1, October, 1967.

Nimbus III Data Catalog, Volume 6 (Final) January 1, 1970 to May 21, 1970. Goddard Spaceflight Center.

Polarad Electronics Corporation, Notes on Microwave Measurements, March, 1958.

Mosley Autograf, General Catalog 64A, 1964.

General Radio Company, Type 874-LBA, "Slotted Line" Instructions of Operation.

USDA: A National Program of Research for Agricultural Remote Sensing, December 1967. A National Program of Research for Weather Modification, January, 1968.

Filipowsky, R. F. (IBM): Fundamental Characteristics of Trigonometric Product Waveforms, February, 1968. Trigonometric Product Functions in Signal Processing Systems, January, 1969.

General Electric Co. "Earth Resources Technology Satellite," June 10, 1968.

"Field Infrared Analysis of Terrain, Semi-Annual Progress Report, May, 1966, R. J. P. Lyon, Stanford University.

Identification of Remote Objects by Means of Scatterometry Data and Application to Pisgah Crater, by G. W. Dalke, CRES Report No. 61-17, University of Kansas, February, 1967.

"Aerospace Sensor Systems," Gene G. Mannella, NASA Electronics Research Center.

"Climates of the World," U.S. D. C., Environmental Science Services Administration, January 1969.

A Proposal on Aerospace Remote Sensing Systems for Resource Development Planning and Management, Prepared by LARS, February, 1969.

Phase Zero, A Proposal for Investigations Preliminary to the Program on Aerospace Remote Sensing Systems for Resource Development Planning and Management, Prepared by LARS, March, 1969

Earth Resources Satellite System, Report for the Subcommittee on NASA Oversight on the Committee on Science and Astronautics U.S. House of Representatives, 90th Congress, 1968.

United Nations Panel Meeting on the Establishment and Implementation of Research Programs in Remote Sensing, Nov. 29-Dec. 10, 1971, Vol. I-A GENERAL, Vol. I-B GENERAL, Vol. II AGRONOMY, Vol. III AGRONOMY, Vol. IV GEOLOGY and Vol. V OCEANOGRAPHY

Tropical Soils: Characteristics and Airphoto Interpretation, Prof. Ta Liang, School of Civil Engineering, Cornell University, August, 1964.

Interim Technical Progress Report Ninth Semi-Annual Technical Report September 1971-March 1972 Project Themis: A Center for Remote Sensing, March 1972, U.S. Army Engineer Topographic Laboratories Fort Belvoir, Virginia 22606, The University of Kansas/Center for Research Inc.

Photogrammetric Engineering, Journal of the American Society of Photogrammetry, Vol. XXXVIII, No. 6, June 1972 Abstracts of March Convention Papers.

Water Resources Research, Volume 8, June, 1972, Number 3, published by the American Geophysical Union.

Remote Sensing of the Chesapeake Bay, A conference held at Wallops Station, Virginia, April 5-7, 1971, National Aeronautics and Space Administration.

*NOTE: *Beth Altenkirch*, our esteemed librarian, is running a special this week (August 4 and 5 only) on Selected Water Resources Abstracts, distributed by the USDI (at least 50 of them are clogging up our library space). Friday and Monday, she will offer a free bookmark to anyone who checks out an Abstract for at least 30 minutes. Special prizes will be awarded to those who check them out and never bring them back. Hurry while the supply lasts!

Legend
✓ 2-weeks
* 1st week only
2nd week only
+ Guest

A Short Course
on
"Remote Sensing Technology
and
Applications"

July 31 - August 11, 1972

Purdue University

R O S T E R

West Lafayette
Indiana 47907

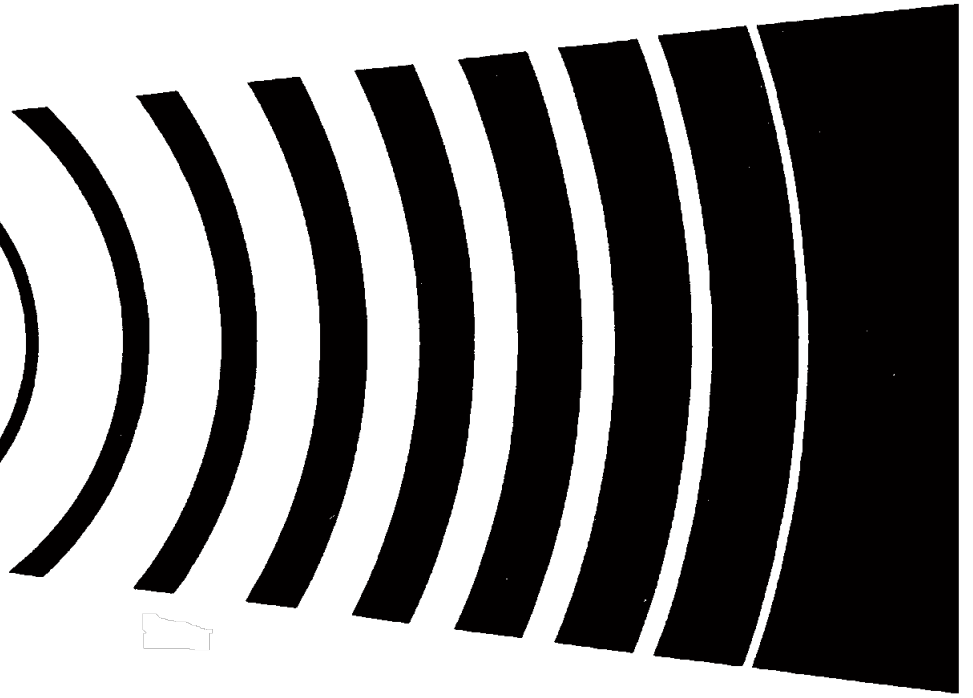
Participants

- ✓BARGER, Gerald L., Director, Research Lab., Environmental Data Service,
NOAA, U.S. Dept. of Commerce, 1527 Ainsley Road, Silver Spring,
MD 20904
- ✓BARKER, George R., Silviculturist, St. Regis Paper Co., P. O. Box 18020,
Jacksonville, FL 32229
- ✓BELKNAP, Nathaniel J., Senior Computer Scientist, Terrater, Inc., 8805
Annapolis Road, Lanham, MD 20801
- ✓BLACKWELL, Richard J., Sen. Eng. JPL, 4800 Oak Grove, Pasadena, Calif.
91103
- ✓BLAD, Blaine, L., Ass't. Professor, Agricultural Climatology, University
of Nebraska, 104 Plant Industry, Dept. of Hort. & Forestry,
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- *BRADFORD, Lewis H., Staff Engineer, TRW Systems, Space Park Drive,
Houston, TX 77058
- ✓BRESSANIN, Gianfranco, Head, Data Processing Branch, Telespazio, Pome,
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- ✓BROWN, Lottie, Data Analysis, Goddard Space Flight Center, NASA,
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- ✓COINER, Jerry C., Res. Scientist, Center for Research RSL, Irving Hill
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- ✓CURTIN, David P., Remote Sensing Tech., University of Nebraska, 181 W.
Nebraska Hall, Lincoln, NE 68508
- ✓DE LAS CUEVAS, Rodolfo Nunez, Dr. Ingeniero, Jefe del Servicio de
Cartografia, Instituto Geografico Ycatastral, General Ibanez
Ibero, 3 Madrid (Spain) 15
- ✓DE PARATESI, Sergio Galli, Engineer, CCP Evratom Ispra, Technology
Division CCR Evratom, Ispra (Varese) Italy
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- ✓FRAZIER, Noah A., Sr. Geoph., Battelle-Columbus Labs, 505 King Avenue
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- ✓GARO, Joseph T., Asst., Technical Management, NASA - Kennedy Space
Center, P. O. Box 6343, Titusville, FL 32780
- ✓GEPHAN, George G., Maj., Program Manager Recon & Survey Systems,
Canadian Armed Forces, Chief of the Defence Staff: Canadian
Armed Forces, Atten: DACS 3-2, Ottawa, Ont. Canada

- ✓HALSTEAD, E. H., Associate Professor, Dept. of Soil Science,
University of Saskatchewan, Saskatoon, Saskatchewan
- ✓HARRISON, Edwin F., Head, Mission Analysis Section, NASA-Langley
Research Center, Mail Stop 212A, Hampton, VA 23366
- ✓KARP, James R., Asst. Prof., Biological Sciences, Purdue University,
West Lafayette, IN 47907
- ✓KOVACS, Denes F., Drs., I.T.C. Int. Inst. For Aerial Survey and
Earth Sciences, 144 Boulevard 1945, Enschede, Holland Box 6
- ✓LACAZE, Bernard F., Ecologist, University of Montpellier (France),
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34033
- *LE GRAND, A. John, Senior Engineer, Litton Systems (Canada) Ltd.,
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- ✓MAURER, Harold E., Asst. Data Systems, NASA Wallops Station,
Wallops Island, VA 23337
- ✓MILLER, John M., Head, Scientific Services, Geophysical Institute,
University of Alaska, Fairbanks, Alaska 99701
- ✓MOKMA, Delbert L., Research Associate, Michigan State University,
Dept. of Crop & Soil Sciences, East Lansing, MI 48823
- ✓OCHIAI, Hiroaki, Assistant Professor, Toba Merchant Marine College,
Toba-shi, Mie-Ken, Japan
- *ROSSI, Nicholas M., Advisory Engineer, IBM Federal Systems Div.,
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- ✓SALOMONSON, Vincent V., Research Hydrologist, Code 650.3, Goddard
Spaceflight Center, NASA, Greenbelt, MD 20771
- ✓SCORUP, Peter C., Resource Evaluator, University of Alaska, Inst.
of Ag. Sciences, Palmer, AK 99645
- ✓SCHATTAN, Salomão, Inst. of Agricultural Ec. Sec. of Agriculture
Rua Achieta, Sao Paulo, Brazil 41 Fº
- ✓WIGTON, William, Mathematical Statisticians, U.S. Dept. Agr.,
Statistical Reporting Service, Washington, D.C. 20250
- ✓WILLIAMS, Donald L., Research Scientist, Center for Research,
Inc., ESL, University of Kansas, Irving Hill Rd., Lawrence,
KS 66044

- +FISCHER, William A., Research Coordinator, EROS Program, U.S.
Geo. Survey GSA Building, Room 5226, 201 19th N. W. Avenue,
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- +LILLESTRAND, Robert L., Director of Electro-Optics Research,
Control Data Corporation, 8100 34th Avenue S., Minneapolis,
MN 55420
- +MACDONALD, Robert, Chief Earth Observation Division, Code TS,
NASA/MSC Houston, TX 77058
- +MILES, Robert W., Civil Engineer, Civil Engineering, Purdue
University, West Lafayette, IN 47907
- +WACKER, Arthur G., University of Saskatchewan, Saskatoon,
Saskatchewan

#DEPEW, Rex, IBM, Gaithersburg, MD
#VANDER MEEB MOHR, H. E. C., I. T. C. Int. Inst. For Aerial
Survey and Earth Sciences, 144 Boulevard 1945, Enschede,
Holland Box 6
#THOMAS, Garland, Brerard County Planning Department, Titusville
Fla.
#STEPHEN, J. G., Batelle, Columbus, Ohio
#EYTAS, J., Ronald, Univ. of Illinois, Geography, Urbana, Illinois
61801
#LECHI, Giovanni, Italian National Research Council, Milan, Italy
#MAIRS, Robert, Oceanographer, NOAA, Hillcrest Heights, MD
#BPILL, Evan, Batelle, Columbus, Ohio
#HAYDORN, Richard, Batelle, Columbus, Ohio
#JOHNSON, J. P., IBM, Houston, TX
#FELIX, H. R., IBM, Houston, TX
#BLANCHCLARD, Bruce J., Agricultural R. S. (USDA) Chichasaw, Okla.
#RAY, ROBERT, Uni. of Ill., Center for Advanced Computer, Urbana,
Illinois
#BRANDT, O. N., Lockheed (MSC), Houston, TX
#ULLIMAN, J. J., College of Forestry, University of Minn.
#KOEDLEP, James, TRW Systems, Space Park Drive, Houston, TX 77058
#MICHALSKI, John P., Kennedy Space Center



UPDATE

Laboratory for Applications of Remote Sensing

Volume 57

September 11, 1972

ITEMS OF INTEREST

*To start with an item of only moderate interest, the old, old editor of UPDATE is now back at the job and expresses thanks to the interim editors, of whom there were several. (It's not a job loved my most!) I'm sharing a new office with an old office mate, Tom Builta, and am glad to get back into the routine. It's probably fair to say, however, that LARS is one of the few places I've seen where it's possible to be three weeks behind after being at work three days. Stop by to say "Hello."

*To say that Hollywood came to LARS would be overstating the situation a little, but LARS this week was the subject of filming activities. The movie, a documentary on ERTS being prepared under the auspices of NASA, will be about thirty minutes long, with about 5 minutes devoted to LARS. The LARS activities emphasized are those related to computer assisted data analysis. The Exotec was also filmed in operation.

*Dr. Andrew E. Potter of NASA has called quarterly meetings from September 26 - 29 in Houston in which LARS will participate. The purpose of the meetings is to plan future activities in NASA's Scientific Research and Technology program, to report significant technical progress, and to discuss administrative matters. Presentations for LARS will be made by D. A. Landgrebe, T. L. Phillips, L. F. Silva, J. E. Cipra, M. E. Bauer, and P. H. Swain.

COMING EVENTS

*September 14 and 15 are the dates for Dr. Hancock, Dean of Engineering, to visit LARS and discuss the direction and emphases of the activities at LARS. The initial briefing session will be followed by brainstorming and general discussion among the Program Leaders and Dr. Hancock.

PUBLICATIONS

*"First" of any sort are exciting times, but the publication of a person's first professional article is a special occasion for cheers. Congratulations to Debbie Remsburg on the appearance of her article entitled "Growing up with Scientific Illustration," which appeared in the August 1972 issue of Industrial Art Method. The six-page article is accompanied by two photographs and ten illustrations. In it Debbie discusses the methods and approaches she has developed during her five years at LARS. If you have been wondering just what problems an illustrator has to find solutions for - and in particular our illustrator - borrow a copy of the article from Debbie. It may be a real eye-opener.

SEMINARS

*Forestry 579, Remote Sensing Seminar, will again be offered as an inter-disciplinary graduate and undergraduate seminar. This year, for the first time, it will be held at LARS (in the Seminar Room) with the hope that staff members will be able to attend frequently and that the seminar will serve as a means for discussing among a larger segment of the LARS staff current developments in the field of remote sensing. The September 5 meeting was given by Dr. Van der Meer Mohr; Dr. Landgrebe will present the second session on the ERTS Satellite on September 12.

UPDATE QUOTE OF THE WEEK

"Anyone who has a leaf usually has a problem" ...Dick Mroczynski

TRAVEL

*M. F. Baumgardner will serve as a consultant to the Food and Agriculture Organization of the United Nations in Bulgaria from September 7 to October 6, 1972. His address in Bulgaria is UNDP/FAO Project, P. O. Box 1369, Sofia, Bulgaria.

*Tom Martin will be at Willow Run Labs on September 12 to take part in the quarterly aircraft scheduling meeting.

LIBRARY ACQUISITIONS

*Proceedings IBM Scientific Computing Symposium Environmental Sciences, 1967. (from the private file of Christian J. Johannsen)

*Beta Attenuation - A Technique for Estimating Forage Yield *In Situ*. I. D. Teare, G. O. Mott, and J. R. Eaton, Dpt. of Agronomy & Nuclear Engineering, Purdue U., 1966, Reprinted from Radiation Botany, Vol. 6, pp. 7 - 11.

*Tools for the Future. M. R. Holter, Head, Infrared and Optical Sensor Lab., Institute of Science and Technology, U. of Michigan, Amer. Astronotical Society reprint, from 13th Annual Meeting, May, 1967. AAS 67-111.

*Preliminary Discussion the World Food Budget. Submitted by Center for Aerial Photographic Studies, Cornell University, D. J. Belcher, Director. April, '67.

*Potential World-Wide Benefits to Agricultural, Forest and Range Resources from Applications of Aircraft and Satellite Remote Sensing. Center for Aerial Photographic Studies, Cornell Uni., April, 1967.

*"Plan to Develop Technology for Increasing Water Yield from Atmospheric Sources." Richard A. Schleusener, South Dakota School of Mines and Tech.

*"Project Hailswath." G. G. Goyer, W. E. Howell, V. J. Schaefer, R. A. Schleusener, and P. Squires, Amer. Meterological Soceity, 1966.

*Atlas of Photogrammetric Instruments. Vj. Cimerman, Z. Tomasegovic, 1970.

*"Youth and Environment." International Youth Federation for Environmental Studies and Conservation, Amsterdam, 1972.

*Analysis of Optical and Electro-optical Imaging Systems Using Modulation Transfer Function. H. E. Brown, et al. Texas U., March, 1968. (10 page article)

*A Compatible Satellite Meteorological Data Collection System, H. W. Hill and C. F. Whistler, T. I., Inc. AIAA 5th Ann. Meeting, Oct., 1968.

MISCELLANEOUS

*Plaudits to the wall-washing secretaries who abandoned their typewriters for rubber gloves and soapy water last Friday. Things really sparkle, in case you haven't noticed, and the results are well worth the red knuckles and dry hands; they will be healed long before the walls are dirty again!

*A belated "happy birthday" to:

Ted Sheets--September 4
Diane Rice--September 6

*Best wishes also to:

Dave Nelson--September 14
Gerry Jurica--September 24

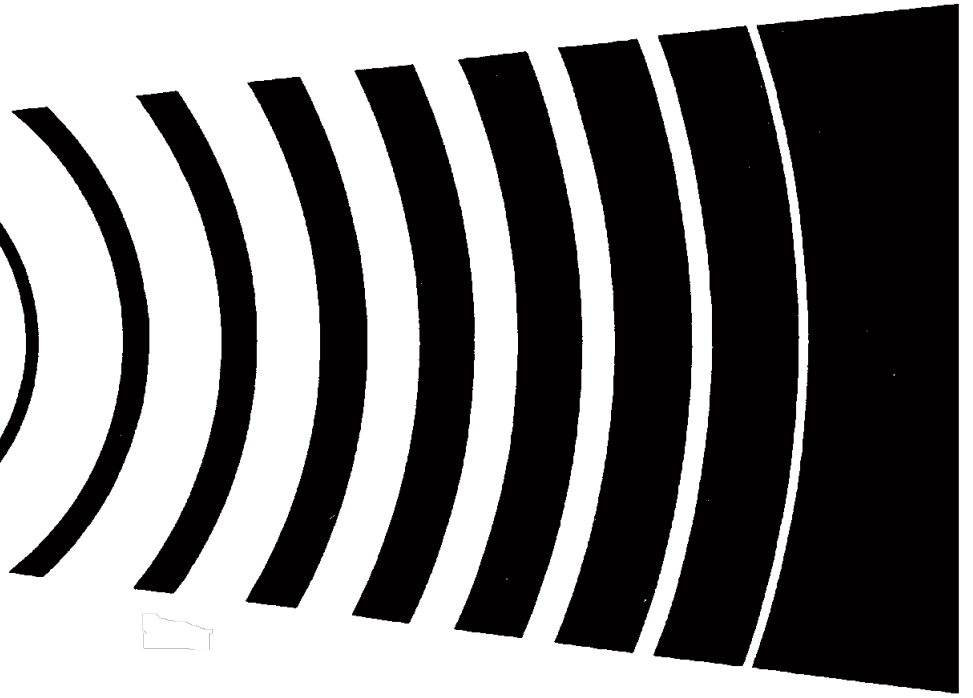
*Kay Hunt (and Bob, too) have welcomed a new member into their family. Julie Allison was born August 12 and weighed in at 7 pounds, 5 ounces. Congratulations!

*Recently departed graduate student Eric Stoner reports that his current address is Peace Corps/Brazil, c/o American Embassy, Brasilia, Brasil 47302.

NEW FACES

*Those of us in Flex Lab I need a pictorial directory if we are ever to catch up on all the arrivals in Flex II. Two new Applications Programmers began working last week: Barbara Addressio comes with scientific programming experience from Bell Telephone Laboratories in Whippany, N. J., and Jeanne Etheridge comes from the University of Illinois via North Dakota State University. Recently hired computer operators who have not yet been given an UPDATE welcome are Benham Ashjari, Salin Momin, Keith Philipp, Bill Shelley, Dave Taylor, Perry Thayer, and Perry Trost. Welcome also to Viola Ward, Flex II secretary, who after being away from the Lafayette area for twenty-five years, is returning to friends and family here. Diana Docktor, past Flex I receptionist and secretary, deserves a "Welcome Back" after being gone for some seven months. She is now working in Flex II, too.

*New Faces in Flex I include that of Dr. Ken Wenner, in Land Use, and Bill Todd, a new graduate student in Agricultural Geography.



UPDATE

Laboratory for Applications of Remote Sensing

Volume 58

September 27, 1972

ITEMS OF INTEREST

*All principal investigators for ERTS-1 will be participating in a preliminary report at Goddard on Friday, September 29. *Dave Landgrebe* and *Roger Hoffer* will make a presentation based on the first analysis of the Texoma frame during ERTS' first pass, July 27-28.

*The remote terminal at Goddard is scheduled to be linked up September 28. *Phil Swain* will be there for the dedication and take with him materials for training staff there in the use of LARSYS. A second remote terminal is scheduled for Houston/MSR around November 1, 1972.

*The following LARS staff members have been awarded grants for their current work:

- R. M. Hoffer, from NASA, \$186,132, June 30, 1972 -
November 30, 1973
- D. A. Landgrebe, from NASA, \$202,958, June 27, 1972 -
January 26, 1974
- M. F. Baumgardner, from NASA, \$58,790, June 30, 1972 -
September 30, 1973
- D. A. Landgrebe, from NASA, \$10,890, June 1, 1972,
May 31, 1975
- D. A. Landgrebe, NASA \$550,000, June 1, 1972 - May 31, 1975

*Weather Forecast - Don't plan a picnic for this coming weekend. The ERTS-1 "Rainmaker" satellite will be passing over Lafayette then and will be trying for 4 out of 4 this time. For your future planning -- the next pass is scheduled for October 17.

TRAVEL

**Roger Hoffer* will be getting several new stamps on his passport this fall when he travels to Vienna to present an invited paper at the 23rd International Astronautical Congress, October 9 - 14. He will be the panel speaker on Agriculture

and forestry in the session entitled Space for World Development. Other participants include C. A. Berry, NASA, Werner von Braun, formerly of NASA, and scientists from Brazil, Argentina, The Netherlands, Rome, Paris, Moscow, and Naples. During his October 5 through October 22 absence from LARS, he will visit several European remote sensing centers that LARS has been in contact with and will talk with some participants in last summer's short course: in Rome, Dr. Bruno Ratti, and in Holland, Dr. Denis Kovacs and Dr. Wan der Meer Mohr. His voyage will also take him to the European Space Agency in Pairs and to the Experimental Cartography Unit of the Royal College of Art, London. The National Science Foundation has awarded him a travel grant for his trip.

**Terry West* is using Las Vegas, Nevada, as his starting point for a trip into the Mojave Desert this week. He is a member of the ground observation team for the California Highway Department's test site near Halloran Spring, California. The 8-mile long site will be overflown by the U. of Michigan C-47 with scanner data, color IR, and black and white photography collected. The site, which contains very little vegetation, was chosen primarily for studying exposed bedrock. The digitized tapes will be placed at LARS.

PAPERS AND SEMINARS

*Early October brings two major conferences that LARS staff will participate in. The 8th International Symposium on Earth Resources will be held in Ann Arbor, Michigan, from October 2-6. *Jan Cipra* will present a paper authored in cooperation with *Phil Swain* and *Steve Kristof*, "Definition of Spectrally Separable Classes for Soil Survey Research." "Results of the 1971 Corn Blight Watch Experiment" will also be presented; it was written by *Marv Bauer* and *Dave Landgrebe* in association with R. B. MacDonald (NASA/MSU), R. E. Allen (SRS/USDA), J. W. Clifton (ASCS/USDA), and J. D. Erickson (WRL/U. of Michigan). The American Society of Photogrammetry meeting on October 12, 1972, in Columbus, Ohio, will include a paper by *Mike Coggeshall* and *Roger Hoffer* "Automated Forest Cover Mapping."

*The Interdisciplinary Remote Sensing Seminar roster of speakers goes as follows:

- September 26 - "LARS Color Display Techniques" - Tom Martin, Assoc. Program Leader
- October 3 - "Economic Analysis of Optimum Sampling Ratios for Remote Sensing Applications" - Douglas Trunnell, Graduate Student in Agricultural Economics
- October 10 - "Prospecting From the Sky" Dr. Donald Levandowski, Assoc. Head, Department of Geosciences

All meetings are held at 3:30, Tuesdays in Flex Lab I.

VISITORS

*Dr. Peterson and Bud Goodrick hosted about 60 leaders of the Agricultural Alumni Association for a tour of Flex II on Saturday, September 23. After Dr. Pete's briefing on the over-all activities of LARS, Bud demonstrated the digital display using the ERTS/Texoma data.

NEW FACES

*Dr. *Kenneth Wenner*, a land use specialist in agronomy will be spending 25% of his time at LARS this year and 75% in Agronomy Extension as a natural resource extension specialist for the state. He received his Ph. D. in resource development in 1972 from Michigan State University and before that was in Crown Point, Indiana, for eight years as a county agent working in non-agricultural soils interpretation. Ken earned his B. S. and M. S. degrees from Ohio State. His concerns his year involve developing practical applications of the satellite data, determining what information local users need and how they can use it. His LARS headquarters is in the "visiting scientist" area.

*Welcome to *Ernestine (Tina) Klotz*, who has emerged from the graveyard shift at Flex Lab II to work more normal hours under Roger Hoffer on the ERTS Colorado frame.

*Welcome to *Carl Westfall*, a new secretary in Flex Lab II. Carl, a long time Lafayette resident, is a graduate of Indiana Business College and is married and has one child. He is taking the place of Viola Ward who will be leaving soon.

*New graduate students at LARS this fall are:

Bob Haselby M. S. candidate under LeRoy Silva, processing ERTS data
Chester Parsons, M. S. candidate under Gerald Jurica, working on ERTS data
Gary Singer, M. S. candidate under Marion Baumgardner, working on ERTS data
Oscar Montgomery, M. S. candidate under Marion Baumgardner, working on SR&T program
Bruce Scherr, Ph. D. candidate under Ludwig Eisgruber, working on the economic benefits of remote sensing for land use planning.

LIBRARY ACQUISITIONS

Remote Sensing of Earth Resources, Vol. 1, edited by F. Shahrokhi, Univ. of Tennessee, a collection of papers presented at the Earth Resources Observation and Information Analysis System Conference held in Tullahoma, Tennessee, March 13-14, 1972.

Citizens' Advisory Committee on Environmental Quality, Annual Report to the President, and to the Council on Environmental Quality, for the year ending May, 1972.

Summary Proposal for the Thailand National Programme of the Earth Resources Technology Satellite, July, 1971, Submitted to the Ofc. of International Affairs, NASA, Washington, D. C. by the National Research Council, Bangkok, Thailand, donated to LARS library by Pongpit Piyapongse.

Uses of Remote Sensing in the Inventory of Agricultural Crops, J. E. Colwell, Willow Run Laboratories, Michigan, July 1972.

A Program to Develop Analog and Digital Signal Processing Techniques for Remote Sensing Applications, Indian Institute of Science Bangalore, India, and Willow Run Lab.

Remote Sensing for Evaluating Flood Damage Conditions, The Rapid City, South Dakota, Flood, June 1972, South Dakota University, S. D.

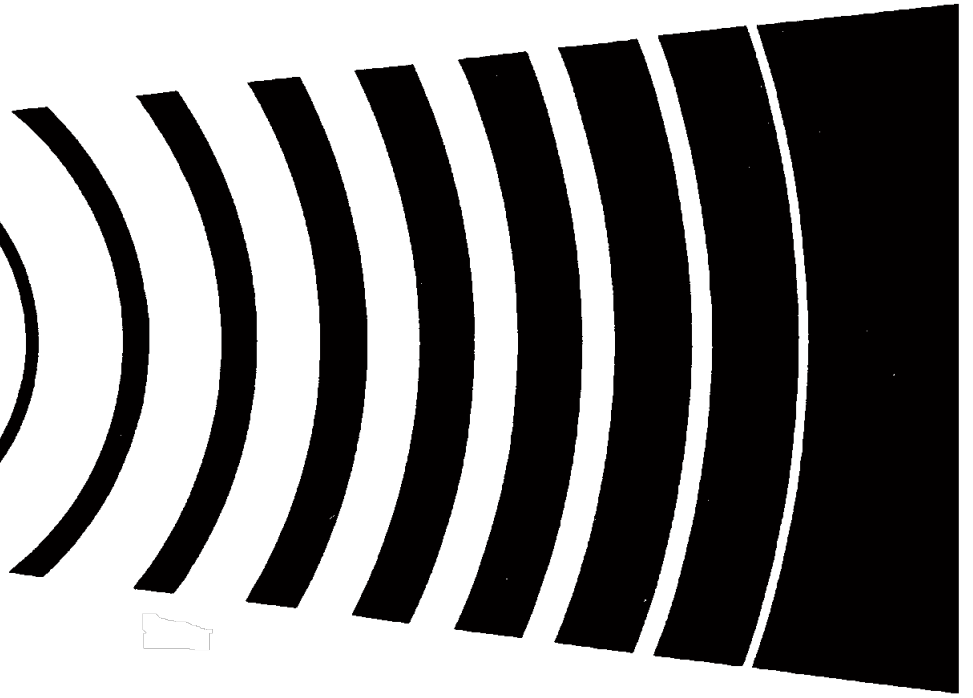
MISCELLANEOUS

*Want to share your interests with the rest of the staff? Make up a display for the blue bulletin board in Lorraine VanMeter's office. Personal photographs, art work, collections, etc. are appropriate - just don't be put off by the "professional" look of Vern's photography currently being displayed. The displays will be changed every few weeks if there are enough contributions. See Lorraine.

*Susan Schwingendorf left work last Wednesday afternoon at the usual time but finished out the day in a somewhat more unusual manner -- she gave birth to a 7 pound 10 ounce baby girl that night. Both mother and daughter are doing fine.

*Happy Birthday to:

Mike Coggeshall-October 13
Mr. Hughes-October 14



UPDATE

Laboratory for Applications of Remote Sensing

Volume ~~58~~ 59

October 11, 1972

ITEMS OF INTEREST

*The remote terminal at Goddard Space Flight Center is up and running. The terminal, connected to our computer by phone lines, gives users there access to LARSYS processing. *Phil Swain* checked out the terminal operation on September 28-29 and briefed prospective users of the system. Goddard users will have ID's prefixed by "GSFC". Their remote terminal virtual machine (equivalent to our FLEXLAB1) is called GODDARD.

*Due to an overload situation in the Clerical Staff some changes have been made. Effective Wednesday, October 11, *Susan Henderson* will type only for Roger Hoffer, Marvin Bauer, Marion Baumgardner and Jan Cipra. *Lorraine VanMeter* will type for all others in these Program Areas.

**Roger Hoffer* reports from the September 29, 1972 ERTS meeting at Goddard that at the present time there are about 330 principal investigators working on ERTS data: 64 federal, 16 state, 35 private, 97 university, and 116 international. All principal investigators and their colleagues will be invited to an in depth one-week seminar at Goddard in January to review analysis of ERTS data to date.

*NASA has officially announced that the projected thermal IR scanner band for ERTS-B has now been dropped. This deletion is due to delay in the development of the multispectral scanner with a thermal IR band. Proposals for ERTS-B are due November 30.

*In late October a program outline and brochure will be available for the Forth Program in Remote Sensing at the University of Wisconsin, December 14-15, 1972. Although this year's program carries the same title as the one offered last year, "Applications of Remote Sensing to Urban and Regional Planning," there will be little overlap between the two programs. Both the speakers and their topics will be different.

TRAVEL

**Dave Landgrebe* is currently in Europe, scheduled to return to the lab October 20. In Vienna he will be presenting a paper "Automatic Classification of Soils and Vegetation with ERTS-1" at the 23rd International Astronautical Congress. While in Europe he will also visit remote sensing labs in Paris and The Netherlands.

**Dick Mroczyński* attended the meetings of the Society of American Foresters in Hot Springs Arkansas from October 1 - 5. While there he served on a nominating committee for the Land Use Planning and Design Working Group. News from the meetings is that *Roger Hoffer* was nominated as a candidate for chairman of the Remote Sensing and Photogrammetry Working Group of the SAF.

*After attending the 8th International Symposium on Earth Resources in Ann Arbor, *Ray Frederking* went to St. Louis to attend the Westlakes Division meetings of the American Association of Geographers.

UPDATE WELCOMES

**Dr. Clare D. McGillem* to the LARS staff. Dr. McGillem, who comes to LARS after being Associate Dean of Electrical Engineering and Dean of the Engineering Experiment Station for the last four years, will now be devoting full time to teaching and research. Working mainly with Terry Phillips and Paul Anuta, Dr. McGillem will help in developing a more effective research program in the data processing program area. Before coming to Purdue, Dr. McGillem, spent seven years as Program Manager of Lunar Exploration Programs for General Motors and prior to that worked for the U. S. Department of Naval Avionics in Indianapolis. We are pleased to have him here to share his expertise with LARS.

**Nancy Shen* is also due a LARS's welcome. As an analyst and applications programmer, she is working half-time in Phil Swain's area. She comes to LARS with an BA from Western College, Oxford, Ohio, and a MS in math from Lehigh University. The "other" half time is spent making a home for her husband, a professor in the Physics department, and her children (all Hoosiers) ages 3, 5, and 7.

*Welcome also to *Sue Keogh*, an undergraduate studying in the School of Agriculture. A past participant in several NSF high school programs, Sue is now majoring in Natural Resources and Environmental Sciences with an agronomy option. At LARS she is working on analyses of ERTS and land-use data under the direction of Ken Wenner.

LIBRARY ACQUISITIONS

Goulard, R., B. Singh, and J. Y. Wang. Remote Sensing in Flames: An Inversion Technique. September, 1972 Purdue Uni., AA & ES.

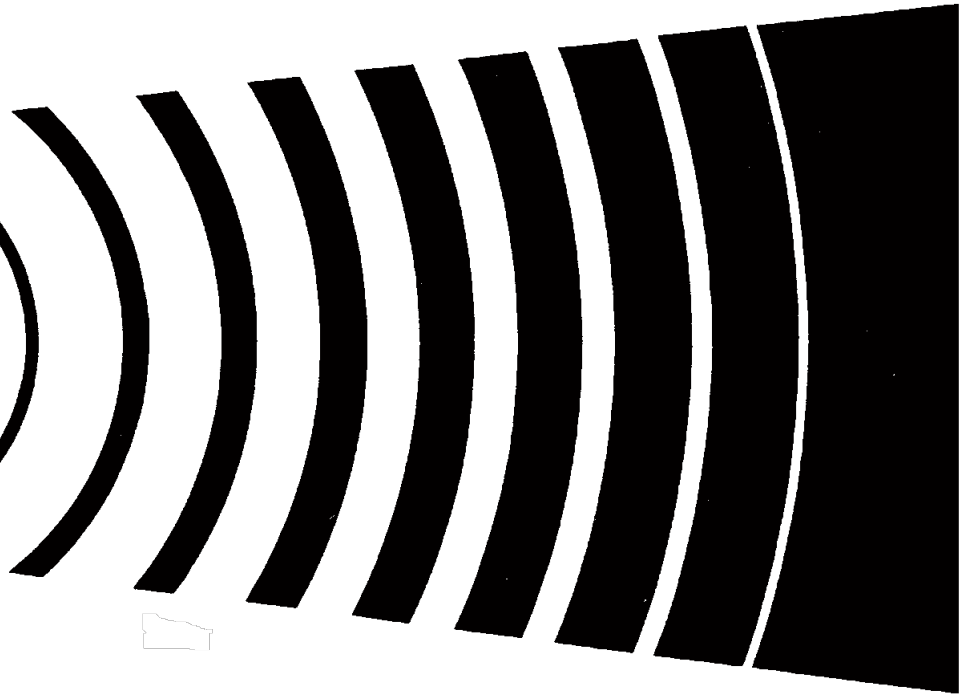
Lyon, R. J. P. and A. A. Green. Infrared Spectrometry Studies, Final Report, Standford R. S. L. Technical Report.

MISCELLANEOUS

Seems like Christmas is still far away??? Not to those who are planning the LARS Christmas party. The Big Family Party is scheduled for Friday afternoon, December 22. Anyone with ideas for making it better-than-ever is invited to pass suggestions along to *Debbie Remsburg* or *Susan Taylor*. And, while we are thinking about parties, there have been rumblings about having a LARS New Year's Eve party (adults, only!). Susie is eager to hear your reactions to this idea.

*Happy Birthday to:

Mike Coggeshall--October 13
Mr. Hughes--October 14



UPDATE

Laboratory for Applications of Remote Sensing

Volume 60

October 25, 1972

ITEMS OF INTEREST

*Dave Landgrebe and Roger Hoffer found their trip to the 23rd International Astronautical Congress in Vienna, Austria "very interesting and informative, tiring but enjoyable." Both papers were well received, and LARS had further acclaim when in a key-note address on Tuesday Von Braun stressed the value of space for earth resources applications and included several comments about the corn blight situation. In general, the other Congress attendees have been quite involved in rockets and spacecraft communication and are just now becoming concerned with remote sensing applications. It appeared that many of the future remote sensing programs political and legal problems may take much longer to solve than scientific and technical problems.

Prior to the Congress, Drs. Hoffer and Landgrebe visited ESRO in Paris (European Space Research Organization). Work there has largely been with operational satellites and communications applications, but they are now developing plans for some earth resources aircraft systems. Their major thrust is to work on programs that are too large for individual European countries. The *1972 General Report on ESRO*, a *Directory of European Activities in the Remote Sensing of Earth Resources*, and a *Directory of Advanced European Remote Sensing Instruments* were obtained from ESRO and will soon be placed in the LARS library. A visit to the French National Center of Space Studies (CNES) revealed that they are planning balloon flights in 1973 to obtain small-scale aerial photography over a number of important test sites at a reasonably low cost. They have also developed a number of interesting computer programs in conjunction with their work.

Before their return to the USA, Drs. Hoffer and Landgrebe stopped in Enschede, London and Rome. The International Training Center (ITC) in Enschede, Netherlands is an extremely well-equipped center for training approximately 400 international students annually in both photo-interpretation and photogrammetry. Discussions with several people in Great Britain and Italy revealed that the problems faced in these European countries are quite different from those in the U.S. and thus approached must be different with less emphasis on ADP in some cases, and more on photo-interpretation. They also found many indications that LARS is the world leader in automatic data processing of remote sensor data, although there are several other organizations (principally in the U.S.) which are developing very excellent programs in ADP.

*The "steering committee" for the remote terminal experiment held its first meeting on October 18, 1972 with representatives from the various remote sites, present and proposed: NASA/Goddard, NASA/Houston, and NASA/Wallops Island. *Terry Phillips* is LARS' official representative; *Phil Swain* is also heavily involved. Houston's terminal is planned to be on the air about November 15. A support team from Houston will be at LARS in early November for training by *Phil Swain & Co.* Wallops is not expected to join the system until early next year.

*Dr. Peterson has requested that the following memo be quoted in its entirety:

October 17, 1972

MEMORANDUM

TO: *Dr. Peterson*

FROM: *Debby Remsburg*

SUBJECT: *Illustrations*

We have a problem! For years I've complained, threatened and "bugged" people here about the care of our illustrations. During the last two weeks, I've found several lying on the floor, tables and propped against a wall. The corners are bent, or either the whole illustration is, the acetate is torn and patched (sloppy looking!) and dirty, actually in deplorable condition. No one ever checks out the illustrations unless Sharon or I catch them, so we have several missing. I've written memos concerning this, but they don't phase anyone. The people want nice illustrations but won't cooperate. Most of these cost over \$20.00 each. (We have over 400 too!)

Could you please make up a memo or some recommendations?

Thanks.

Debby

**Dr. Paul Wintz*, associate professor of electrical engineering and a member of LARS ecosystems research program, received a grant for \$39,900 from NASA for the year October 1, 1972 - September 30, 1973.

**Tom Martin* reports that the planned Skylab orbit has been modified to repeat the ground track approximately every five days. fifteen EREP passes are slated for the first 26-day mission and 20 to 25 EREP passes for each remaining 56-day mission. Tom and Dr. Levendowski attended a meeting in Houston on Skylab and EREP.

VISITORS

Week of October 9, 1972

- *Al Watkins, Cliff Charlesworth, Forrest Hall-NASA
- *H. R. Sinclair, Jr., Soil Conservation Service, USDA-to see Jan Cipra
- *A. Hugham, Hauant, England - to see Jan Cipra

Week of October 16, 1972

- *John Howard, FAO/Rome
- *C. S. Holling, University of British Columbia, Vancouver
- *Prof. R. A. Savigear, University of Reading, Great Britain
- *Russell Miller, Indiana Department of Commerce, Division of Planning - to see Dr. Peterson
- *Frances James, University of Arkansas, and James Karr, Purdue, to see Phil Swain

TRAVEL

*Several sun-worshippers who happen to be agronomists will be attending the Society of Agronomy annual meetings in Miami Beach, October 29 - November 4. Soon to be packing their sun glasses and light-weight clothes are *Jan Cipra, Marv Bauer, Marion Baumgardner, Steve Kristof, Hassan Al-Abbas, and John Stockton.*

**Marion Baumgardner* returned last week from an extended consulting mission in Bulgaria. Under three-way sponsorship by the Bulgarian government, FAO, and the UN Development Program, he advised the government on soil conservation research and helped in the development of a national soil conservation program. Although he stayed primarily in Sophia, Dr. Baumgardner also visited the eastern part of the country to give a short course in Land Use Capability Classification.

**John Lindenlaub* attended the American Society of Photogrammetry meeting in Columbus, October 14, 1972. Of special interest to him was the workshop on Remote Sensing Education.

MEETINGS, SEMINARS

**Dr. Peterson* addressed the Lafayette Business Men's Club on Wednesday, October 18, on the activities of LARS.

*The following LARS-associated papers are scheduled to be given at the annual meetings of the American Society of Agronomy, Miami Beach, October 29 - November 3:

"Spectral Sensing of the Earth from Space" by Dr. Norman MacLeod and M. F. Baumgardner.

"Characterizing Soils of Crosby County Texas through the Analysis of Digitized Satellite Photography" by M. F. Baumgardner and S. J. Kristof.

"Characterizing Water Resources through the Analysis Digitized Satellite Photography" by S. J. Kristof.

"The Effects of Canopy Density of Multispectral Reflectance from Maize" by E. R. Stoner, M. F. Baumgardner and J. E. Cipra.

"Utility of Multispectral Signatures for Soil Survey" by J. E. Cipra, P. H. Swain and C. J. Johannsen.

"Effect of Nitrogen Content on Reflected and Emitted Energy from Maize" by A. H. Al-Abbas.

"The Effect of Internal Drainage on Multispectral Reflectance from Surface Soils" by J. G. Stockton and A. L. Zachary.

"Differentiation of Land Use by Remote Multispectral Sensing Techniques" by Phillip LeBlanc, Joseph Yanner and C. J. Johannsen.

**Emil Horvath* plans to present a paper authored jointly with *Steve Kristof* at the Indiana Academy of Science meetings November 4, 1972, St. Mary's College, South Bend. The paper is titled "Automatic Mapping of Earth Features Using Digitized Data from Multiband Satellite Photography."

*Topics for the next few meetings of the Interdisciplinary Remote Sensing Seminar held at 3:30 Tuesdays in the ERTS Conference Area are:

October 31 - "Water Quality Studies Using Remote Sensing Techniques" by Luis Bartolucci, graduate student in geosciences.

November 7 - "Thermal Mapping of Terrain -- Problems and Possibilities" by Stan Woodring, graduate student in geosciences.

November 14 - "Techniques for Obtaining Color Infrared Photography" by Antony Tokarz, graduate student in geosciences.

PUBLICATIONS

*A new publication from LARS now available:
Information Note 080372: Hoffer - ADP of Multispectral Scanner Data for Land Use Mapping.

*Copies of LARS' Short Course Notes are now available. The limited number here is being distributed to speakers, program leaders and associate program leaders. Several copies are in the library for check-out. Others wanting copies may purchase them for \$10.00 from Conferences and Continuing Education.

*Dave Nelson reports that *Volume 2* of the *Corn Blight Watch Final Report* is complete and has been distributed to contributors for comments. Work is now starting on *Volume 3 - Results*.

*Dave Landgrebe has recently received his copy of *Volume 2, No. 3* (1972), *Remote Sensing of Environment* published at the University of Michigan. The contents are as follows:

- "Aircraft Measurements of Microwave Emission from Arctic Sea Ice"
- "The Multispectral Concept as Applied to Marine Oil Spills"
- "Comments on 'Estimation of Sea Surface Temperature from Space'"
- "Reply to the Comment by G. A. Maul and M. Sidran"
- "The Cause of Azimuthal Variations in Directional Reflectance on Vegetative Canopies"
- "Verification of a Reflectance Model for Mature Corn with Applications to Corn Blight Detection"
- "Optimization of Spectral Intervals for Remote Sensing of Atmospheric Temperature Profiles"

LIBRARY ACQUISITIONS

*Mathews, Harold L. Application of Multispectral Remote Sensing and Reflectance Patterns to Soil Survey Research. Dept. of Agronomy, Pennsylvania State University, Ph. D. Thesis, September, 1972.

*McGivern, R. F., Don B. Martin, John E. Benjamin. Planimetric Map Revision with the Bausch & Lomb Zoom Transfer Scope, presented at the Joint Annual Meeting of the American Congress on Surveying and Mapping and the American Society of Photogrammetry, Washington, D. C., March, 1972.

*Lyons, Thomas R., Robert K. Hitchcock. Aerial Archeology: A Progress Report, Submitted by New Mexico Archeological Center for Remote Sensing Project. June, 1972.

*Functional Design for Operational Earth Resources Ground Data Processing, Final Report. Prepared by Earth Resources Technology Office, Applied Technology Laboratory, Houston Operations, TRW Systems. September 15, 1972.

LARS WELCOMES...

**Dave Spitznagle* and *Ron Boyd*, freshman in the School of Agriculture, who will be working in the Ecosystems and Earth Science Research Programs with Marv Bauer and Jan Cipra.

MISCELLANEOUS

*Sympathy is extended to *Phil Swain* on the death of his father in Maryland October 16.

*Happy Birthday to:

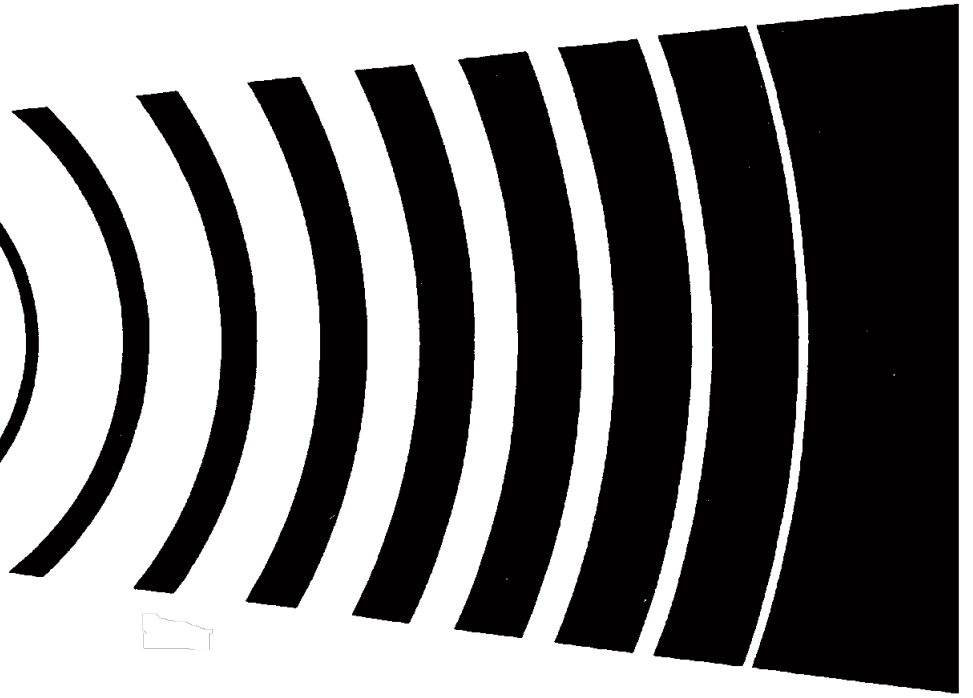
Dr. Silva-November 7

*The program leaders decided that this year's Christmas celebration would be a staff party in place of the traditional Family Christmas Party. It will be held during working hours, shortly before Christmas.

*See Tom Martin for a HOT TIP!

*Congratulations to our newest United States citizen. Nancy Shen passed her citizenship test and was sworn in as a citizen on October 24.

*Thanks to Dr. Marion Baumgardner for sharing with us his experiences in Bulgaria. Dr. Baumgardner spent five weeks there as an FAO consultant at the Paushkarov Institute of Soil Science.



UPDATE

Laboratory for Applications of Remote Sensing

Volume 61

November 10, 1972

ITEMS OF INTEREST

*Confirmation of approval of LARS' Skylab proposal has been received for both the Wabash Valley and the Colorado projects. *LeRoy Silva* is the principle investigator for the former and *Roger Hoffer* for the latter. The contract period will begin in April, 1973.

*One of the "new faces" around the Flex Lab 1 terminal is *John Cornwell* of Lockheed Electronics Corp., Houston, Texas. John will be the "hardware/software specialist" supporting the remote terminal to go on the air at the Manned Spacecraft Center near the end of November.

*Anyone doing analysis of ERTS data should be cautioned against underestimating time required for batch jobs - especially classifications with a large number of classes (i.e. 20 or more). This is important not only to you but also to your fellow workers and the computer operators who must schedule the batch jobs. They have to balance the estimated times and tape drives required with all the other jobs, and one job running much longer than estimated may create a real problem for them. Unfortunately there isn't any good way to make an accurate time estimate for running against other jobs, but by watching the actual times used we can probably improve future time estimates. A recent ERTS classification using 4 channels, 33 classes, 1200 samples, and 1500 lines (approximately 1/6 of an ERTS frame) took 7.5 hours of clock time and 5.5 hours of CPU time. It has been estimated at 1.5 hours. Computing time in the classifier varies approximately with the square of the number of channels but linearly with the number of classes.

*Welcome to *Robert Hawkins*, freshman engineering student who is working on a part time basis with John Lindenlaub. Bob is a recipient of one of President Hansen's Freshman Engineering Scholarships.

*At the American Society of Agronomy meetings (previously reported in full), *M. F. Baumgardner* chaired a special 4-paper symposium on "Man's Environment: The ERTS Perspective." The invited papers included:

1. "The Earth Resources Technology Satellite" by *Thomas Ragland*, Assistant Project Manager of ERTS, Goddard Space Flight Center.
2. "Spectral Sensing of the Earth from Space" by *Norman H. MacLeod*, American University, and *M. F. Baumgardner*, Purdue.
3. "Aerospace Remote Sensing and Its Implications to Agronomy: Sources of Data, Benefits, Training." by *C. L. Weigand*, USDA, Weslaco, Texas.
4. "Aerospace Remote Sensing and Its Implications to Agronomy: Ground Observations," by *C. J. Johannsen*, University of Missouri.

*The National Aeronautics and Space Administration will launch the GEOS-C satellite in mid 1974. The satellite will be equipped with a radar altimeter, S-Band satellite-to-satellite (SST) tracking systems (to be used with ARS-F), coherent and non-coherent C-Band radar transponders, laser retroreflectors, doppler beacons and associated telemetry, attitude and housekeeping systems. The satellite will be launched in a near-circular orbit of 115° inclination and nominal height of 927 kilometers. Data will be gathered from a globally distributed ground tracking network in addition to the data obtained from the altimeter and SST system. ~~Additional technical data are included in Appendix A.~~ The data obtained from the GEOS-C flights can be made available to qualified proposers for use in investigations in the earth and ocean physics disciplines.

Anyone who would like more information should ask Sue Taylor for Memo Change 53 (13 October 1972), "Opportunities for Participation in Space Flight Investigations."

TRAVEL

**Tom Martin* was in Denver recently to take part in a seminar on color theory sponsored by the Society of Photographic Scientists and Engineers. While there he heard a presentation on the generation of color photography from ERTS-1 and on SKYLAB; he also talked extensively with Norm Fritz of Kodak.

*This week Denver is again the destination for two LARSians; *Bill Melhorn* and *Dick Mroczynski* are attending a seminar on INSTAAR. From there they will continue to Tuscon to attend a conference on remote sensing at the University of Arizona.

SEMINARS

- *On November 9 *T. V. Robertson* presented a seminar on "Contextual and Adaptive Pattern Recognition in Remote Sensing."
- *Interdisciplinary Remote Sensing Seminar - Tuesdays at 3:30:
Nov. 14: "Techniques for Obtaining Color Infrared Photography" by *Antony Tokarz*, graduate student in geosciences.
Nov. 28: "Thermophysical Properties of Materials in Relation to Remote Sensing" by *Dr. David P. DeWitt*, Associate Director, Thermophysical Properties Research Center.

ADDRESSES

**Roger Hoffer* is taking the rostrum twice this week, first at the meeting of the Indiana Chapter of Land Use Foresters in Vincennes on November 4 and on November 9 at the meeting of the Indiana-Illinois chapter of the American Society of Photogrammetry in Lafayette. His subject for that group is "Early Results of ERTS-1 Experiment."

**Dave Landgrebe* addressed the November 8 meeting of IEEE in Bloomington with a presentation entitled "Assessing the Earth's Resources and Man's Environment from Space."

VISITORS

*November 6-8, 1972

Fred Brock, Louisville Courier Journal to see D. A. Landgrebe for material on a story on ERTS.

Messrs Miller, Wood, and Schulenberg. (Director of the Division of Planning), Indiana Department of Commerce - to see D. A. Landgrebe concerning land-use planning activities from ERTS-1 data.

Steven A. Johnson, Mayo Clinic - to see D. A. Landgrebe concerning image processing.

*October 23-November 3, 1972

Don Davidson, University of Minnesota, Duluth, Minnesota

Harold Lorsch, University of Pennsylvania - to see D. A. Landgrebe

Joao de Rocha Hirson, University of Brasilia, Brazil

Dirceu Coellio, Federal University of Vicosa, Brazil

*November 6-8

Harold Huddleston, Statistical Reporting Service, USDA, to discuss with Marv Bauer and Lu Eisgruber cooperative work between SRS and LARS on crop identification and acreage estimation using ERTS data.

PAPERS

*The following LARS papers were distributed during the past few weeks and are now available:

Information Note 100272

Results of the 1971 Corn Blight Watch Experiment

R. B. MacDonald, M. E. Bauer, et al

Information Note 100372

Definition of Spectrally Separable Classes for Soil Survey
Research

J. E. Cipra, P. H. Swain, et al

Information Note 102372

Changes of Multispectral Soils Pattern with Increasing Crop
Canopy

S. J. Kristof and M. F. Baumgardner

Information Note 092972

An Early Analysis of ERTS-1 Data

D. A. Landgrebe, R. M. Hoffer, et al.

FY73 LARS Projects

LARS Staff

LIBRARY ACQUISITIONS

*University of California, Quarterly Progress Report to NASA,
January 1, 1972 - March 31, 1972.

*Ealing Science Teaching Catalog, 1973-1974.

*European Space Research Organization, Directory of European
Activities in the Remote Sensing of Earth Resources, November, 1971.

*Daus, S. J. and D. T. Lauer, Testing the Usefulness of Side Looking
Airborne Radar Imagery for Evaluating Forest Vegetation Resources.
University of California, Final Report, May, 1971.

MISCELLANEOUS

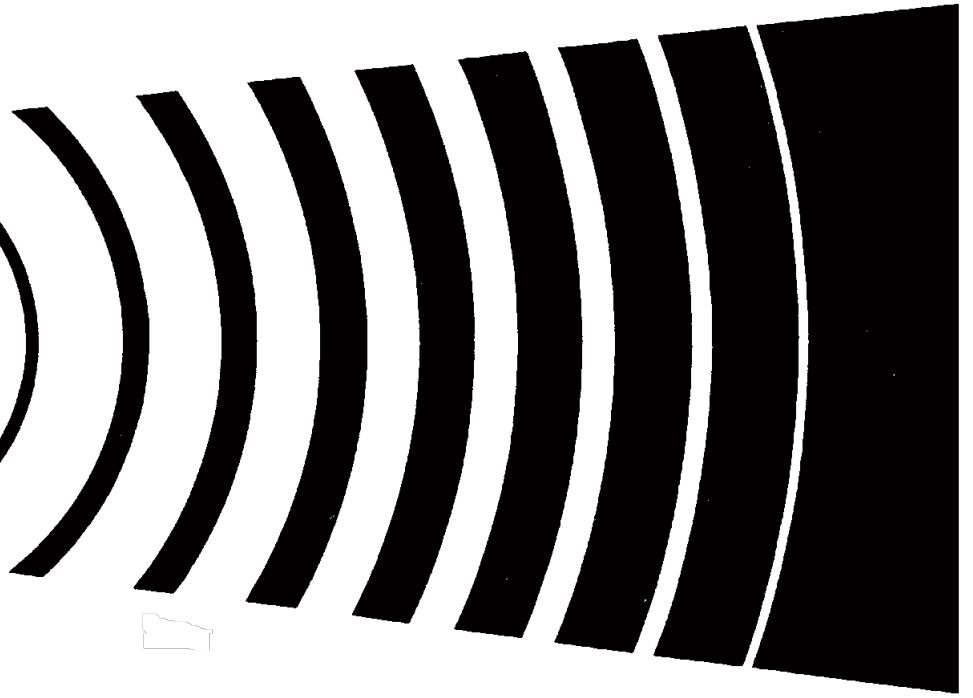
*Thank you, Steve, for the bag full of sunshine from Miami.

*Join the movie viewers each Wednesday at noon in the Flex II conference room. Selections are made from the A-V Center catalogue and announced each Monday. If you would like to see what is available, see Tina Klotz or Jean Etheridge for the catalogue- they'll have it until about November 22. Make your suggestions, bring your own popcorn - or sandwich - and join the crowd.

*Happy Birthday to:

Dr. Silva-November 17
Sharon Mayo-November 19

*It is with deep jealousy we note that following the Agronomy meetings in Miami Beach, *Marion and Maralee Baumgardner* and Mr. and Mrs. Tom Ragland (NASA) joined 500 other tourists for a 3-day cruise to Nassau in the Bahamas. Marion reports that the 80-85° weather, sunshine, and white sandy beaches were delightful but that it didn't take long to get back to reality in Flex 1.



UPDATE

Laboratory for Applications of Remote Sensing

Volume 62

November 27, 1972

ITEMS OF INTEREST

*Beginning with the next issue of *Update*, we are expanding the distribution list to include considerably more people on campus. Heads of all departments with LARS staff members and heads of all departments in the Agriculture and Engineering Schools will be receiving *Update*, as well as several others by virtue of their positions in the university administration. Other people on campus may be added to the list by contacting Sharon Mayo. Publication frequency will continue at approximately once every two weeks.

**Steve Kristof* will be putting his new United States passport to use early in December when he travels to Europe to present invited lectures on remote sensing of earth resources and to observe similar research in Austria and the Netherlands. He will leave Lafayette December 9 for Graz, Austria, to give two lectures at the Institute for Microbiology and Water and By-product Technology of the Technical College there. His topics are "Multispectral Techniques for the Automatic Recognition and Mapping of Surface Water Bodies" and "Identifying Earth Resources from Satellites". From there he will travel to Vienna to visit the University of Agriculture, Forestry, Soil Sciences and Water Supply. In Feldbach, Austria, he plans to consult with directors of Merino, a manufacturer of ready-made clothes, on agricultural uses of by-products from leather processing. Before returning to this country on December 19, Steve will visit the International Institute for Aerial Survey and Earth Sciences in Enschede, The Netherlands.

**Terry West* recently received a grant of \$22,000 from the U.S. Department of Transportation for research through October 31, 1973.

*Welcome to *Carl Walker*, a new graduate student working with Marion Baumgardner and Ken Wenner. He will be at LARS full time until the beginning of the second semester when he will become a half-time employee.

TRAVEL

**Phil Swain* is spending this week furthering the use of the remote terminals at Houston/MSC and at Goddard. After spending November 27 and 28 in Houston, he will travel to Goddard where he will be joined by *Terry Phillips* for the Remote Terminal Steering Committee meeting there.

**Ken Wenner* and *Marion Baumgardner* plan to attend the National Land Use Conference in Ames, Iowa on November 28-29.

**LeRoy Silva* and *Tom Martin* will visit Mead Technology Corporation, Dayton, Ohio, on November 30, 1972, to discuss radiometric processing of aerial films.

**Marv Bauer* and *Jan Cipra* traveled to DeKalb and Ogle Counties, Illinois, on November 15-16 to visit with Dr. John Eastin of DeKalb Research Center and to identify fields of corn, soybeans, and other crops for use in analysis of ERTS data.

VISITORS

*November 8 - November 22, 1972

Dixon D. Jones, Vancouver, British Columbia
William E. Wildman, University of California, Davis,
California - to see Marion Baumgardner
Forestry 558 Class - to see Roger Hoffer
Harold Balbaln, Daniel Sturmon, R. K. H. Jain, Sharen E. Kloster,
U.S. Army CERL., Champaign, Illinois
Professor Nasahide Shiki, Tokyo, Japan
Ronald L. Langerin, Lyon Metal Products, Kokomo, Indiana
Charles Meininger and Herb Jones, Educational Section, Data
Processing Division, IBM
James Thorp, Earlham College, Richmond, Indiana - to see
Marion Baumgardner

ADDRESSES

*On Monday, December 4, 1972, *LeRoy Silva* will address the Columbus, Indiana, Rotary Club on applications of remote sensing from aircraft and satellites. After the meeting he will meet with Dr. George Newlin, president of Irwin Management Corporation, and Mr. John Hachett, executive vice president of Cummins Engine Company, to discuss support of the Purdue/LARS aircraft program.

SEMINARS

*Interdisciplinary Remote Sensing - 3:30, Tuesdays

- Nov. 28 - "Thermophysical Properties of Materials in Relation to Remote Sensing" by Dr. David P. Dewitt, associate director, Thermophysical Properties Research Center,
Dec. 5 - "Automatic Classification Techniques Applied to Basic Forest Cover Mapping" by Michael Coggeshall, graduate student in Forestry and Conservation (Thesis results)
Dec. 12 - Class Discussion

PAPERS

*Papers distributed at LARS during the last two weeks and now available:

LARS Print 120371 - The Importance of "Ground Truth" Data in Remote Sensing by Roger M. Hoffer.

Information Note 110471 - Second Edition, Revised
Remote Sensing Analysis: A Basic Preparation
John Lindenlaub.

LIBRARY ACQUISITIONS

*Jerlou, N. G., Optical Oceanography, Elsevier Oceanography Series.

MISCELLANEOUS

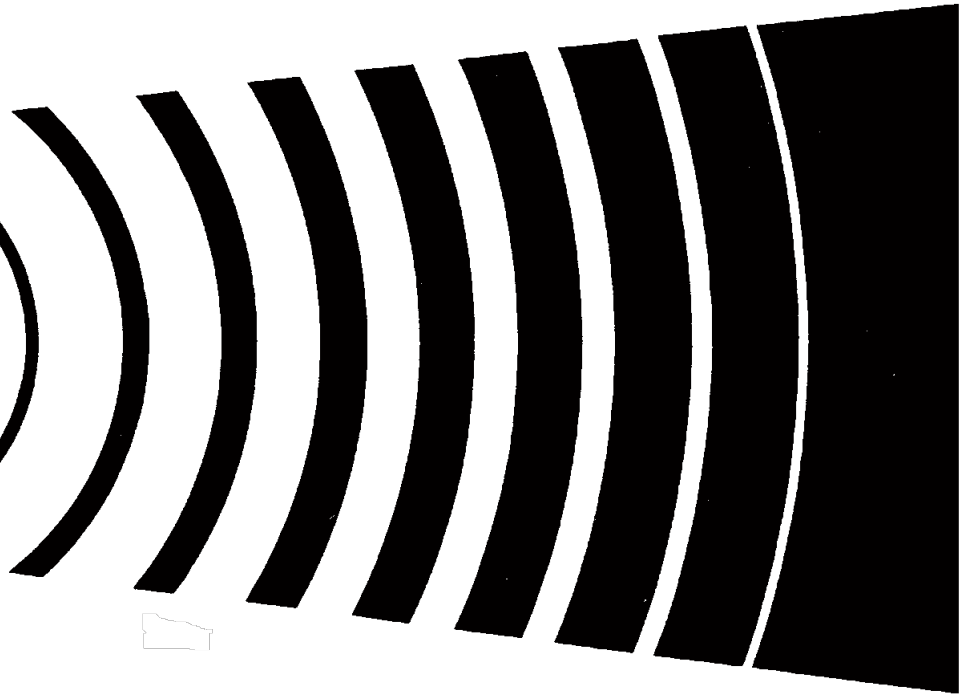
*Sympathy is extended to Marion Baumgardner on the death of his mother, November 20, 1972.

*Have you heard??? The LARS secretaries have been seen running around with a number of men on campus. The rumor is that more than a few of our "ladies" are making the rounds in the field house during their lunch hours -- all in the interest of good health and exercise. No doubt the mean there are lapping it **up!**

*Happy Birthday to:

Dr. Hoffer-December 5

*Johannesburg, South Africa - An unidentified man shot, but failed to kill, a computer in the office of a Johannesburg company. The police speculated that the gunman was a distraught customer. Despite 4 bullet wounds, the machine continued to compute, (**gleaned** from *Playboy*)



LARS/Purdue
Update

Number 63
December 12, 1972

ITEMS OF INTEREST

* *Dick Emmert*, a Ph. D. candidate in Electrical Engineering, is finishing his work at LARS. On December 6 he gave a special seminar for the LARS staff on multitemporal data overlay, presenting some of his recent research results on distortion correction and data overlay of images taken at different times. His final Ph. D. examination was held on December 7. Under the direction of *Clare McGillem*, his major professor, Dick completed a thesis entitled "A Study of Conjugate Point Determination Techniques for Multitemporal Image Overlay." Assuming successful completion of his examination, Dr. Emmert will resign his position as a Graduate Research Assistant at LARS and join his family in Livermore, California where he will work at Lawrence Livermore Laboratories. We all wish Dick good luck in his future endeavors.

**Dave Landgrebe* is at Cape Kennedy, Florida December 10-15, as a consultant serving on the NASA Advanced Imagers and Scanners Working Group. The purpose of the meeting is to evaluate the kinds of remote sensors which should be retained by NASA.

*Plans for a symposium on automatic Processing of Remotely Sensed Data, to be held at Purdue in the October, 1973, are now developing under guidance of *Clare McGillem*. The three-day conference will include a keynote session by top people in the field of automatic data processing, technical sessions on computational techniques, applications of data, etc., and an open house of LARS facilities. A preliminary announcement with a call for papers will go out in January.

*Non-regular visitors to Unit F of Flex Lab II may feel lost the next time they enter the computer room. *Bill Hockema* and the computer operations group have re-arranged the Data Processing equipment in order to handle more efficiently the increased output generated by LARS computer users. The new arrangement creates a "user area" consisting of five typewriter terminals, a card reader, and the digital display. The rearrangement also creates a computer operations area with all output units placed where the operators can efficiently receive output from the users. Along with placing users' names on the output boxes, this new arrangement should speed the delivery of printer and card punch output to all users. The computer operators will be encouraged to prepare the output for the user as fast as possible.

*LARS staff members were crowded in the conference room last week Monday for the second conference on current ERTS research. The report was given by those working on the Central States project, and they had literally papered the walls with printouts and maps. Work on two frames of ERTS data was reported by the members of Marion Baumgardner's "team." Emil Horvath presented his classification results for the Lavon Reservoir area (Lake Texoma frame) completed jointly with Oscar Montgomery. Their classification of surface features made use of information from geologic maps and personal ground observation. Jay Henderson reported on his work toward the classification of rock substructures in Fannin County, Texas (Lake Texoma frame), using both machine-selected and hand-picked training samples. Steve Kristof reported that he had had some help from the police in DeKalb County, Illinois, in identifying ground conditions for his work on that area of small towns and farms. Classifications of Milwaukee County, including dense urban areas, suburban areas, farmland, and water, raised questions for Bill Todd: What do you really see when you look down at a city from 560 miles in altitude?

This second conference followed one the previous week in which Bud Goodrick discussed some of the problems associated with handling data in such large quantities as ERTS provides.

SPECIAL NOTICES

- *Third ERTS program review for LARS staff is scheduled for Monday, December 18, at 3:30 in the Conference Room of Flex 1. Phil Swain is in charge of the meeting.
- *Please Help! Marion Baumgardner's copy of *Eric Stoner's* thesis has been missing from his office for several weeks. He has no record of who borrowed it. Would the borrower please return it as soon as possible?
- *On December 11 at approximately 9:30 a.m. ERTS passed over Lafayette making another attempt to collect data of good quality for the Wabash Valley project. We're keeping our fingers crossed.
- *LARS Information notes distributed during the past two weeks and available to those interested:
 - Information Note 110872
Mapping of Soils and Geologic Features with Data from Satellite-Borne Multispectral Scanners.
M. F. Baumgardner, S. J. Kristof, and W. N. Melhorn.
 - Information Note 110972
Application of Multispectral Remote Sensing to Soil Survey Research in Indiana.
A. L. Zachary, J. E. Cipra, R. I. Diderickson, S. J. Kristof, and M. F. Baumgardner

*Congratulations to *John Plant*, who received his B. S. degree in Personnel Management in December. Although we at LARS are happy to wish John and his wife *Maryanne* good luck in their new home in Springfield, Illinois, we are sorry to lose *Maryanne Plant* as our Data Processing secretary. *Maryanne's* last working day is December 13. We encourage everyone who has made use of her as a source of information about Data Processing activities to bid her farewell before that date.

*Call for Papers

January 10, 1973 - Abstracts for consideration for the *First Pan American Symposium on Remote Sensing*, Pan American Institute of Geography and History, April 27 - May 2, 1973.

January 10, 1973 - Abstracts and summaries for papers to be considered for the *Seventh Annual Princeton Conference on Information Sciences and Systems*, Princeton University, Department of Electrical Engineering, March 22-23, 1973.

January 15, 1973 - Abstracts for papers for consideration for an *International Symposium on the Remote Sensing of Water Resources*, sponsored by the American Water Resources Association, in Ontario, Canada, June 11-14, 1973.

March 31, 1973 - Proposals for papers for *Workshop 1973: Color Aerial Photography in the Plant Sciences and Related Fields*, sponsored by the American Society of Photogrammetry, to be held July 10-12, 1973 at the University of Maine.

See the bulletin board in Flex I for details.

TRAVEL

- **Phil Swain* to NASA/MSC, Houston, November 27-28 to give further instructions on the use of LARSYS and the remote terminal there.
- **Marion Baumgardner* and *Ken Wenner* attended the National Land Use Conference in Ames, Iowa November 28-29.
- **Dave Landgrebe* attended a conference at Goddard November 17.
- **Marion Baumgardner* and Dr. Byron Blair, professor of agronomy, attended a NE-69 meeting in Houston December 5, 6, and 7. Dr. Baumgardner is Chairman of the NE-69 Technical Committee for 1972 and both he and Dr. Blair are members of the steering committee for the ERTS Phenology Satellite Experiment.
- **LeRoy Silva* went to Columbus, Indiana December 11 to address the Rotary Club and to confer with Cummins Foundation personnel.
- **Tom Martin* and *LeRoy Silva* were in Dayton, Ohio on December 7 to visit the Mead Technology Corporation and to discuss radiometric processing of aerial films.
- **Terry Phillips* and *Phil Swain* will travel to Goddard Space Flight Center for a Remote Terminal Steering Committee meeting on December 13, 1972.

VISITORS

- *Dr. Horst, University of Missouri - December 8-9 - to visit the laboratory. Dr. Horst will be at LARS after the first of the year as a post-doctorate assigned to the Agronomy Department to work on NE-69 projects from ERTS data.
- *William Shields and C. C. Grove, Public Service Indiana - December 6 - to discuss ways in which remote sensing, and particularly ERTS data, might be useful to public utilities in power line investigations.
- *Ronald Bauerle, Cooperative Extension Service, Covington, Indiana - to see Marion Baumgardner.
- *John B. Patton, Indiana Geological Survey
- *Tom Schmidt, Hewlett Packard - to see Marion Baumgardner.
- *Dr. Roger Berry, research climatologist, and Steve Rudd, both of the University of Colorado and co-investigators for the INSTARR program, visited LARS November 29 - December 1 to learn about LARSYS and to discuss ideas for ERTS-B research with Roger Hoffer.
- *James Wray, U. S. Geological Survey, Washington, D. C. - December 7-8 - to discuss with Dave Landgrebe and Phil Swain applications of LARSYS and ERTS data to urban studies and to see the LARSYS remote terminal system.
- *Thomas H. Van der Harr, Colorado State University - to see Jerry Jurica.
- *Robert Ray, Center for Advanced Computation, University of Illinois - December 8 - to see Dave Landgrebe and Phil Swain.
- *George Zissis, Environmental Institute of Michigan, Willow Run Labs - plans to visit Dave Landgrebe December 19.

ADDRESSES

- **Paul Anuta* attended the National Telecommunications Conference in Houston on December 4-5 and presented a paper there entitled "Data Handling and Analysis for the 1971 Corn Blight Watch Experiment." This was an invited paper for one of the three Earth Observations sessions organized by Dr. William Tranter of the University of Missouri.
- *On December 12, Marion Baumgardner will address a dinner meeting of the Northern Indiana Section of the Instrument Society of America in Schererville, Indiana. The talk entitled "A Look at Man's Environment from Space" will be a description of the rapidly developing technology in aerospace information systems, with emphasis on ERTS-1 analysis and potential applications.

MISCELLANEOUS

- *For the more than two years of his employment at LARS, the name of *Ted Sheets* was synonymous with a spirit of helpfulness. His unexpected death on December 3 put an end to the building and designing of book-cases and cabinets and the planning of room arrangements that have left his mark in just about every room in the laboratory. While a machinist for the lab, Ted was available to help in every way he was needed - whether that meant caring for the van or assembling and distributing new equipment. This kind of person leaves a vacuum that can't be filled.

*The Student Government-sponsored book exchange, a non-profit service for students, gives students the freedom to sell and buy used text books at prices they set themselves. Books to be sold will be collected December 14, 15, and 19 (Stewart Center during days; in dorms, evenings), and the sale will be held January 8 - 12 in Room 111, Stewart Center, from 9:30 a.m. to 3:30 p.m.

*Happy Birthday to:

Maryanne Plant - December 12

Ludwig Eisgruber-December 12

Tom Builta-December 17

Dr. Levandowski-December 20

Paul Anuta-December 27