SCAN LINES

LARS · Purdue University · VOL. 2 · NO. 6 · January 18, 1977

ITEMS OF INTEREST

* The Central Indiana Chapter of IEEE and the Central Indiana Chapter of the IEEE Computer Society, PHIL SWAIN, Chairman, are pleased to have Dr. DANIEL L. SLOTNICK visiting as part of the IEEE Computer Society's distinguished visitor program.

  Dr. Slotnick will speak on current frontiers in digital electronic technology. He will discuss new system and problem-solving capabilities which can be achieved by exploiting the current state-of-the-art in electronic devices and circuits.

  Dr. Slotnick, a 25-year veteran in the field of computer design, has been employed with the Institute for Advance Study, IBM, and Westinghouse, and he is presently Professor for Advanced Computation and Professor of Computer Science at the University of Illinois. He is noted for his development of the parallel-array-processor-based computer which is a radical departure from the single-data-stream architecture. He directed the Illiac-IV Project, a realization of this new architecture, at the University of Illinois from 1965-1974.

  The joint meeting will be held on THURSDAY, JANUARY 20, 1977 at the Holiday Inn Northwest, located at the junction of I465, I74 and US136 in Indianapolis. Contact PHIL SWAIN, Flexlab 1 if interested in attending.

Prepared by the Laboratory for Applications of Remote Sensing for distribution at Purdue. Contact Susan Ferringer, SCAN LINES editor, to be placed on the mailing list (749-2052, ext. 273).

* JOHN LINDENLAUB has been asked to serve as guest editor for a special issue of the IEEE Proceedings dealing with education. The special issue is scheduled for publication early in 1978.

* MARION BAUMGARDNER has been asked to serve on the Subcommittee on Data Analysis and Processing at the upcoming Environmental Research Institute of Michigan (ERIM) Symposium to be held the last week in April. Papers will be given as poster papers, a format which allows 24 participants to have presentations in an open house type of visual/personal interaction. Interested persons should contact Dr. Baumgardner for furthur information.

* LARS analysts and protagonists desparately needed to analyze what's what with the LARS bowling team! The averages are clustering nicely in the 160's with only a couple having to be thresholded out. However, we need some outside help in recognizing our pattern of error. We have to change our algorithm or rolling rhythm as our winning accuracy is far below an acceptable level. Perhaps what is needed is a cheering (or a jeering) section.

  Possibly applauding spectators might add enough correlated noise to improve our ability to spectrally discriminate the atmospheric window that will lead us down the alleys without attenuation and into the pocket for more strikes.

  We hope the path and timing of your sensor system might enable you to scan the land use at Rose Lanes on Monday nights at 6:30 p.m. where you should use supervised training fields identified by white shirts with orange tigers on the back. ALL BOWLING BUFFS NOT ONLY WELCOME BUT URGED TO COME.

PERSONNEL CHANGES

* TELL GATES has accepted a Teaching Assistantship and is therefore, leaving the Computer Operations staff. He has graciously consented to stay on the Operations staff temporarily until a replacement is found for him.

* DAVE ALENDUFF has left the Operations staff to continue his education at Purdue while working evenings at ALCOA. RON FASSNACHT also is leaving to accept employment with Chrysler Corp. in Detroit. He is to work in the engineering department that designs new automotive safety devices and automatic controls.

* GARY MUZZILLO has transfered from Computer Operations to the Basic Systems Group. He is replacing RANDY CULP who has left LARS and is now in Philadelphia, Pa.

* JULIE HANOVER has joined the Computer Operations staff. She was a secretary at Flexlab I but has decided to continue her education at Purdue. ROSEYRE DELL ITALIA replaces Julie as ROGER HOFFER'S secretary after recently moving to West Lafayette from New Jersey with her parents.

* The responsibilities and challenges of secretary to TERRY PHILLIPS, Deputy Director, have been assumed by COURTNEY BROWN. She serves as Clerical Supervisor for Flexlab II, continues as secretary to BARBARA PRATT and JIM KAST, and assists in the preparation of LAIS (LARS Administrative Information System) as well as compiling and editing reports. Courtney fills the vacancy left by MARLENE HODGE, recently promoted to Assistant to the Director.

TRAVEL: SEMINARS & ADDRESSES

* NASA/Johnson Space Center is the site of an upcoming LACIE Project Review to be held January 26-28. LARS participants will include PHIL SWAIN, BARBARA DAVIS, MARV BAUER, and TERRY PHILLIPS.

* LUIS BARTOLUCCI will be in Bolivia from January 13-27 to negotiate two future projects connected with the LANDSAT Bolivian series.

* Papers to be presented in the near future include one by DICK MROCZYNSKI at the First Conference on the Economics of Remote Sensing Information Systems to be held from January 19-21 at San Jose, California.

  LEROY SILVA will also present two papers. One will be presented at the Missouri Farm Electric Conference held on February 1-2 at Columbia, Missouri. Dr. Silva will also be presenting a paper during March 13-19 at the Annual Conference of the Association for Advancement of Medical Instrumentation, San Francisco, California.

* DICK WEISMILLER was in Ann Arbor, Michigan on January 13 to participate in a planning session for the ERIM Symposium coming up in late April.

VISITORS

* Strip Mine Inventory was the subject of a visit by JOHN ALLEN, from the Indiana Department of Natural Resources, Jasonville, Indiana, on January 6. He visited with DICK WEISMILLER and DICK MROCZYNSKI.

VISITING SCIENTIST

* The Food and Agricultural Organization of the United Nations is sponsoring V. GURU SWAMI as a visiting scientist at LARS for 6 months. After attending the January Short Course Dr. Swami has begun his studies of hydrology and hydro-geology for the Ground Water Department of the government of India where he is Chief Engineer. His sponsor at LARS is MARION BAUMGARDNER.

INFORMATION NOTES

111276 Land Use Classification and Mapping By Machine-Assisted Analysis of Landsat Multispectral Scanner Data by Philip H. Swain.

This report summarizes the results of a three-year effort to demonstrate the feasibility of applying digital analysis of satellite data to land use inventory and mapping. It has been shown that the synoptic view from satellite altitude together with modern sensor and computer processing technologies have much to offer those who need accurate and timely land use information. Also notable has been the success with which the evolving technology has been communicated from the university research laboratory to the potential user agency via the "user-in-residence" approach.

The research reported in this paper was sponsored by USGS under Contract No. 14-08-0001-14725.

SYSTEM SERVICES January 18, 1977

CP/CMS SHORT COURSE

* Once each semester we present an introductory course on the use of CP and CMS. The course is intended for both programmers and LARSYS analysts who wish to become familiar with the basic CP and CMS commands. The course this semester will be presented on January 25, 26, and 27 from 7:30 - 10:00 p.m. in the Flexlab II conference room, and will be taught by JEANNE ETHERIDGE. The last hour or so each night will be "hands on".

  If you wish to attend, please call Jeanne (ext. 228) or her secretary (ext. 239 so that she has some idea of how many people will be attending.

HARDWARE CHANGES

* On January 7 we removed the 2501 card reader and one of the two 1403 printers from the computer. The units were returned to IBM. The acquisition last summer of the Data-100 at Flexlab2 made them somewhat superfluous, and the low usage of the computer during the past half-year has made them an unaffordable luxury.

  Over the weekend of January 8-9, IBM upgraded our 3705 Communications Controller from a Model I to a Model II. Although not particularly important to us at the moment, the upgrade consisted of doubling the storage size from 16K to 32K bytes, and replacing the CPU with a newer one that is about 10% faster. (Yes, the 3705 really is a little computer in itself.) Of more interest is the fact that the upgraded machine costs us about $70 per month less than before! If only IBM would give us more deals like that! To give a feel for the lead times involved in things like this, we might mention that we placed the order for this upgrade 12 months ago.

  During the week of January 3-10, the people at ISU moved their terminal equipment to a new location and took advantage of the opportunity to replace their 2780 terminal with a Data-100 terminal similar to those at LARS (except that they have no card punch). They have also replaced their 2741 terminal with an Infoton and will later be adding a TI terminal.

SOME RAMEFICATIONS OF THE HARDWARE CHANGES

* 1. Since we no longer have the second printer, the operations group will find it necessary to adhere more rigidly to the published schedule for the printing of photo quality output. We will no longer be in a position to respond to requests for immediate production of output at odd times. To repeat the schedule, all accumulated photo quality output is normally printed off three times a day - at 7 a.m., at 12:30 p.m. and at 4:30 p.m. Output is distributed to users' boxes or sent in the mail run to Flexlab1 as soon as practicable thereafter.

2. If any of you have been in the practice of issuing the "spool e on f" CP command, it will no longer be accepted by the system since there no longer is a real printer at address 00F. You will get the error message "? CPARG: 03". If any of you should have such a command in your EXEC files, it will produce that error message on your terminal, but otherwise have no effect.

3. This will be the last month that the usage statistics (see last page) show very little use of the card reader at the Flexlab2 Data-100. Farewell, 2501, you've been a faithful servant and we'll miss you!

COMPUTER OPERATIONS SCHEUDLE

* We installed a change on the 3705 Communications Controller on Saturday, January 8th. Problems developed that caused us not to be able to resume operations until midnight Sunday night. Notice of this was in the computer "log-in" message; however, we neglected to post notices. We apologize for any inconveniences you may have encountered.

LITER DEVELOPMENT STATUS

* Owing to disruption caused by end of semester exams, by Christmas vacation, and by press of other work, there is no progress to report on LITER development. Status remains the same as described last month.

THE SYSTEM SERVICES QUESTION-AND-ANSWER BOX

* We have received a question in response to the call for questions we printed in the November issue of Scan Lines!

  Question: What is signified by the lines that appear on a 2741 terminal before you login - where it prints "cp-67 online xd.65 gsyosu"??

  Answer: CP-67 is capable of talking to two different kinds of 2741 terminals - one kind have the EBCDIC character set, and the other kind having the correspondence character set. Before a terminal logs in, CP doesn't know which kind of character set it uses - so it sends the "cp-67 online" message twice - once in each character set. (If you were using a "Correspondence" 2741, you would see garbage first and the online message second.) CP can tell which terminal he is talking to by examing the first character entered - it must be the letter "l" of "login". If CP doesn't recognize the first character as "l" in either character set, it sends back the message "restart" - again using each character set.

More questions are needed for the question-and-answer box. What have you always wondered about? Send your questions - either signed or unsigned - to HOWARD GRAMS.

HELP!!

We have lost track of the whereabouts of Volume I of the "Datapro 70" reports. If you have it or if you have seen it, would you please give HOWARD GRAMS a call? Thanks.

REFORMATTING OPEN

* DAVE FREEMAN will hold an informal discussion on reformatting procedures and products at 3:30 p.m. Friday, January 21, in the Flexlabl Conference Room.

  One or two present procedures and products will be detailed though no formal presentation is intended. You are encouraged to come and present your data problems and ideas, as well as any questions that may be itching for an answer. Any answers that are not at hand will be supplied later, in writing as required.

SUMMARY OF 360/67 COMPUTER USE FOR DECEMBER 1976

* Usage of the computer system during December was down by 14% compared to November, and it was down by 33% compared to last December.

We present the usual summary of possibly interesting statistics:

Overall Usage -		
	Basic Rate CPU Time used	11.92 hours
	Priority Rate CPU Time used	109.83 hours
	Total CPU Time used	121.75 hours
	Terminal Sessions	2912
	Batch Jobs	688

Batch Job Usage - Batch Machine	Jobs Run	Avg. Clock Time	Avg. CPU Time
BATQUICK	110	0.8 min.	0.1 min.
BATSHORT	434	6.2 min.	0.8 min.
BATMED	105	27.1 min.	4.8 min.
BATLONG	37	47.8 min.	19.0 min.

Local & Remote Terminals - Location	Cards Read	Lines Printed	Cards Punched
Flexlab2	1878 (0%)	451388 (99%)	46851 (1%)
Flexlab1	58605 (9%)	538007 (88%)	16872 (3%)
Houston	58843 (18%)	234143 (71%)	38546 (12%)
ISU	15307 (6%)	252217 (93%)	2807 (1%)

Keyboard Terminals - Location	Port	Terminal Type	Logins	Total Time in Use	Avg. Time Per Session
Comp. Room	78	2741	124	59 hrs.	0.48 hrs.
Flexlab2	7B	Hazeltine 1200	206	141 hrs.	0.68 hrs.
Flexlab2	7C	Hazeltine 2000	198	118 hrs.	0.60 hrs.
Flexlab2	7D	2741	139	131 hrs.	0.95 hrs.
Flexlab2	7E	Infoton GTX	267	193 hrs.	0.72 hrs.
Flexlab2	7F	Hazeltine 1200	250	185 hrs.	0.74 hrs.
Flexlab1	80	Infoton GTX	245	195 hrs.	0.80 hrs.
Flexlab1	81	Hazeltine 1200	245	177 hrs.	0.72 hrs.
Flexlab1	85	2741	155	84 hrs.	0.54 hrs.
Flexlab1	86	2741	156	121 hrs.	0.77 hrs.
Dial-Up	8D	First in Use	47	65 hrs.	1.39 hrs.
Dial-Up	8E	Second in Use	4	4 hrs.	0.94 hrs.
Houston	91,92,93	(various)	282	431 hrs.	1.53 hrs.
ISU	99	2741	120	74 hrs.	0.64 hrs.

SCAN LINES

LARS · Purdue University · VOL. 2 · NO. 7 · February 14, 1977

ITEMS OF INTEREST

* The fourth annual symposium committee is currently reviewing all submitted long papers for presentation at the 1977 Symposium on Machine Processing of Remotely Sensed Data. This symposium will focus on the theory, implementation and applications of machine processing of remotely sensed data. The program will provide an opportunity for researchers in the fields of scene analysis, data processing and data utilization to present current research results, and discuss new applications of existing processing techniques.

  A limited number of short papers describing recent results are also being accepted for presentation at the symposium. These papers will be selected on the basis of a one page double spaced typed abstract which must be received by March 18, 1977. Accepted ones will be included as submitted.

  Four copies of the short paper abstract should be sent to:
  Dr. John Lindenlaub
  LARS, Flexlab2
  317-749-2052

  This sum total of long and short paper presentations is expected to add up to another successful symposium program on June 21-23, 1977.

Prepared by the Laboratory for Applications of Remote Sensing for distribution at Purdue. Contact Susan Ferringer, SCAN LINES editor, to be placed on the mailing list (749-2052, ext. 273).

* For your convenience the LARS Library is now keeping the bibliography and dissertation advertisements that it receives. These will be shelved separate from bibliographies which the library already possess and will be reviewed and discarded as they become out of date.

  Also . . . the library has run short of space to store its periodicals. Therefore, in the near future, and periodically there after, the oldest copies will be removed and discarded to make room for new copies. Anyone objecting to this action or wishing to obtain the old copies should contact DEBBE SCHERER at ext. 273. NOTE: This does not apply to professional publications.

* Outdated artwork, stored in the flat files prior to 1975, will be discarded due to shortage of storage space on February 28, 1977.

  This artwork, which includes hand-colored classifications, soils and geographic maps, as well as other charts and graphs, will be available at the back of the Flexlab2 large Conference Room or by contacting SUE FERRINGER, ext. 273.

  Please come during the period of February 14-28 and indicate which originals should be retained. ANY ARTWORK NOT PICKED UP OR ASKED TO BE RETAINED WILL BE DISCARDED. Note: This does not pertain to "historical" or "old classic" artwork, but to specific project data which has not been reused. If in doubt, contact Sue.

PERSONNEL CHANGES

* JOHN GARNEY and STAN BALDWIN have joined the Computer Operations staff. Both of these fellows are students majoring in Computer Science. John is from Wenachee, Washington and Stan is from the St. Louis, Missouri area.

  Computer Facility also has a new secretary, RUTH JARRET, who came to Lafayette with her husband from Massachusettes. Ruth began her duties on February 1 and will be working while her husband completes his graduate work in Horticulture at Purdue.

TRAVEL: SEMINARS & ADDRESSES

* HOWARD GRAMS was at the IBM Washington Systems Center in Gaithersburg, Maryland between February 1-3 to run benchmark tests on an IBM 370/148 computer system. (He reports that this new machine performs almost exactly as had been expected.)

* MARION BAUMGARDNER plans to travel to Denver, Colorado on February 19-23 to participate in the Committee on Desertification of the American Association for the Advancement of Science (AAAS) and to attend their annual meeting.

  After attending the AAAS meetings Dr. Baumgardner will continue on to Columbia, Missouri to give a series of lectures and seminars to the University of Missouri. He will be hosted for his two day visit of February 24-25 by Dr. C. J. JOHANNSEN.

* JOHN LINDENLAUB will be attending committee meetings of the IEEE Education Group Administrative Committee, Education Activities Board and Technical Activities Board in Philadelphia, Pennsylvania from February 14-16.

* On January 25-28 the recent Large Area Crop Inventory Experiment (LACIE) Program Review was attended by DAVE LANDGREBE, TERRY PHILLIPS, PHIL SWAIN, MARV BAUER and BARBARA DAVIS. The meeting which was held at NASA/JSC in Houston, Texas presented a review of the results of LACIE Phase 2 and critiqued plans for LACIE Phase 3 based on the results of Phase 2. Some very interesting analysis approaches for Phase 3 are being proposed. See PHIL SWAIN or BARB DAVIS for details.

  Those attending the review ran head-on into Indiana's sterling winter weather and were forced to spend an extra night in Houston, and another night stuck in Lebanon, Indiana.

* DAVE LANDGREBE, MARV BAUER, ROGER HOFFER and BARRETT ROBINSON participated in a "Crop Spectra Workshop" held from February 2-4 at Sterling, Virginia. The workshop was sponsored by NASA/Headquarters.

VISITORS

* LARS was recently visited by PAT GORMAN, General Manager; GEORGE SWANLUND, Image Processing Engineer; and BERTRAND IMBERT, Vice-President of Control Data Corporation, Minneapolis, Minnesota, on January 31, 1976. Discussion centered around CDC's activities in the earth resources field and the use of LARSYS in the CDC product line.

COMING ATTRACTIONS

* March 23, 1977 is scheduled for an upcoming IEEE Cumputer Society Chapter meeting to be held at Purdue University. The topic will be: PERSONAL COMPUTING featuring a display of a number of small computers built by computer hobbiests at Purdue. There will also be "hands-on" opportunities. WATCH FOR DETAILS, PLAN TO ATTEND!

* April 25-28 will bring the Eleventh International Symposium on Remote Sensing of the Environment sponsored by ERIM. Several LARS members plan to attend to present their poster format papers. Papers which were accepted include:

  "Quantification of Soil Mapping by Digital Analysis of LANDSAT Data" by FRANK KIRSCHNER, SUE KAMINSKI, CAROL LATOWSKI, ERIC HENSEL and DICK WEISMILLER.

  "Digital Analysis of LANDSAT Data for Surveying Natural Resources in Western Sudan" by MARION BAUMGARDNER, STEVE KRISTOF and YOUSEF YAGOB (Sudan).

  "Evaluation of Change Detection Procedures for Monitoring Costal Zone Environments" by DICK WEISMILLER, STEVE KRISTOF, DONNA SCHOLZ, PAUL ANUTA and SALEEM MOMIN.

  "Disseminating Technological Information on Remote Sensing to Potential Users" by JOHN LINDENLAUB and JAMES RUSSELL.

RECENT ACQUISITIONS TO THE LARS LIBRARY

* Contents of recently acquired remote sensing journals are as follows:

The ITC Journal (Official Quarterly Publication of the International Institute for Aerial Survey and Earth Sciences)
Volume IV, 1976 No. 3

The ITC Model for Cartographic Education, Ormeling

The Design and Construction Exercise Programme in ITC Cartography Courses, Brown and Oxtoby

Actual Space Use Map of Enschede-Urban "Land Use" Inventory with Photo Interpretation, Hofstee

Cartographic Aspects of the Actual Space Use Maps of Enschede, 1:12,500 and 1:2,500, Bos

Photomap Enschede, Brown

Screen Printing in Cartography, Kers and Weinreich

Map Revision, Van Zuylen

Manuscript Charts of the Baltic Sea, Koeman

Towards Universal, Intelligent and Usable Automated Cartographic Systems, Rhind

Automatic Hill Shading with a Photohead, Anda

Some Aspects of Marketing in Commercial Cartography, Bertrand

Extramural Cartography College, Ormeling

Maps for Mass Media-Review, Karssen

This is a somewhat unique issue of The ITC Journal, as stated in their own Preface: "In contrast to the normal contents of the ITC Journal - characterised by the Rector, Professor van der Weele as 'a general-purpose vehicle, carrying a load consisting of goods of great variety in value and weight' - this issue is completely devoted to Cartography."

Remote Sensing of Environment
An Interdisciplinary Journal
Volume 4, Number 4, 1976

Timing of Ground Truth Acquisition During Remote Assessment of Soil-Water Content, Jackson, Reginato and Idso

On the Variability of the Reflected Radiation Field Due to Differing Distributions of the Irradiation, Kriebel

Air Photo-Tones and Soil Properties: Implications for Interpreting Satellite Imagery, Evans, Head and Dirkzwager

LANDSAT Patterns Considered in Relation to Australian Resources Surveys, Story, Yapp and Dunn

Photogrammetric Engineering and Remote Sensing
Volume KLIII, Number 1
January 1977

Mapping Archaeological Sites from Historical Photography, Tinney, Jensen and Estes

A Color Prediction Model for Imagery Analysis, Skaley, Fisher and Hardy

Positioning Off-Shore Features with the Aid of LANDSAT Imagery, Fleming

Filters: An Aid in Color-Infrared Photography, Fritz

Automatic Soil Identification from Remote Sensing Data, Wong, Thornburn and Khoury

Flood-Plain Delineation Using Multispectral Data Analysis, Harker and Rouse

The Analytical Plotter in Close-Range Applications, Masry and Faig

Land-Use Interpretation with Radar Imagery, Henderson

IBM Journal of Research and Development
Volume 20, Number 5
September 1976

Cubic Splines with Infinite Derivatives at Some Knots, Inselberg

Stochastic Modeling of Processor Scheduling with Application to Data Base Management Systems, Lavenberg and Shedler

Exploratory Analysis of Access Path Length Data for a Data Base Management System, Gaver, Lavenberg and Price

Statistical Analysis of Non-stationary Series of Events in a Data Base System, Lewis and Shedler

A General Methodology for Data Conversion and Restructuring, Lum, Shu and Housel

Digital Filtering Using Complex Mersenne Transforms, Nussbaumer

Derivation of Miss Ratios for Merged Access Streams, Shedler and Slutz

INFORMATION NOTES

091576 Description and Evaluation of a Bidirectional Reflectance Factor Reflectometer by D. P. DeWitt and B. F. Robinson.

The Note describes the LARS reflectometer for making bidirectional reflectances factor measurements on large area (30x30cm) samples in the 0.38 to 2.5μm spectral region. This reflectometer simulates field measurement conditions for studying the effects of solar zenith angle and viewing direction on remote sensing observation of targets. Results for typical sample surfaces - paints, soil and cloth - are presented and discussed.

The research reported in this paper was sponsored by NASA under Contract NAS9-14016 and NAS9-14970.

010577 Computers, Satellites and Food -- A Global Perspective by M. F. Baumgardner.

The past two decades have witnessed dramatic advances in science and technology which already impact the daily lives of many hundreds of millions of people. Every morning millions of television viewers in North America see images of cloud formations and patterns over this continent, images generated from satellite sensor data only hours or even minutes prior to broadcast time. All of use are benefactors daily of satellite communication systems which provide the luxury of viewing events or political activities as they occur half a world away, or of dialing directly from our home or office telephones and within minutes or even seconds conversing with friends or colleagues in Bonn, Tehran or Hokkaido. Yet a new dimension of technology is coming into focus which may have an even greater impact on human life. The impact of this new technology will greatly be determined by the degree to which it can contribute to the solutions of three crucial dilemmas facing man -- world hunger, environmental deterioration, and wasteful consumption of finite resources.

010777 Soil Inventory Prepared from Digital Analysis of Satellite Multispectral Scanner Data and Digitized Topographic Data by R. A. Weismiller, I. D. Persinger and O. L. Montgomery.

A soils inventory of Chariton County in north central Missouri was produced using computer-aided analysis of LANDSAT multispectral scanner data. This data was spatially registered at a scale of 1:24,000 and overlaid with watershed and physiographic boundaries. Approximately 65% of the county existed as bare soil which was classified into 14 spectral soil classes. The remaining 35% was classified as forest, pasture and close grown crops. These cover types were correlated with soil types. Topographic data were used to delineate and extract data by watershed and physiographic position. The physiographic boundaries also allowed for the separation of genetically different but spectrally similar soils. Field checking of approximately 100 sites was accomplished to verify the classification.

The research reported in this paper was sponsored by the Soil Conservation Service of Missouri under a Cooperative Agreement.

012477 Crop Identification and Area Estimation over Large Geographic Areas Using LANDSAT MSS Data by M. E. Bauer and Staff.

This report describes the results of a study involving the use of computer-aided analysis techniques applied to LANDSAT MSS data for identification and area estimation of winter wheat in Kansas and corn and soybeans in Indiana. Key elements of the approach included use of aerial photography for classifier training, stratification of LANDSAT data and extension of training statistics to areas without training data, and classification of a systematic sample of pixels from each county. Major results and conclusions are that (1) LANDSAT data was adequate to accurately identify winter wheat in Kansas, but not corn and soybeans in Indiana; (2) computer-aided analysis techniques can be effectively used to extract crop identification information from LANDSAT MSS data, and (3) systematic sampling of entire counties made possible by computer classification methods resulted in very precise area estimates at county as well as district and state levels.

The research reported in this paper was sponsored by NASA under Contract No. NAS5-20793.

SYSTEM SERVICES February 14, 1977

INFORMATION EXCHANGE SESSION

* HOWARD GRAMS and BILL SIMMONS will hold the next in their continuing series of informal discussion sessions on Thursday afternoon, February 24, at 1:30 p.m. in the Flex I Conference Room.

  If you have previously attended one of these sessions, you know that the format is informal. We talk about anything and everything you want to talk about (although our particular fields of expertise are LARSYS and the computer system in general). There will not be any prepared presentations; instead the floor is open for you to ask questions, make suggestions, or air complaints about any subject you wish.

  If you have not attended one of these sessions before, we especially invite you to come and spend a few minutes even if you cannot afford to stay for the entire session (which usually lasts for an hour or a little more).

DISK BACKUP

* Our 2314 disk drives and packs seem to be showing their age! After we had gone for the past five years with only one disk crash in all that time, we have experienced four such crashes in the past seven months. The most recent crash was on February 6. It is worth re-emphasizing the fact that although the computer facility staff is responsible for backing up all system minidisks, each individual user is responsible for backing up his own P-disk (and other minidisks if he has any). For example, on February 6, we lost the LARSYS system disk, several temporary disks, and all files on 12 user minidisks. We were able to recreate a new disk pack and load it with data from all but the 12 user minidisks within an hour or so, but we could only hope that the affected users had indeed backed up their own minidisks recently.

  If you have forgotten or are unclear about how to back up your minidisk, you should re-read section 5.1 of the "LARS Computer Users Guide." Backing up disks is not only to guard against hardware problems such as disk crashes, but also to guard against user errors, such as erasing files when it was not intended to do so. Indeed, we have found that users have many more problems arising from their own inadvertent errors

than they do from disk crashes.

We are hoping for next year, through a higher disk storage rate, to have the personnel resources to provide a backup service for user minidisks on a regular and routine basis - say weekly. This would relieve individual users of much of the need to develop and carry out their own individual backup procedures.

HOWARD GRAMS would be interested in your reactions to this service.

LITER

* Due to the extreme financial pinch that the computer facility finds itself in at the moment because of much lower-than-anticipated usage of the computer, it has been necessary to redirect the efforts of nearly all personnel that had been working on LITER development to other projects. This means that for the near future, very little progress can be expected on LITER development. Status of certain aspects of the project is as follows:

  Table Digitizer - As previously reported, all the software that was planned to be developed for the digitizer for the Phase I LITER work has indeed, been developed and is now operational. Individual users are welcome to use the digitizer and its software, as indeed several are. (See HOWARD GRAMS if you are interested in more information.) Alternatively, if you have digitizing work to be done, but don't have the time or inclination to use the hardware and software yourself, DAVE FREEMAN is ready, willing, and eager to talk to you about doing the job for you.

  Plotter (Line or vector plotting mode) - We have had to stop all work on implementing this software. This capability will likely not be available for some time.

  Plotter (Gray-scale plotting mode) - Some work continues in this area, but not at the level that we had planned. It is hard to say when this capability can be expected to become available.

SUMMARY OF 360/67 COMPUTER USE FOR JANUARY 1977

* Usage of the computer system during January was down by 3% compared to December, and it was down by a whopping 61% compared to last January.

We present the usual summary of possibly interesting statistics:

Overall Usage -		
	Basic Rate CPU Time used	4.53 hours
	Priority Rate CPU Time used	113.89 hours
	Total CPU Time used	118.42 hours
	Terminal Sessions	2827
	Batch Jobs	607

Batch Job Usage - Batch Machine	Jobs Run	Avg. Clock Time	Avg. CPU Time
BATQUICK	145	0.8 min.	0.2 min.
BATSHORT	255	6.8 min.	0.9 min.
BATMED	173	24.1 min.	4.5 min.
BATLONG	31	22.6 min.	7.9 min.

Local & Remote Terminals - Location	Cards Read	Lines Printed	Cards Punched
Flexlab2	6260 (2%)	290500 (98%)	625 (0%)
Flexlab1	19982 (6%)	318710 (94%)	933 (0%)
Houston	13068 (15%)	60606 (70%)	12387 (14%)
ISU	6528 (2%)	260294 (98%)	0 (0%)
Wallops	0 (0%)	107 (63%)	64 (37%)

Keyboard Terminals - Location	Port	Terminal Type	Logins	Total Time in Use	Avg. Time Per Session
Comp. Room	78	2741	172	55 hrs.	0.32 hrs.
Flexlab2	7B	Hazeltine 1200	178	159 hrs.	0.89 hrs.
Flexlab2	7C	Hazeltine 2000	210	158 hrs.	0.75 hrs.
Flexlab2	7D	2741	169	135 hrs.	0.80 hrs.
Flexlab2	7E	Infoton GTX	221	207 hrs.	0.94 hrs.
Flexlab2	7F	Hazeltine 1200	230	229 hrs.	1.00 hrs.
Flexlab1	80	Infoton GTX	242	169 hrs.	0.70 hrs.
Flexlab1	81	Hazeltine 1200	176	122 hrs.	0.69 hrs.
Flexlab1	85	2741	113	61 hrs.	0.54 hrs.
Flexlab1	86	2741	146	92 hrs.	0.63 hrs.
Dial-Up	8D	First in Use	61	72 hrs.	1.17 hrs.
Dial-Up	8E	Second in Use	7	5 hrs.	0.68 hrs.
Houston	91,92,93	(various)	263	323 hrs.	1.23 hrs.
ISU	95,96,97	(various)	219	159 hrs.	0.73 hrs.

SCAN LINES

LARS · Purdue University · VOL. 2 · NO. 8 · March 21, 1977

ITEMS OF INTEREST

* ROGER HOFFER has received the "Meritorious Service Award" for his work during the past year as Director of the Remote Sensing and Interpretation Division of ASP and also for work as a member of the National Planning Committee and the Board of Directors of the American Society of Photogrammetry.

  Dr. Hoffer received this award during the Annual Convention of the American Society of Photogrammetry held from February 28 - March 3, 1977 in Washington D. C. In addition, the president of ASP asked Dr. Hoffer to serve on a committee to evaluate the proposed "ASP Mapping Institute" and to chair a committee to define the inter-relationships between the three technical divisions of the American Society of Photogrammetry.

* LEROY SILVA was recently promoted to full Professor in the Electrical Engineering Department. Dr. Silva expressed his appreciation to his research associates at LARS for all their assistance.

* The Fall 1976 issue of the Journal of Applied Photographic Engineering shows a LARS photograph on the front cover. It shows a multispectral classification of Fort Wayne, Indiana area from a Skylab S-192 Scanner Data using three reflective bands plus the thermal infrared band. The data was collected on January 25, 1974, and was classified by PAUL ANUTA using

Prepared by the Laboratory for Applications of Remote Sensing for distribution at Purdue. Contact Susan Ferringer, SCAN LINES editor, to be placed on the mailing list (749-2052, ext. 273).

LARSYS. Pictured is a color coded output product by Mead Technology Laboratories, Dayton, Ohio.

A copy of the journal is now in the LARS Library.

* Photographic Service black and white RUSH jobs now have the following schedule:

  in by 11:30 AM - out by 4:00 PM the following day
  in after 11:30 AM - out by 4:00 PM 2 days later

* Congressman CHARLIE ROSE, 7th District, North Carolina, has accepted LARS invitation to give the banquet address at the Fourth Annual Symposium on Machine Processing of Remotely Sensed Data.

  Congressman Rose is a member of the House Committee on Agriculture, and chairman of the Subcommittee on Family Farms and Rural Development. He is also a member of the House Administration Committe, and chairman of its Ad-Hoc Subcommittee on Computers.

* TENNIS BUFFS! Spring is here again and with it the sound of bouncing tennis balls. The intrepid statisticians, BARB DAVIS and MARILYN HIXSON have agreed to take their lives in their hands and set up the 1977 tennis ladder.

  The following procedure is proposed for the singles ladder:

  1. All players who wish to join the tennis ladder will place themselves in one of three groups: Beginning (can identify a tennis racket and ball and knows what the lines on the court are for), Intermediate (has a forehand and backhand, and can get 75% of his second serves in), and Advanced (can volley, rush the net, or get 75% of his first serves in).
  2. The initial ranking will be stratified random within each group.
  3. A player may challenge either of the two players ranked directly above him and will be moved above the challenged player if he wins.
  4. The top player in a group may challenge the two lowest players in the next group, and the second ranked player may challenge the bottom player in the next group as well as the top player in his own group.
  5. Players on vacation will be ignored in challenges.
  6. A challenge must be played within one week of being made or the challenger and challengee exchange places.
  7. Players refusing three challenges will be removed from the ladder.
  8. A best of three set matches will be played for each challenge unless the two players agree differently prior to playing.

The following procedure is proposed for a doubles ladder:

1. Initially no one will be ranked.
2. Rankings will be on an individual basis.
3. Players may have partners who are not on the ladder and/or are not LARS employees.
4. Each individual on a doubles team will receive one point on the ladder for a winning match.

If you have any suggestions or additions, please contact Barb or Marilyn. If you wish to play on either or both ladders, please send your name and the group you feel you belong in to Barb or Marilyn. Happy hitting!

TRAVEL: SEMINARS & ADDRESSES

* DAVID LANDGREBE, TERRY PHILLIPS, JOHN LINDENLAUB, PHIL SWAIN, PAUL ANUTA, LEROY SILVA, JIM KAST, DICK MROCZYNSKI, MARION BAUMGARDNER and MARV BAUER, travelled to NASA/JSC, Houston, Texas, from February 28 - March 4 to participate in the quarterly SR&T review. Other participating remote sensing organizations were ERIM and the University of California at Berkeley.

  LARS also received a preliminary briefing on a major new research program called the Food & Fiber Inventory Systems Program. LARS is assigned some of the tasks for planning this program.

* DICK MROCZYNSKI travelled to Indianapolis on February 14 to discuss the potential of remote sensing applications with the Indiana Department of Natural Resources Division Heads. This is the first in a series of monthly meetings.

  Dick also travelled to Washington D. C. to present a paper about the applications of spatial processing to forestry to the annual meeting of the American Society of Photogrammetry.

* On February 22, LUIS BARTOLUCCI and ROGER HOFFER went to South Bend, Indiana, where they met with RICHARD SIMMS and JACK WOOD of the Southcentral Michigan Regional Planning Council (SMRPC). LARS currently has a subcontract with the SMRPC and has been working with them on water quality studies.

  Drs. Bartolucci and Hoffer discussed the details of a briefing that Mr. Simms will give to NASA/Headquarters on March 18 concerning their water resources activites. They also discussed some ideas for a major proposal to be submitted to NASA by SMRPC that would involve another subcontract to LARS which would include some research analysis work with both LANDSAT and Exotech data. This proposal will also include installation and operation of a low cost remote terminal in the SMRPC office in Kalamazoo, Michigan, and the development of a low cost band-pass spectrometer for field use from a helicopter.

* ROGER HOFFER chaired a technical session of the Annual meetings of the American Association for the Advancement of Science, held from February 25-26, in Denver, Colorado. The session was entitled "Political and Social Aspects of Remote Sensing from Space" and featured a blue ribbon group of speakers, including:

  DR. FREDERICK J. DOYLE, USGS
  "Technical Capability of Space Systems"

  JAMES V. ZIMMERMAN, international relations specialist, NASA
  "International Cooperation in Remote Sensing: The LANDSAT Experience"

  RONALD F. STOWE, legal advisor,
  U. S. Department of State with the United Nations
  "International Law in Remote Sensing from Space"

  MERRILL CONITZ, remote sensing specialist,
  Office of Science and Technology, AID,
  U. S. Department of State
  "Applications of Remote Sensing in Developing Countries"

  PAUL M. MAUGHAN, COMSAT General Corporation
  "A business View of Remote Sensing from Space"

* FRANK KIRSCHNER and DICK WEISMILLER discussed PY project objectives with the Indiana Rural Development Committee in Fort Wayne on March 16. Dick also plans to attend a Land Use Planning Symposium from March 21-25 in Omaha, Nebraska.

* DAVID LANDGREBE was accompanied by PHIL SWAIN, TERRY PHILLIPS and MARV BAUER to Minneapolis on March 16 to hear a briefing on CDC programs and remote sensing data processing. He also visited Carnegie-Mellon University in Pittsburgh to give a seminar on remote sensing data processing on March 17.

  Dr. Landgrebe's upcoming travel will take place on March 25 when he will attend a USRA Meeting of the Board of Trustees and represent Indiana University and Purdue University at a USRA Council of Institutions Management in Washington, D. C.

PERSONNEL CHANGES

* NANCY ZIPPERIAN has been hired as a Computer Operator Trainee. She is from Peru, Indiana, and is now a Sophomore in Computer Science. She is assuming BILL FREESTONE's hours and part of JIM MEYERSON's. Bill and Jim have had most of their hours reassigned to their original programming projects.

PROPOSALS & PROJECTS FUNDED

* SYNTHETIC APERTURE RADAR DATA REGISTRATION STUDY - NASA/Wallops Island has funded an eight month project to study radar image

registration problems and to define a system to be implemented at LARS to register radar data to LANDSAT data. PAUL ANUTA is principal investigator and will be assisted by DAVE FREEMAN, BILL SHELLEY and the reformatting staff.

* INVENTORYING OR DERELICT LANDS IN SOUTHWESTERN INDIANA - The Indiana Department of Natural Resources has funded this project from April 1977 - January 1978 to map derelict lands associated with strip mines. Principal investigators are DICK WEISMILLER and DICK MROCZYNSKI.

VISITORS

* On march 8, ROGER HOFFER met with REX JONES, Indiana Divison of Water Polution Control; PHIL POPE and CLAIR MERRITT, Purdue Forestry Department, to discuss some possible research activities involving non-point pollution control.

* LUIS BARTOLUCCI hosted a group of three officials from Mexico: ARG. LUIS VELASCO ALBIN, ING. RODOLFO VELASCO, and ING. JULIO CESAR MARGAIN, for a series of day long discussions with LARS staff concerning various aspects of computer-aided analysis of multispectral scanner data. These discussions resulted in a proposal being generated to analyze some LANDSAT data over an area of particular interest in Mexico and to compare the results of this analysis for two dates - one before and one following the recent agrarian reform activities in Mexico.

* The February monthly meeting/field trip of the Indiana Geologist Association was held at LARS, and featured a geologic application slide presentation by DON LEVANDOWSKI. The participants, which included 40 professional geologists representing Indiana University, Indiana State University, IUPUI, DePauw University, Indiana State Highway Department, Purdue University and the Indiana Geologic Survey, were then given a tour of the labs by DONNA SCHOLZ.

* DICK WEISMILLER and DONNA SCHOLZ hosted the Section Heads of the Indiana Geologic Survey for a presentation of remote sensing applications and tour of the laboratories on February 23. Participants included: JOHN HICKMAN, coal geologist, WALTER HASENMUELLER, coal geologist, JOHN HILL, glacial geologist, HENRY GRAY, stratigrapher and Geology Section Head, ED HARTKE, environmental geologist, and NED BLEUR, glacial geologist. Of particular interest was the Indiana mosaic in Flexlab I.

* WALTER WHINNERY, University of Louisville Speed Institute, visited with DONNA SCHOLZ and DICK WEISMILLER on March 4 about his studies of the effects of acid drainage in strip mining.

VISITING SCIENTIST

* ALI VIRASTEH, from the Ministry of Agriculture in Iran, is nearing completion of his program at LARS. His period of study from April 1976 to March 1977 has been spent in evaluating the utility of LANDSAT data for agricultural surveys in Iran, and he has recently completed classifications of two LANDSAT scenes where the primary crops were rice and tea.

RECENT ACQUISITIONS IN THE LIBRARY

* The library recently received an advance copy of the text:

Remote Sensing of Environment
Joseph Lintz, Jr. and David S. Simonett (Editors)
Addison-Wesley Publishing Company, Inc.
Advanced Book Program
1976

The basic sections covered in this text include:

(1) Remote Sensing: Principles and Concepts

(2) Instrumentation for Remote Sensing

(3) Remote Sensing Supporting Functions: Data Processing, Ground Truth, and Mission Planning

DAVID LANDGREBE authored Chapter 10 within this section, entitled "Machine Processing of Remotely Acquired Data".

(4) Remote Sensing Ap-lications: Analysis, Interpretation, and Resource Management

* Other new additions include:

P
IN8
76
C1
ER-MAN
Earth Resources Management (Proceedings)
IBM International Earth Resources Management Symposium
January 27-29, 1976

A775
R68
76
Evaluation of Activated Sludge Control Techniques Through Pilot Plant and Computer Analyses
Ralph E. Roper, Jr. and C. P. Leslie Grady, Jr.
Purdue University Water Resources Research Center
June 1976

A775
S05
76
Effect of Wet-Air Oxidation on the Chemical Composition of Sewage Sludges
L. E. Sommers and E. H. Curtis
Purdue University Water Resources Re earch Center
August 1976

A775
M15
76
Sampling and Analysis of Stormwater Runoff From Urban and Semi-Urban/Rural Watersheds
Felix T. R. McElroy III, C. Fletcher Mattox, Dennis W. Hartman, and John M. Bell
Purdue University Water Resources Research Center
September 1976

* New journals (and brief table of contents) in the library include:

IBM Systems Journal
Volume Sixteen/Number One/1977

"A user-oriented data-base retrieval system", A. U. Jones

"An APL interpreter and system for a small computer", M. Alfonseca, M. L. Tavera, and R. Casajuana

"The IBM 5100 and the Research Device Coupler-A personal laboratory automation system", H. Cole and A. A. Guido

"A method of programming measurement and estimation", C. E. Walston and C. P. Felix

* Environmental Management
Volume 1, Number 1
1976

"Satellites Viewing Our World: The NASA Landsat and the NOAA SMS/GOES", George B. Heaslip

"Estimates of Health Benefits due to Reductions in Ambient NO_2 Levels", Brian P. Leaderer, Rebecca T. Zagraniski

"Gradient Modeling: A New Approach to Fire Modeling and Wilderness Resource Management", Stephen R. Kessell

"Environmental Risk: Management Strategies in the Developing World", W. R. Derrick Sewell, Harold D. Foster

* Water Resources Research
Volume 13, Number 1
February 1977

* Journal of Applied Photographic Engineering
Official publication of the Society of Photographic Scientist and Engineers
Volume 2, Number 4
Fall 1976

"Digitized Image Display Using Ink-Jet and Laser Printing Techniques", Ronald L. Antos and Gaylord A. Helgeson

"An Interactive, User-Oriented, Digital Image Processing System", Samuel K. Barrett

"Comparison of Objective and Subjective Measurement of Gamma", David J. Kelch and Gaylord A. Helgeson

"An Objective Tone Control System for Production Photographic Laboratories", David J. Kelch

"Mathematical Model of Silver Complexes in Fixing Baths", David J. Kelch

"Photometric and Radiometric Calibration of Sensitometers", David A. Fatora

"Print Contrast Measurement", C. S. McCamy

The Epipythology of Late Blight of Potato Monitored by Sequential Color In rared Aerial Photography", H. R. Jackson, and V. R. Wallen

"Resonant Absorption Characteristics of a Posivive Photoresist Film", Musti A Narasinham, Jane M. Shaw and F. H. Dill

"Statistics in Processing Control", J. Edward Jackson

* Photogrammetric Engineering and Remote Sensing
Journal of The American Society of Photogrammetry
Volume XLIII, November 2
February 1977

"Digital Processing of Analog Thermal Infrared Scanner Data P. F. Goldsbrough

"Digital Processing of Conical Scanner Data", S. W. Murphrey, R. D. Depew, and R. Bernstein

"Geometric Evaluation of Skylab S-192 Conical Scanner Imagery", R. C. Malhotra

"Photogrammetric Determination of Iceberg Volumes", L. D. Farmer, and R. Q. Robe

"Effect of Vegetation on Rock and Soil Tyoe Discrimination", B. S. Siegal and A. F. Goetz

"Remote Sensing Survey of Melaleuca", B. L. Capehart, J. J. Ewel, B. R. Sedlik, and R. L. Myers

"Landsat Agricultural Land-Use Survey", A. J. Richardson, C. L. Wiegand, R. J. Torline, and M. R. Gautreaux

* IBM Journal of Research and Development
Vol. 21, No. 1
January 1977

"Application of Ink Jet Technology to a Word Processing Output Printer", W. L. Buehner, J. D. Hill, T. H. Williams, and J. W. Woods

"Scale Model of an Ink Jet", S. A. Curry and H. Portig

"Satellite Droplet Formation in A Liguid Jet", W. T. Pimbley and H. C. Lee

"Effect of Parameter Variations on Drop Placement in an Electrostatic Ink Jet Printer", T. G. Twardeck

"Drop Charging and Deflection in an Electrostatic Ink Jet Printer", G. L. Filmore, W. L. Buehner and D. L. West

"Boundary Layer Around a Liquid Jet", H. C. Lee

"Controlling Print Height in an Ink Jet Printer", J. M. Carmichael

"Study of Fluid Flow through Scaled-up Ink Jet Nozzels", M. Levanoni

"Development and Characterization of Ink for an Electrostatic Ink Jet Printer", C. T. Ashley, K. E. Edds, and D. L. Elbert

"Materials Selection for an Ink Jet Printer", B. L. Beach, C. W. Hilenbrandt and W. H. Reed

INFORMATION NOTES

011277 Digital Registration of Topographic Data and Satellite MSS Data for Augmented Spectral Analysis by Paul E. Anuta.

The problem of utilization of topographic and other ancillary data exists in digital analysis of remote sensing data. The report describes techniques and an example of digital registration of topographic data to SKYLAB and LANDSAT MSS data for use in forest and land use classification of areas in the Rocky Mountain region.

The work reported in this paper was sponsored by NASA under Contract No. NAS9-13380.

011977 LARS Computer User's Guide by Howard L. Grams.

The LARS Computer User's Guide is designed to document and incorporate all the basic information one needs in order to gain access to the machine and use the equipment. Topics covered include a description of LARS Computer Services, administrative procedures, available documentation, and procedures for operating terminals or submitting batch jobs.

SYSTEM SERVICES March 21, 1977

REVISED EDITION OF COMPUTER USER'S GUIDE AVAILABLE

* A newly revised version of the LARS Computer User's Guide is now available as LARS Information Note 011977. The LARS Computer User's Guide is designed to document and incorporate all the basic information one needs in order to gain access to and use the LARS computer. Topics covered include a description of available Computer Services (hardware and software), administrative procedures (e.g. how to open accounts and request ID's), who you can talk to for various kinds of questions, procedures for operating terminals, procedures for submitting batch jobs, notes for programmers and more.

  We have a limited number of copies available upon request from MIKE COLLINS (phone 226).

COMING CHANGES THAT WILL MAKE MORE DISK SPACE AVAILABLE

* A multi-faceted project to make available more disk space is nearing completion. (We have been sorely in need of more disk space for some time now). To make everything work together, we will need to put a new version of CMS online the morning of Friday, April 8. The changes will not affect you as a LARSYS user at all (unless you have your own private version of some LARSYS module on your P-disk). The changes will affect you as a CMS user if you have MODULE files on your minidisks. See the following paragraphs for more complete information.

* LARSYS will now use a 10-cylinder TEMP disk for most jobs, instead of a 25-cylinder TEMP disk as is currently the case. In the rare case where more than 10-cylinders is needed (as in a large *CLASSIFYPOINTS job with results going to disk, or as in an *IMAGEDISPLAY job using the DISK option, or as in a large *SEPARABILITY job), LARSYS will automatically "trade-in" its initial 10-cylinder disk for a larger 25-cylinder one. This "trade-in" will be transparent to the user--you will not be aware of it when it does occur.

  This will allow us to operate effectively with a supply of about a dozen 10-cylinder TEMP disks plus about four 25-cylinder TEMP disks. This compares with current operations, which have required a supply of about eleven 25-cylinder TEMP disks.

  If you are a typical LARSYS user, you will not even notice that any changes have been made. However, if you have your own private versions of one or more LARSYS modules, you will need to regenerate those modules. If you have any questions, or if this will cause you any problems, please call HOWARD GRAMS.

INFORMATION FOR TEMP DISK USERS

* CMS users who use TEMP disks should be aware that we will be changing the number of available TEMP disks, their sizes, and their addresses. After April 8, TEMP disks will be available as indicated in the following table:

Size of TEMP Disk	Number Available	Addresses
2 cyl.	About 5	TEMP 021, TEMP 022, etc.
5 cyl.	About 5	TEMP 051, temp 052, etc.
10 cyl.	About 10	TEMP 101, TEMP 102, etc.
25 cyl.	About 4	TEMP 251, TEMP 252, etc.

You can most conveniently obtain a TEMP disk by using a version of the GETDISK command as in this example asking for a 5-cylinder TEMP disk:

```
GETDISK TEMP 5CYL ADR 192 MODE T CLEAR
```

Since address 192 and mode T are defaults, you can omit them as in this example calling for at least 8 cylinders of space:

```
GETDISK TEMP 8CYL CLEAR
```

The GETDISK command links to a disk and logs it in. It will be cleared if you specify CLEAR, other wise it will not be. If you ask for X cylinders, you will get the smallest available disk having at least that much space. In the example where we asked for 8 cylinders, we would have gotten 10 cylinders unless all of the 10-cylinder disks were in use, in which case we would have gotten 25-cylinders.

The GETDISK command is documented in a forthcoming LARS addendum to the CP/CMS User's Manual. Pre-publication copies are posted on bulletin boards at Flexlab I and Flexlab II.

(The older GET-TEMP command is obsolete. Although it will still work, its use is not recommended.)

Please avoid using the older LARGE option of either GETDISK or GET-TEMP unless you really need to. You should instead ask for approximately the number of cylinders you need. This will avoid unnecessarily tying up all of the limited number of very large TEMP disks.

INFORMATION FOR CMS PROGRAMMERS

* After April 8, the default load address for CMS programs will be location 20000 (hex) instead of 12000 (hex). If you have any MODULE files on your disk, you will have to do the LOAD and GENMOD again in order to make them usable after April 8.

You can do this anytime you want to, using the following sequence of operations:

```
LOAD      PROGNAME ( SLC20000
GENMOD    PROGNAME
```

A module generated as above will be usable both before and after April 8. If you wait until after April 8, you will not need to use the SLC20000 option.

If you have any questions, or if this will cause you any difficulty, please call HOWARD GRAMS.

* You may be interested to know that the CMS 190 S-disk will be 30 cylinders in size after April 8 instead of the present 54 cylinders.

* You may also be interested to know that the CMS transient area will be at location 0E000 (hex) instead of 11000 (hex) and will be 2 pages long instead of one.

NEW PROGRAMS AVAILABLE

* The new version of CMS that will be put on-line the morning of April 8 will include several miscellaneous useful programs or modified versions of standard CMS programs that have been developed by various people at LARS. While some of these routines are not officially supported, we are making them available on the CMS system for you to use if you wish to do so. If you currently have copies of any of these routines on your own P-disk, you will now be able to free up some of your disk space by erasing them.

* SEDIT - Super-(tongue-in-cheek)-EDIT is a modification of the standard CMS editor. It was originally created by BILL ZURNEY, and has had a few features added by BRUCE CLARKE. The most significant features include:

    1. You can move a block of one or more lines from one place to another in the file being edited.
    2. You can copy a block of one or more lines from one place into a new place, without disturbing the original lines in their original place.
    3. In case your disk is too full to FILE your file when editing is completed, a message is generated and you are free to issue certain CMS commands (such as LISTF, ERASE, etc.) from within SEDIT in order to free up the necessary space.
    4. Ten CMS commands (as mentioned in item 3) can be issued from within SEDIT.
    5. You can issue a MODE command from within SEDIT so that a FILE command will write the edited file onto a different disk that it obtained the source from.

6. You can specify the file mode as well as the filename and filetype when you go into SEDIT.
7. You can invoke a new AUTOSAVE N command to have your file automatically SAVED after each N changes that you make.

You can get a copy of the documentation for SEDIT by typing the CMS command:

OFFLINE PRINT SEDIT MEMO SY

While SEDIT is not officially supported by LARS, it has been in wide use for many months with no problems encountered.

* COMPRESS - This is a program that converts a CMS file into a compressed format that significantly reduces the disk space needed to store it. Typical FORTRAN and SYSIN files have been observed to occupy 30-50% of their original amount of disk space when compressed. You can perhaps save significant amounts of disk space by compressing little used files. When needed, they can be expanded by using the EXPAND program.

One invokes COMPRESS by giving it the filename and filetype of a file which must be on the P-disk or on a read-only extension of the P-disk. For example:

COMPRESS MYPROG FORTRAN

will create the compressed file MYPROG CFORTRAN P5, and leave the original file unchanged.

Output of COMPRESS is always mode P5, always has the same filename as the original file, and has a filetype the same as the original with a C in front of it.

Sequence numbers are deleted from FORTRAN and SYSIN files.

* EXPAND - This program converts a COMPRESS'ed file back into its original format.

One invokes EXPAND by giving the filename and filetype of a compressed file on the P-disk or read-only extension of the P-disk. For example:

EXPAND MYPROG CFORTRAN

will create the file MYPROG FORTRAN P5, and leave the compressed file unchanged.

Output of EXPAND is always mode P5, always has the same filename as the COMPRESS'ed file, and has the C removed from the filetype.

Expanded FORTRAN and SYSIN files are unsequenced in columns 73-80. Sequence numbers can be re-inserted with EDIT if desired.

Both EXPAND and COMPRESS were created by BRUCE CLARKE, who has kindly submitted them for wider use.

* DUMPP - This is a version of the standard CMS DUMPF command (see page 389 of CP/CMS Users' Guide). The only difference is that the output goes to the virtual printer instead of to your terminal.

* ENVIRON - This is a command designed to be issued from an EXEC file to find out whether the job is running in a batch machine or is running disconnected. For example:

  ENVIRON BATCH

  will return error code zero if the job is running in a batch machine, and will return error code one if it is not. Likewise,

  ENVIRON DISC

  will return error code zero if the job is running disconnected and will return error code and if it is not (i.e., if it is running connected).

  The ENVIRON command is fully supported, and it is the recommended method of letting your EXEC file find out (if it needs to know) whether it is running in a batch machine or not. A Fortran-callable version, called ENVIR, is also available in SYSLIB TXTLIB, if needed.

* DEFINE - The Fortran-callable DEFINE subroutine described on page 472 of the CP/CMS User's Manual has been enhanced to allow an optional sixth parameter which is the 2-byte filemode. If this parameter is not specified, the filemode defaults to P5 as before. This means that now DEFINE can be used for any file on any disk, whereas before only P-disk files could be read and P5 files written.

SPSS NOTES

* During the months of December-February, at least seven separate instances showed up where SPSS would improperly go into DEBUG. As of this writing, all seven problems have been fixed, and there are currently no known problems with SPSS. However, it seems likely that more will come to light as users attempt to use new and different routines in the package. If you have a problem with SPSS, you should consult MARILYN HIXSON. It has become easy to fix problems of the sort that have been encountered so far, and if you can supply a copy of the data deck that causes the program to bomb, we can probably have the problem corrected in a day or so.

PRINTING-THE-LAST-CARD-OF-A-DATA-100-PUNCH-DECK PROBLEM FIXED!!!!!!

* At long last, and after literally dozens of attempts by the Data-100 people, they have managed to supply us with a load deck containing software that does not suffer from this bug. You should no longer have the problem of having the last card of an output card deck missing.

DISK CRASHES (AGAIN! -OUCH)

* As we mentioned last month, we have recently been having many more problems with head crashes on the 2314 disk drives than we have ever before experienced. Yet another crash (this time on March 8) caused loss of data from 46 user minidisks.

  If you have forgotten or are unclear about how to back up your minidisk, you should re-read section 5.1 of the "LARS Computer Users Guide." Backing up your disks is not only to guard against hardware problems such as disk crashes, but also to guard against inadvertent errors, such as erasing files when it was not intended to do so. Indeed, we have found from experience that users have had many more problems arising from their own inadvertent errors than they have had from disk crashes.

  We are planning next year to have the resources to provide a backup service for user minidisks on a regular and routine basis - say weekly. This should relieve individual users of much of the need to develop and carry out their own individual backup procedures.

  HOWARD GRAMS would be interested in your reactions to this service.

LITER

* Work on the LITER terminal development continues at a slow pace as described last month due to the present financial pinch. However, we have recently been able to make some visible progress in the area of gray-scale plotting. We now are able to produce sample pictures from the plotter version of *PICTUREPRINT, and we have an example posted on the wall at Flexlab II near the PDP-11 and the plotter. We have a sample pasted-up printout from the standard *PICTUREPRINT which measures six feet square, together with the equivalent output from the plotter that is only 1½ feet square. (We think the plotter version shows more detail and is easier to look at). Stop by and look at this sample if you haven't already seen it.

INFORMATION EXCHANGE SESSION

* HOWARD GRAMS and BILL SIMMONS held one of their series of informal question-and-answer sessions on February 24. It was attended by about a dozen people. We will probably hold the next one of these sometime in April. If you have any thoughts about good and bad times for it to be scheduled, please let Howard know. It appears that our normal time of early Thursday afternoon conflicts with class schedules for several people, but we don't know when would be a better time.

SUMMARY OF 360/67 COMPUTER USE FOR FEBRUARY 1977

* Usage of the computer system during February was up by 65% compared to January, but it was down by 12% compared to last February.

We present the usual summary of possibly interesting statistics:

Overall Usage

Basic Rate CPU Time used	24.31 Hrs.
Priority Rate CPU Time used	170.59 Hrs.
Total CPU Time used	194.90 Hrs.
Terminal Sessions	3378
Batch Jobs	739

Batch Job Usage

Batch Machine	Jobs Run	Avg. Clock Time	Avg. CPU Time
BATQUICK	159	1.20 Min.	0.10 Min.
BATSHORT	264	4.97 Min.	0.47 Min.
BATMED	213	19.13 Min.	3.69 Min.
BATLONG	99	40.27 Min.	11.04 Min.

Local & Remote Terminals

Location	Cards Read	Lines Printed	Cards Punched
Flexlab2	13627 (2%)	545482 (96%)	6975 (1%)
Flexlab1	58600 (8%)	629110 (90%)	9482 (1%)
Houston	75153 (14%)	446516 (81%)	28267 (5%)
ISU	9330 (6%)	152057 (94%)	629 (0%)
Wallops	0	0	0

Keyboard Terminals

Location	Port	Terminal Type	Logins	Total Time in Use	Avg. Time Per Session
Comp. Room	78	2741	218	98 Hrs.	0.45 Hr.
Flexlab2	7B	Hazeltine 1200	183	204 Hrs.	1.12 Hr.
Flexlab2	7C	Hazeltine 2000	234	208 Hrs.	0.89 Hr.
Flexlab2	7D	2741	184	164 Hrs.	0.89 Hr.
Flexlab2	7E	Infoton GTX	256	243 Hrs.	0.95 Hr.
Flexlab2	7F	Hazeltine 1200	303	235 Hrs.	0.77 Hr.
Flexlab1	80	Infoton GTX	303	223 Hrs.	0.74 Hr.
Flexlab1	81	Hazeltine 1200	185	148 Hrs.	0.80 Hr.
Flexlab1	85	2741	193	109 Hrs.	0.56 Hr.
Flexlab1	86	2741	170	128 Hrs.	0.75 Hr.
Dial-Up	8D	First in Use	56	64 Hrs.	1.14 Hr.
Dial-Up	8E	Second in Use	20	23 Hrs.	1.13 Hr.
Houston	91,92,93	(various)	267	311 Hrs.	1.17 Hr.
ISU	95,96,97	(various)	365	178 Hrs.	0.49 Hr.

SCAN LINES

LARS · Purdue University · VOL. 2 · NO. 9 · April 18, 1977

ITEMS OF INTEREST

* The administration of NASA and the Secretary of Agriculture are proposing a major new program: FOOD & FIBER, to pick up after LACIE and develop into a "second generation" technology system.

  LARS hosted discussions between NASA representatives: BOB MCDONALD, GARY GRAYBEAL, DON HENNINGER and KEITH HENDERSON and Purdue Staff from the Agriculture/Agronomy Departments on March 30-31, 1977. These discussions considered the national and information (output) requirements of a global food and fiber information system which may be operational in the late 1980's.

* Short Course activity during the month of April was brisk as two different courses were offered. The regular monthly course, "Remote Sensing Technology and Applications" was held at Flexlab 2, while an advanced course, "Advanced Topics in the Analysis of Remote Sensing Data" was held at Stewart Center.

  April 4-8 was the first offering of the advanced course designed for individuals having completed the regular monthly course or with a basic knowledge of statistical pattern recognition techniques and their applications to remote sensing data. Course staff: PHIL SWAIN, JOHN LINDENLAUB, DAVID LANDGREBE, MARV BAUER and BARBARA DAVIS, presented a variety of information in the areas of Multitemporal Analysis, Spatial Analysis Techniques, Systems Design and Data Transformation.

Prepared by the Laboratory for Applications of Remote Sensing for distribution at Purdue. Contact Susan Ferringer, SCAN LINES editor, to be placed on the mailing list (749-2052, ext. 273).

The regular monthly short course, featuring the fundamentals of remote sensing, sensor systems, reflectance characteristics of earth surface features, applications, pattern recognition and data processing, as well as LANDSAT data analysis workshops, has been extended to run another year (through June 1978). For furthur information on either of these two courses, contact DOUG MORRISON, Flexlab 2, ext. 271.

* JERRY O'BRIEN, Continuing Education, reported on a break-down of those people purchasing the Minicourse Series Fundamentals of Remote Sensing, as follows: University - 16, Industry - 5, Government - 22, and Foreign - 18.

* LARS has recently been allocated new space in unit D of Flexlab 2 to house the Field Measurements and Visiting Scientist areas. When space was requested it became even more apparent a new phone system was needed. JIM MARIGA has announced that the new system has been approved and should begin being operational in June. It will be located in Flexlab 1 and will increase the facility for transferring calls and reaching people after hours.

* CORRECTION: The Fall 1976 issue of the Journal of Applied Photographic Engineering which shows a LARS/Mead Technology image of Fort Wayne, Indiana was classified by LARRY BIEHL from data collected on January 25, 1974 from Skylab S-192 multispectral scanner.

PERSONNEL CHANGES

* Secretarial changes at LARS include two farewells and one welcome: JANE BUCKLES left the Director's Office on April 8 to accept a job as receptionist for Kemmer Construction, Lafayette. DEBBE SCHERER leaves Technology Transfer on April 15 to return to Fort Wayne with her husband.

  A new face will greet you at Flexlab 2 - DIANNA JENNINGS joined LARS on March 21. She is a graduate of Southwestern High School where she majored in business. Dianna is the Flexlab 2 receptionist, secretary to BARBARA PRATT and JIM KAST, and mail girl. We heartily welcome her.

* A belated congratulations to KEN and CHARLOTTE BROWN who were blessed with a son, STEVEN CRAIG, on January 30th.

* We were all happy to hear that JEANNE and BILL ETHERIDGE's April Fools suprise was ahealthy baby girl. KATHLEEN YVONNE successfully makes her presence known in spite of her parent's adamant protests that she will not run their lives! The "LARS Statistical Baby Guessing Package" exhibited remarkable accuracy in predicting Kathleen's weight (7 lbs. 3 oz. - 100% accuracy) and length (19½ in. - 97.4% accuracy). Unfortunately it was 32 days off on the birth date. Congratulations, Jeanne!

TRAVEL: SEMINARS & ADDRESSES

* The Association for Advancement of Medical Instrumentation meetings held in San Francisco, California were attended by LEROY SILVA and JOHN PEARCE. Dr. Silva presented a paper on the NDM project and Pearce submitted a paper which won the best student paper award, including a round trip ticket to California and $150.

* Travel during late March included two meetings for DAVID LANDGREBE. On March 24, Dr. Landgrebe attended the USRA Board of Directors meeting at the COSMIC Club and on the following day the Council of Institutions, National Academy of Sciences. Both meetings were held in Washington D.C.

* DICK MROCZYNSKI travelled to Denver, Colorado from March 16-18 to participate in a multistage remote sensing workshop conducted by the United States Forest Service.

  On March 28-29, Mroczynski was also in Milwaukee, Wisconsin to brief the regional forester's staff (USFS) regarding the Hoosier National Forest Demonstration project, which is part of the PY effort.

* Upcoming travel includes a trip to Houston, Texas by BILL SIMMONS to oversee final processing of photo products from SEFEL J. and Associates for the USSR-US project.

* MARV BAUER will be on the road April 18-22. Dr. Bauer will be in Houston, Texas for a Field Measurements Project meetings at NASA, and then will travel to Chicago, Illinois for a USSR-US Remote Sensing project meeting.

  Field Measurements will also have data collected in Hand County, South Dakota by CRAIG DAUGHTRY and JOHN AHLRICHS.

* April 22-23, MARION BAUMGARDNER will participate in the annual meetings of the Natural Resources Alumni, Utah State University, Logan, Utah.

* LARS will have four poster paper presentations at the Eleventh International Symposium on Remote Sensing of the Environment sponsored by ERIM on April 25-28. These papers are:

  "Quantification of Soil Mapping by Digital Analysis of LANDSAT Data" by FRANK KIRSCHNER*, SUE KAMINSKI, CAROL LATOWSKI, ERIC HENSEL and DICK WEISMILLER.

  "Digital Analysis of LANDSAT Data for Surveying Natural Resources in Western Sudan" by MARION BAUMGARDNER, STEVE KRISTOF* and YOUSEF YAGOB (Sudan).

  "Evaluation of Change Detection Procedures for Monitoring Coastal Zone Environments" by DICK WEISMILLER, STEVE KRISTOF, DONNA SCHOLZ*, PAUL ANUTA and SALEEM MOMIN.

  "Disseminating Technological Information on Remote Sensing to Potential Users" by JOHN LINDENLAUB* and JAMES RUSSELL*.

VISITORS

* NORMAN MCLEOD, consultant for FAO/Bangladesh, visited with JOHN PETERSON on March 23 to discuss the specifications for a combined land use study of a selected area of Bangladesh and a training program for their scientists.

  Dr. Peterson was also visited by DON JORDAN, writer for Environmental Magazine, to discuss an upcoming article on LARS.

* Professor CLARE KENAGA and 12 ag science majors from the Purdue School of Agriculture visited MARION BAUMGARDNER for a briefing about LARS on April 1.

PROJECTS AND PROPOSALS

* LAND USE OF BANGKOK AREA - a proposal is currently pending with the United States Agency for International Development for a twelve month project involving the preparation of a land use inventory of an area surrounding Bangkok, Thailand. VALAIRAT SONTIRAT, graduate student under MARION BAUMGARDNER, will be the principal personnel involved.

* GODDARD SPACE FLIGHT CENTER - continuation of the current remote terminal system support from March 1 to August 3, 1977. Principal investigator is TERRY PHILLIPS. Other personnel assigned to this project include LARRY BIEHL, BILL FREESTONE, HOWARD GRAMS, SUE SCHWINGENDORF and BILL SIMMONS. Sponsored by NASA.

SYSTEM SERVICES April 18, 1977

CMS USER'S MANUAL UPDATE #4 AVAILABLE

* A new memo containing LARS addenda and modifications to the IBM CP/CMS User's Guide (Form GH20-0859-2) has been issued. This memo is dated April 8, 1977 and is the 4th such memo in a continuing series. It has already been sent to everyone listed on our list of recipients of the CP/CMS User's Guide. If you have a CP/CMS User's Guide but did not receive a copy of Update Memo #4, you should call MIKE COLLINS (phone 226) to receive one and get your name on the list to receive future updates.

TEMP DISKS

* As announced last month, several changes were put on-line on April 8 having to do with TEMP disks. Twenty-five cylinder TEMP disks now have addresses beginning with 251, 252, etc, instead of the older 001, 002, etc. In order to ease the transition, for two weeks we are temporarily leaving the old addresses in the directory, but these will be removed on April 22. Before that time you should finish purging any references to TEMP 001, 002, etc. from your EXEC files. We now recommend use of the GETDISK command for acquiring TEMP disks, as described in the updated CP/CMS User's Guide.

  The number of large 25-cylinder TEMP disks is much smaller than before. If you routinely ask for 25 cylinders when you really need much less space, your chances of getting the TEMP disk you request are greatly reduced. What is worse, tying up a 25-cylinder disk when, for example, 5 cylinders is ample severely impacts the chances for success of someone else who really needs a large disk to get his work done - for example, a person running *IMAGEDISPLAY.

  Please get into the habit of asking the GETDISK program for only the amount of space you actually need.

NEW OVERNIGHT BATCH MACHINE AVAILABLE

* Due to increased demand for overnight batch machine service,

there have been several instances when all jobs submitted to the BATLONG machine could not be finished overnight. Accordingly, we have created a new overnight batch machine called BATONITE. BATONITE is similar to BATLONG in all respects except that a time limit of 20 minutes of CPU time will be in effect. It is intended that BATONITE will process the shorter overnight jobs while BATLONG will continue to process the longer-running jobs. Our goal will be to achieve 24-hour turnaround on all jobs submitted to BATONITE or BATLONG, and if possible, to have all jobs submitted before 5 pm completed by 8 am the next morning.

The priority service rate is not applicable to either BATONITE or BATLONG - only the basic computer service rate will be charged.

DIAL-UP PORTS

* We have more and more been experiencing congestion on the two existing dial-up ports to the computer. In addition to the two TI terminals at LARS that use these ports, the ports receive considerable utilization by terminals at Houston and Goddard, as well as occasional use from other sources.

  To help alleviate the overload, we have ordered a third line and modem to be installed. Hopefully this will occur during May.

LITER (USE OF THE VARIAN PLOTTER IS AT HAND!!)

* Progress continues, albeit at a slow pace due to lack of funding for LITER development. We expect to make Varian plotter output generally available to users about the first part of May. User software available will be *GDATA, which is a slightly modified version of *PICTUREPRINT, and *GRESULTS, which is a slightly modified version of *PRINTRESULTS. Naturally, this software is by no means in any kind of final, completely stabilized form; however, we believe that it can be useful in its preliminary form and we are eager to receive comments or suggestions for improvements from pioneer users.

  We also hope to make available preliminary versions of software routines for doing vector plotting (lines, curves, etc.) at about the same time. These will be programmer-oriented routines, as opposed to the user-oriented *GDATA and *GRESULTS programs.

  At the beginning, plotter output will be available using procedures similar to those for requesting photo-quality printer output. Depending on volume of requests, we hope it can be done on an overnight basis. Individual users

will not operate the PDP-11 and plotter - this will be done by the operations staff.

Watch for a seminar announcement for early May when HOWARD GRAMS will present a discussion of what you can do with the plotter and how you can do it.

EXPIRED OR OVER-RUN ID'S

* Occasionally computer accounts have suddenly been run deeply into the red before the account managers become aware of it. Our practice will be to delete the ID's in the account as soon as the flow of red ink becomes apparent. We will immediately notify the managers of the account, and retain all disk files belonging to the ID's for 30 days. The ID's will be quickly re-installed upon authorization from the account manager.

SUMMARY OF 360/67 COMPUTER USE FOR MARCH 1977

* Usage of the computer system during March was up by 43% compared to February, and it was up by 7% compared to last March.

We present the usual summary of possibly interesting statistics:

Overall Usage		
- Basic Rate CPU Time used	35.92 hrs.
Priority Rate CPU Time used	243.42 hrs.
Total CPU Time used	279.34 hrs.
Terminal Sessions	4547
Batch Jobs	1102

Batch Job Usage - Batch Machine	Jobs Run	Avg. Clock Time	Avg. CPU Time
BATQUICK	210	1.3 min.	0.1 min.
BATSHORT	268	10.4 min.	0.8 min.
BATMED	396	22.4 min.	4.6 min.
BATLONG	227	30.6 min.	9.5 min.

Local & Remote Terminals - Location	Cards Read	Lines Printed	Cards Punched
Flexlab2	49616 (6%)	712350 (93%)	2552 (1%)
Flexlab1	42155 (7%)	538114 (91%)	8845 (2%)
Houston	59252 (10%)	489485 (82%)	49236 (8%)
ISU	29897 (6%)	478757 (94%)	-

Keyboard Terminals - Location	Port	Terminal Type	Logins	Total Time in Use	Avg. Time Per Session
Comp. Room	78	2741	348	180 hrs.	0.52 hr.
Flexlab2	7B	Hazeltine 1200	290	312 hrs.	1.07 hr.
Flexlab2	7C	Hazeltine 2000	340	262 hrs.	0.77 hr.
Flexlab2	7D	2741	249	222 hrs.	0.89 hr.
Flexlab2	7E	Infoton GTX	197	147 hrs.	0.75 hr.
Flexlab2	7F	Hazeltine 1200	372	287 hrs.	0.77 hr.
Flexlab1	80	Infoton GTX	367	256 hrs.	0.70 hr.
Flexlab1	81	Hazeltine 1200	230	150 hrs.	0.65 hr.
Flexlab1	85	2741	215	149 hrs.	0.69 hr.
Flexlab1	86	2741	224	152 hrs.	0.68 hr.
Dial-Up	8D	First in Use	101	123 hrs.	1.22 hr.
Dial-Up	8E	Second in Use	45	62 hrs.	1.37 hr.
Houston	91,92,93	(various)	403	413 hrs.	1.02 hr.
ISU	96,97	(various)	621	334 hrs.	0.54 hr.

SCAN LINES

LARS · Purdue University · VOL. 2 · NO. 10 · May 20, 1977

ITEMS OF INTEREST

* Personnel interaction and frequent evaluations of the LARS Short Course on a monthly basis since its inception in July 1975 have paid off in full measure during the May course.

  DOUG MORRISON has commented that participants and staff alike agreed that May was one of the best sessions of the course to date. A variety of reasons for this would indicate that the participants themselves, and the increased number of LARS personnel available for individual interpersonal relationships, combined successfully.

  Questions and interest by the participants was lively and the course's success was supported by their written evaluations and indications of future interest. JIM KAST has received three requests for more information on the possibilities of picking up access to remote sensing capabilities through means of low cost remote terminal systems.

  All in all, each LARS staff member in contact with a short course participant can feel that his input contributed to an overall fine impression of LARS.

* Congratulations to CHRIS PARKER, undergraduate student working in Field Measurements, on his Agronomy Club award as the outstanding junior agronomy student.

Prepared by the Laboratory for Applications of Remote Sensing for distribution at Purdue. Contact Susan Ferringer, SCAN LINES editor, to be placed on the mailing list (749-2052, ext. 273).

PERSONNEL CHANGES

* Congratulations to PETE WILKINSON and NANCY ZIPPERIAN who are graduating this Spring. Nancy has obtained employment as a programmer with Zenith Corporation in Chicago. Pete will be going to sunny California after a brief stay with his parents in Detroit.

* JOHN GARNEY has gone home to E. Wenachee, Washington for the summer and expects to be back in August.

* Secretarial changes abound in both Flexlab I and II this month. In Flexlab I JOANN TINKLE, Ecosystems, is leaving to accompany her husband to his new job in California, and MELANIE SHROYER, Data Analysis, is leaving to accept a position in Staley's new team management group. To fill the gaps, JULIE HANOVER is back behind a typewriter afternoons this summer, and WANITA BOOTH will be helping temporarily.

* In Flexlab II TAMI THOMPSON is Technology Transfer's secretary while spending her summer vacation from Brigham Young University at home in West Lafayette.

* RON BOYD was promoted on April 1, 1977 and will continue in his duties as Remote Sensing Data Analyst and Training Specialist.

TRAVEL: SEMINARS & ADDRESSES

* DAVID LANDGREBE recently presented a paper at the IEEE Communication Theory Workshop on April 24 in Tucson, Arizona, as well as a talk at the IBM Scientific Center in Mexico City on May 9.

* DICK WEISMILLER and FRANK KIRSCHNER travelled to the University of Arizona from May 2-6 to present a seminar on soils research at LARS. They also met with DON POST and EMIL HORVATH, University of Arizona, the Bureau of Land Management (BLM), and the Soil Conservation Service (SCS) to compare field conditions to spectral maps in the general area of Safford, Arizona. These results will be used to determine the feasibility of rangeland mapping.

  Weismiller also travelled to Indianapolis on May 16 for a presentation to the Indiana Department of Natural Resources and to Chicago on May 19 to discuss the Great Lakes project results with the Environmental Protection Agency.

* FRANK KIRSCHNER, SUE KAMINSKI and ERIC HINZEL have returned from Jasper County, Indiana, where they were checking the accuracy of their soil parent-material maps during the week of May 9-13.

* Field Measurements staff have begun their summer data collection in Williston, North Dakota during May-August. CHRIS PARKER and DON CRECELIUS will be in North Dakota for the entire period, with the following people: LARRY BIEHL, MARV BAUER, LEROY SILVA, BARRETT ROBINSON, CRAIG DAUGHTRY, JOHN AHLRICHS, JOE SMITH, JOE WOJDA and VIC FLETCHER travelling to Williston at different intervals during the summer.

* PHIL SWAIN will visit remote sensing centers in Germany, France, Spain and Italy to assess remote sensing data processing technology abroad and to present various seminars during the period of May 14-28.

* Quarterly review time, May 24-26, will see BARBARA DAVIS, JIM KAST, TERRY PHILLIPS, MARION BAUMGARDNER, DAVE DEWITT and DAVE LANDGREBE travelling to NASA/JSC in Houston, Texas.

* JOHN PETERSON has been asked by the United States-Saudi Arabian Joint Commission on Economic Cooperation to serve as a senior scientist for approximately 6 weeks beginning June 1. He will be making a Soil and Land Use Vegetation map of Saudia Arabia on a mosaic of LANDSAT imagery at the scale of 1:1,000,000. He has also been asked to guide them in manual interpretations of LANDSAT, utilization of available equipment, advise on methods and procedure for collecting and using "ground truth data" and advise on the direction they should go in expanding their Remote Sensing program in the Ministry of Agriculture. Also working on the Soil and Land Use Vegetation map is an Agronomy graduate from Purdue, IVAL PERSINGER, a soil scientist with the Soil Conservation Service. He will be going to Saudia Arabia June 11 for 2 years. Both Mr. Persinger and Dr. Peterson will be involved in mapping the whole country from satellite data.

  In August Dr. Peterson has been invited to return as a consultant to the International Fertilizer Development Center in Florence, Alabama for 2 weeks. He will be consulting on problems in technology and management. The purpose of this center is to increase food production in the tropics.

  After returning from a summer of travel, Dr. Peterson has been invited to give one of the three principal addresses at the general session of the annual meeting of the American Society of Agronomy at Los Angeles, California in November 1977. The theme of the session will be "Agronomy in Today's Society".

  Dr. Peterson has also been selected by New Mexico State University as a Visiting Distinguished Professor during November 1977. He will be presenting seminars at New Mexico on University Research, Education, and Administration in the Land Grant System to undergraduate and graduate students and staff and on Remote Sensing in Agriculture. He will be meeting with Staff formally and informally on specific areas of crops and soils research and will be reviewing the progress in the Agronomy Ph.D. program. He will also counsel interested staff on international programs of study and research in Agronomic Science and counsel and advise on establishment of Ph.D. programs in the Agricultural Sciences.

CURRENT PROPOSALS

* LARS' NASA SR&T proposal is in the final stages prior to a six-month extension. The current eight tasks are being proposed in a consolidated form, as follows:

    1. Agricultural Scene Understanding
        - Field Measurements (both analysis and collection)
        - Continuation of the Thermal Band, Soils, and FAP projects
    2. Processing Technique Development
        - Technology Evaluation and Development
        - Scanner Parameter
    3. Large Area Agricultural Inventory Design

* TERRY PHILLIPS was recently asked to submit a proposal to Control Data Corporation (CDC) in Minneapolis, Minnesota, to determine how specialized remote sensing algorithms developed at LARS could best be mated with hardware developed at CDC.

  Should this four month project be funded, 20-30 LARS staff members would be involved in analyzing the capabilities LARS would provide, the capabilities CDC would provide and the potential users of this hybrid system.

* TERRY PHILLIPS and JIM KAST are submitting a proposal to Washington University, St. Louis, offering access to remote sensing capabilities through a low cost dial-up remote terminal system.

INFORMATION NOTES

120776 A Laser Technique for Characterizing the Geometry of Plant Canopies by V. C. Vanderbilt, L. F. Silva and M. E. Bauer.

A measurement technique is needed which is capable of providing timely information concerning the geometric characteristics of a vegetative canopy, the location and orientation of its foliage. Such data is required as input to many models for the radiation regime in a canopy. Therefore, this report

(1) proposes such a technique, designated the 'laser technique',
(2) demonstrates the feasibility of the technique, and
(3) offers suggestions for the implementation of the technique.

The work reported in this paper was sponsored by NASA under Contract No. NAS9-14016 and Contract No. NAS9-14970.

032977 Separability of Agricultural Cover Types by Remote Sensing in the Visible and Infrared Wavelength Regions by R. Kumar and L. F. Silva.

The purpose of the study was to determine the statistical separability of multispectral image data from agricultural cover types in 1 to 12 spectral channels. When four channels were used the spectral bands were distributed in visible, near and middle IR, and thermal wavelength regions for maximum separability. Cover type properties are used to explain the results.

The research reported in this paper was sponsored by NASA under Grant No. NGL 15-005-112.

052977 The Focus Series: A Collection of Single-Concept Remote Sensing Educational Materials by S. M. Davis.

The Focus Series has been developed to present basic remote sensing concepts in a simple concise way. Each pamphlet in the series is designed to illuminate a single concept through one page of concisely written text supported by illustrations. Issues currently available are collected in this Information Note.

The work reported in this paper was sponsored by NASA under Contract Numbers NAS9-14016, NAS9-14970 and Grant Number NGL 15-005-112.

042777 Disseminating Technological Information on Remote Sensing to Potential Users by J. D. Russell and J. C. Lindenlaub.

The Laboratory for Applications of Remote Sensing has developed materials and programs which range from short tutorial brochures to post-doctoral research programs which may span several years. To organize both the content and the instructional techniques, a matrix of instructional materials has been conceptualized. Each row in the matrix represents a subject area in remote sensing and each column in the matrix represents a different type of media or instructional strategy.

The research reported in this paper was sponsored by NASA under Contract Number NAS9-14970.

System Services May 20, 1977

LITER (YOU CAN USE THE VARIAN PLOTTER)

* As reported in a seminar by HOWARD GRAMS on May 5, software is now available for you to use to produce gray scale plots of unprocessed remote sensing data and of classification results. The programs are called *GDATA (a modified version of *PICTUREPRINT) and *GRESULTS (a modified version of *PRINTRESULTS). Both programs are available on the LARSYSDV system. Listings of control card inputs are also available via the REFERENC command in LARSYSDV; you should obtain copies before you try to run either program, and should make sure your copy is up to date as we make changes.

  When you run either *GDATA or *GRESULTS, be sure to send your printer output to LITER (just as you would for PHOTOQUAL). Be sure <u>not</u> to send punch output to LITER!!

  We hope to be able to print off all accumulated output for the Varian plotter once each day and send it to you in the mail. You can also obtain vector plots using the same procedure (i.e. output to LITER) if you have suitable software to run. Similarly, upper-and-lower case printer output is available.

  If you have any questions about plotting, or if you missed the seminar, you can contact HOWARD GRAMS for more information.

LITER (WHERE DO WE GO FROM HERE?)

* We would like to hear about problems with, or suggestions for, the plotting software that is available on a trial basis as of May 5. We already have a lengthy list of work that needs to be done to make plotter output more useful. Some of these (16 gray levels, a few more gray level patterns to choose from, and elimination of the fading of the last two inches of a gray plot) should be finished before this appears.

The outlook for further enhancements is less bright unless funding support for a programmer can be found. Among important areas that need work are providing gray patterns to allow a wider choice of scales (or even to make available completely arbitrary scales), and allowing for pixel sizes larger than 16 plotter nibs wide or high. Work also needs to be done to eliminate throughput bottlenecks and simplify operational procedures.

NEW INFOTON GTX TERMINALS

* Three new Infoton GTX terminals that were ordered to replace the three existing rented Hazeltine 1200 terminals have arrived and were placed in use on May 10. We believe that they will be more reliable and better-liked than the old Hazeltines.

NEW DIAL-UP PORT

* As mentioned last month, we are installing a third dial-up port for use with the TI portable terminals and other dial-up terminals. It is scheduled to be installed the week of May 9, so it should be in operation by the time you read this.

  All three ports are connected in "rotary" so that they can be reached by dialing the same telephone number. The first user who dials in will be connected to port 8F of the computer, the second user will be connected to port 8E, and the third user will reach port 8D.

SUMMARY OF 360/67 COMPUTER USE FOR APRIL 1977

* Usage of the computer system during April was down by 36% compared to March, and it was also down by 36% compared to last April.

We present the usual summary of possibly interesting statistics:

Overall Usage

Basic Rate CPU Time used	28.31 Hrs.
Priority Rate CPU Time used	151.03 Hrs.
Total CPU Time used	179.35 Hrs.
Terminal Sessions	3453
Batch Jobs	876

Batch Job Usage

Batch Machine	Jobs Run	Avg. Clock Time	Avg. CPU Time
BATQUICK	158	1.2 Min.	0.1 Min.
BATSHORT	278	9.8 Min.	0.8 Min.
BATMED	180	30.0 Min.	3.2 Min.
BATONITE	41	76.5 Min.	2.9 Min.
BATLONG	209	38.1 Min.	7.4 Min.

Local & Remote Terminals

Location	Cards Read	Lines Printed	Cards Punched
Flexlab2	13305 (2%)	522291 (97%)	5001 (1%)
Flexlab1	39630 (9%)	389963 (90%)	2780 (1%)
Houston	47446 (21%)	148997 (65%)	33803 (15%)
ISU	7855 (2%)	331926 (98%)	-
Wallops	67 (1%)	8993 (97%)	174 (2%)
Goddard	57 (0%)	122341 (100%)	0 (0%)

Keyboard Terminals

Location	Port	Terminal Type	Logins	Total Time in Use	Avg. Time Per Session
Comp. Room	78	2741	227	121 Hr.	0.53 Hr.
Flexlab2	7A	TI-735	120	130 Hr.	1.08 Hr.
Flexlab2	7B	Hazeltine 1200	190	248 Hr.	1.30 Hr.
Flexlab2	7C	Hazeltine 2000	306	251 Hr.	0.82 Hr.
Flexlab2	7D	2741	155	153 Hr.	0.99 Hr.
Flexlab2	7E	Infoton GTX	248	253 Hr.	1.02 Hr.
Flexlab2	7F	Hazeltine 1200	225	261 Hr.	1.16 Hr.
Flexlab1	80	Infoton GTX	225	228 Hr.	1.01 Hr.
Flexlab1	81	Hazeltine 1200	203	178 Hr.	0.88 Hr.
Flexlab1	85	2741	173	95 Hr.	0.55 Hr.
Flexlab1	86	2741	158	130 Hr.	0.82 Hr.
Dial-Up	8D,8E,8F		113	143 Hr.	1.27 Hr.
Houston	91,92,93		358	324 Hr.	0.91 Hr.
ISU	96,97		262	178 Hr.	0.68 Hr.

SCAN LINES

LARS · Purdue University · VOL. 2 · NO. 11 · June 17, 1977

ITEMS OF INTEREST

* The Fourth Annual Symposium on Machine Processing of Remotely Sensed Data will be held June 21-23 in the Stewart Center conference facilities.

  Complimentary registration is available to all Purdue personnel. Those planning to attend the symposium should obtain a program from their program leader, fill out the registration form and return it to the Continuing Education Business Office no later than Monday, June 20.

  To obtain complimentary registration write STAFF in the blank for "registration fee". To obtain a copy of the Proceedings (NOT included with registration) enclose $20. If you wish to attend the banquet (at the Trails) enclose $6.50.

  Campus mail may take anywhere from one to three days. In order to assure receipt of complimentary tickets it is suggested all registrations, especially those including a check, be hand-carried to Room 110 of Stewart Center no later than Monday, June 20.

* The Color Booklet; "Remote Sensing of Agriculture, Earth Resources and Man's Environment" has arrived and has been distributed as requested to specific persons both at and outside the University. Additional copies are available for Purdue staff from DAVIDA PARKS or BARBARA PRATT for $1.92. Anyone outside the University can obtain a copy for $2.56 plus postage and handling. Contact BARBARA PRATT for furthur information.

Prepared by the Laboratory for Applications of Remote Sensing for distribution at Purdue. Contact Susan Ferringer, SCAN LINES editor, to be placed on the mailing list (749-2052, ext. 273).

A slide set of the imagery contained in the booklet is also planned, and will be available in early July. To reserve your set, contact SUE FERRINGER.

PERSONNEL CHANGES

* The Field Measurements and Bilateral projects have gained two new graduate students: CHRISTINA STELLON, Statistics, and JEFFREY KILLENKARK, Agronomy. Both students will be working in the Crop Inventory Research Programs under MARVIN BAUER.

* IDA TENDAM joined LARS June 1 as Technology Transfer's new secretary. Ida, her husband and 8-year old son reside in West Lafayette.

  Flexlab I has two new secretaries, LISA AFANADOR who is working for Crop Inventory and KIM THOMPSON, Tami's sister, who is working temporarily for Ecosystems until she leaves for Brigham Young University in August. BEVERLY CARPENTER has transferred from Crop Inventory to Field Measurements.

* A welcome to SUSAN PHILLIPS who was recently hired as a Computer Operator Trainee. She has already been a big help in handling our keypunching load. A 1977 graduate of Harrison High School and recipient of the Senior Math award, Susan will be enrolled in Electrical Engineering at Purdue this Fall.

VISITORS

* RAY SINCLAIR visited FRANK KIRSCHNER and MARION BAUMGARDNER on May 26 to discuss manuscripts and the continuation of SCS personnel working at LARS. Mr. Sinclair also visited LARS on June 6 to review the progress of work in Jasper County.

* LARS recently hosted two visiting scientist on June 9 and 10. Drs. STANISLAW KOWALINSKI, Director of the Department of Soil Science, Agricultural University, Poland and JACK R. HARRIS, Senior Research Scientist, CSIRO-Division of Soils, South Australia visited with various personnel at LARS to discuss an overview of the laboratory's activities.

  Dr. Kowalinski is interested in micromorphology of soils, soil genesis and applications of remote sensing technology to soils studies. Dr. Harris is interested in relating health and vigor of cereal crops and intervening dryland pasture with soil type. He is presently using 70mm and 35mm oblique aerial photos to study crop, pasture and soil conditions.

TRAVEL: SEMINARS & ADDRESSES

* Summer is a busy time for the LACIE Field Measurements project. The collection of remote sensing and agronomic measurements on spring wheat canopies at the Williston, North Dakota Agriculture Experiment Station began the first week of June. CHRIS PARKER, DON CRECELIUS, and KEVIN HEALEY are spending their summer in residence at Williston. Measurements staff, LARRY BIEHL, BARRETT ROBINSON, JOE SMITH and JOE WODJA, along with Crop Inventory staff and students, CRAIG DAUGHTRY, MARVIN BAUER, JOHN AHLRICHS and JEFF KOLLENKARK will each be going to Williston for one or more missions.

  JOHN AHLRICHS and JEFF KOLLENKARK were also in Hand County, South Dakota, June 1-2, to make crop and soil observations and measurements for the Bilateral project.

* DAVID LANDGREBE was in Troy, New York and Washington D. C. from June 6-9. During his trip to New York Dr. Landgrebe visited with Rep. CHARLES MATHEWS about his bill before Congress on giving NASA an operational activity for the first time and how Universities would be utilized in this program. He also visited with Crop Spectra Workshop people.

  In Washington Dr. Landgrebe chaired a session at the IEEE Pattern Recognition & Image Processing Meeting and visited with NASA officials in Washington.

* June 15-17 MARION BAUMGARDNER participated in a meeting of the Committee on Desertification of the American Association for the Advancement of Science, Washington D. C.

* DICK WEISMILLER travelled to Jasonville June 7 to review the preliminary interpretation results of the Strip Mine project with JOHN ALLAN.

* BOB BAILEY recently attended a Conference on Environmentally Oriented Government Research held in Washington D. C. from June 4-9.

CURRENT PROPOSALS & PROJECTS FUNDED

* Several proposals have recently been submitted. Following are a list of these proposals and the principal personnel involved. Contact these personnel for more information.

  Thermal Interpretation - LEROY SILVA and DAVE DEWITT

  Assessment of Methods of Acquiring, Analyzing and Reporting Wheat Production Statistics - VIRGIL ANDERSON and MARION BAUMGARDNER

Water Resources - Spectral Characteristics and Turbidity - LUIS BARTOLUCCI and ROGER HOFFER

Extend Multi-image Classification Technology to the Thematic Mapper Era - PHIL SWAIN

Ancillary Data Registration in Forestry - ROGER HOFFER

Extension of Technical Coordination and Implementation of Remote Sensing Experiments for Analogous Vegetative Areas in the United States and the Soviet Union - MARVIN BAUER

Information Extraction Techniques for Multiple Data Types - PAUL ANUTA

Large Area Training and Classification - MARVIN BAUER, BARBARA DAVIS and MARILYN HIXSON

* Four proposals for the development of a low cost earth resources processing capability have also been submitted by TERRY PHILLIPS and JIM KAST.

RECENT ADDITIONS TO THE LIBRARY

* Contents from recently received periodicals are as follows:

IBM Systems Journal
Volume Sixteen | Number One | 1977

Contents The ITC Journal

IBM Systems Journal
Volume Sixteen | Number Two | 1977

PHOTOGRAMMETRIC ENGINEERING and REMOTE SENSING

Volume XLIII April 1977 *Number 4*

COVER PHOTO—LANDSAT multi-spectral scanner (MSS) images taken on two dates, 26 August 1973 (left) and 22 May 1974, showing normal water level and high water level of the Peace Athabasca Delta, Alberta, Canada. Courtesy of the Alberta Remote Sensing Center, Edmonton, Alberta.

TECHNICAL ARTICLES

PHOTOGRAMMETRIC ENGINEERING and REMOTE SENSING

Volume XLIII May 1977 *Number 5*

COVER PHOTO—Oblique view looking eastward at Telluride in southwestern Colorado. The San Juan Mountains in the background form a segment of the Continental Divide. The exposure was made on July 10, 1969, with a Zeiss RMK A 15/23 camera by Scharf and Associates of Denver. Photo submitted by Nelson, Haley, Patterson, and Quirk, Inc., Engineering Consultants of Greeley, Colorado.

TECHNICAL ARTICLES

INFORMATION NOTES

050377 A Short Course on Remote Sensing by B. M. Lube and J. D. Russell.

The article describes a monthly, week-long short course in the fundamentals of remote sensing. The individualized training program gives each participant a background in remote sensing, then provides actual practical applications tailored to his individual needs. The design and development of the workshop is described along with the various instructional components.

The research reported in this paper was sponsored by Continuing Education at Purdue University.

SYSTEM SERVICES June 17, 1977

DISK CRASH

* On June 6th, we experienced a disk head crash with our "old reliable" 2314 disks. The pack was copied to a tape on May 27th. As a result, we were able to recreate the pack as it was at that time. There were 48 user mini-disks on this pack that were affected. Any user alterations made between May 27 and the crash will have been lost for user disks on this pack. If your disk was involved, you will want to verify that you are not producing output with obsolete programs. You may contact BILL HOCKEMA or MIKE COLLINS if you wish to know if your disk was affected.

  Please remember that you should periodically back your disk up to tape. This is not only to guard against hardware failures, but also to guard against inadvertant human errors. See section 5.1 of the "LARS Computer User's Guide" for information on doing this.

SUMMARY OF 360/67 COMPUTER USE FOR MAY 1977

* Usage of the computer system during May was down by 19% compared to April, and it was also down by 32% compared to last May.

We present the usual summary of possibly interesting statistics:

Overall Usage -		
	Basic Rate CPU Time used	17.30 Hrs.
	Priority Rate CPU Time used	128.61 Hrs.
	Total CPU Time used	145.91 Hrs.
	Terminal Sessions	3374
	Batch Jobs	662

Batch Job Usage - Batch Machine	Jobs Run	Avg. Clock Time	Avg. CPU Time
BATQUICK	138	0.96 Min.	0.15 Min.
BATSHORT	246	11.50 Min.	1.45 Min.
BATMED	148	16.61 Min.	2.44 Min.
BATLONG	39	54.12 Min.	19.89 Min.
BATONITE	56	16.14 Min.	1.47 Min.

Local & Remote Terminals - Location	Cards Read	Lines Printed	Cards Punched
Flexlab2	19915	567868	3835
Flexlab1	44262	690642	7408
Houston	38278	274922	36406
ISU	22527	141434	0
Wallops	15176	78705	5251

Keyboard Terminals - Location	Port	Terminal Type	Logins	Total Time in Use	Avg. Time Per Session
Comp. Room	78	2741	234	77.90 Hr.	0.33 Hr.
Flexlab2	79	Hazeltine 1200	99	60.16 Hr.	0.61 Hr.
Flexlab2	7A	(various)	133	80.96 Hr.	0.61 Hr.
Flexlab2	7B	Hazeltine 1200	176	161.37 Hr.	0.92 Hr.
Flexlab2	7C	(various)	224	174.01 Hr.	0.78 Hr.
Flexlab2	7D	2741	109	95.69 Hr.	0.88 Hr.
Flexlab2	7E	Infoton GTX	318	271.51 Hr.	0.85 Hr.
Flexlab2	7F	(various)	272	273.34 Hr.	1.00 Hr.
Flexlab1	80	Infoton GTX	191	175.18 Hr.	0.92 Hr.
Flexlab1	81	(various)	172	154.97 Hr.	0.90 Hr.
Flexlab1	85	2741	128	91.54 Hr.	0.72 Hr.
Flexlab1	86	2741	140	75.90 Hr.	0.54 Hr.
Dial-Up	8D,8E,8F		76	84.34 Hr.	1.11 Hr.
Houston	91,92,93	(various)	286	267.31 Hr.	1.00 Hr.
ISU	96,97	(various)	151	84.17 Hr.	1.79 Hr.

SCAN LINES

LARS · Purdue University · VOL. 3 · NO. 1 · July 15, 1977

ITEMS OF INTEREST

* By early next year an excellent introductory textbook, Remote Sensing: The Quantitative Approach, will be on bookstore shelves, courtesy of McGraw-Hill International. Emphasizing computer processing of numerical remote sensing data, the textbook is authored by DAVE LANDGREBE, LEROY SILVA, PHIL SWAIN, TERRY PHILLIPS, ROGER HOFFER, SHIRLEY DAVIS and JOHN LINDENLAUB. Phil and Shirley coordinated the project and edited the text, which was shipped to the publisher in late June.

  The authors have copies of the complete text. Unfortunately, copyright restrictions will not permit general distribution of the manuscript, but the authors will lend you their copy for a short time.

  The authors would like to thank the many people throughout the lab, too numerous to list, who took their own time to contribute directly or indirectly to this work. The editors especially hope that when the book appears all LARSians will be able to feel that it is a credit to them and their own contribution to the remote sensing community.

* JOHN LINDENLAUB has received a preliminary program and Call for Papers for an upcoming open conference to be held in Toulouse, France on Earth Observation from Space and Management of Planetary Resources (OST). This conference is being sponsored by the EUROPEAN SPACE AGENCY and the CENTRE NATIONAL D'ETUDES SPATIALES on 6-10 March 1978.

Prepared by the Laboratory for Applications of Remote Sensing for distribution at Purdue. Contact Susan Ferringer, SCAN LINES editor, to be placed on the mailing list (749-2052, ext. 273).

Abstracts of 200-300 words are being accepted for consideration in three general sessions: (1) Survey of results obtained from observation of the earth from space, (2) Current and future programs and (3) Management of planetary resources: economic aspects; and in four specialized sessions: (1) Pattern recognition, (2) Basic physics of remote sensing, (3) Microwave techniques - technological and thematic aspects and (4) Visible and infra-red sensing techniques. For furthur information, contact Dr. Lindenlaub, ext. 271.

* An operational earth resources system is under consideration by the House Subcommittee on Space Science and Applications. DAVID LANDGREBE has just submitted written testimony favoring this step. A similiar step is under consideration in the Senate in the form of Senate Bill S. 657.

* A special issue of the IEEE Transactions, Geoscience Electronics is out (July issue) featuring PAUL ANUTA as guest editor and contributions by DAVE LANDGREBE and PHIL SWAIN.

* The April-May 1977 issue of Revista Economica (Economic Review) features a series of articles about the ongoing Bolivian LANDSAT projects at LARS. LUIS BARTOLUCCI authored an article entitled "Aplicaciones de la Tecnologia Aeroespacial en Bolivia." This article is a summary in non-technical language of remote sensing technology in general; application, to date, of satellite data in Bolivia; a brief description of LARSYS and computer-aided processing techniques, and the future of satellite data applications in Bolivia.

  CARLOS BROCKMANN also commented in his article, "Como Puede el Satelite LANDSAT Ayudar a Nuestro Desarrollo" about the success of the visiting scientist training programs and the resulting LANDSAT cover type map obtained at LARS with the assistance and coordination of Dr. Bartolucci.

* Slides of the color brochure are now available. Contact SUE FERRINGER to order your set.

* A new project, COMPREHENSIVE ASSISTANCE TO UNDERGRADUATE SCIENCE EDUCATION, sponsored by the National Science Foundation under the direction of JOHN LINDENLAUB, will be carried out within the Schools of Engineering. This project will establish a Center for Instructional Development in Engineering and will run from July 1, 1977 to November 30, 1980. In addition, it will fund several specific instructional development projects and support and encourage the use of innovative instructional approaches in engineering education.

PERSONNEL CHANGES

* BILL HOCKEMA is leaving LARS on July 21 to accept a position with Lafayette Automated Data Services, Inc.

VISITORS

* WYMAN HARRISON visited DAVE LANDGREBE on July 1 to become acquainted with LARS as the new Head of Geosciences (effective October 1). Dr. Landgrebe was also visited by PAUL MAUSEL on ISU terminal business and MICKEY TRICHEL and DICK HEYDORN on working out implementation plans for the SR&T Contract.

TRAVEL: SEMINARS & ADDRESSES

* PHIL SWAIN, LEROY SILVA, DAVE LANDGREBE and ROGER HOFFER participated in the University Space Research Association (USRA) peer review process for proposals in Houston, Texas, July 8-14. Dr. Hoffer chaired the Land Cover Panel, while Drs. Swain and Silva participated in the Systems Panel. Dr. Landgrebe is a member of the Board of Directors.

* On July 6-7 MARION BAUMGARDNER travelled to Washington D. C. to meet with R. M. MACDONALD at NASA Headquarters and the USDA to discuss the Food & Fiber project.

* JOHN LINDENLAUB attended the American Society of Engineering Educators annual conference, June 26-30, in Grand Forke, North Dakota. Dr. Lindenlaub chaired two sessions of the conference.

  He also attended the IEEE Technical Activities Board (TAB) meeting on July 11, 12 in Minneapolis, Minnesota. Dr. Lindenlaub is a member of TAB by virtue of the fact that he is President of the IEEE Education Group this year.

PROPOSALS & PROJECTS FUNDED

* BOLIVIA-3 - LUIS BARTOLUCCI, principal investigator, and PAUL SPENCER will assist the Bolivian LANDSAT program in the implementation of selected LARSYS processors in a DEC-10 computer under this three month project.

* INDIANA STATE UNIVERSITY REMOTE TERMINAL - A project funded by Indiana State University until June 30, 1978, to support a remote terminal. Principal Investigator is TERRY PHILLIPS, assisted by SUE SCHWINGENDORF.

INFORMATION NOTES

022575 ERTS Multispectral Image Transformations for Geological Lineament Enhancement by P. E. Anuta and B. Mobasseri.

The enhancement and detection of linear features in LANDSAT imagery is of interest in geological mapping. This report describes tests of gradient and laplacian transforms for lineament enhancement. A test site in central Nevada is evaluated using continuous and thresholded gradient and laplacian enhancement.

The research reported in this paper was sponsored by NASA under Grant No. NGL-15-005-112 and Contract No. NAS9-14016.

062177 Advancements in Machine-Assisted Analysis of Mulitspectral Data for Land Use Applications by P. H. Swain.

Results are reported of a three-year study participated in by the Laboratory for Applications of Remote Sensing of Purdue University, the Center for Advanced Computation of the University of Illinois, and the Geographic Applications Program of the U. S. Geological Survey. The outcome of the study has been a demonstration of the feasibility of applying digital analysis of satellite data to land use inventory and mapping. Advancements have been made in the areas of data analysis techniques, data processing products, and education and training of personnel within the potential user agency.

The research reported in this paper was sponsored by USGS under Contract No. 14-08-0001-14725.

System Services July 15, 1977

INFORMATION EXCHANGE SESSION

* HOWARD GRAMS will hold the next in his continuing series of informal discussion sessions on Thursday afternoon, July 28, at 3:00 p.m. in the Flex I Conference Room.

  If you have previously attended one of these sessions, you know that the format is informal. We talk about anything and everything you want to talk about (it helps if the subject relates to the computer hardware or software!) There will not be any prepared presentation; instead, the floor is open for you to ask questions, make suggestions, or air complaints about any subject you wish.

  Presumably there will be questions and discussion about the installation of the 370/148 (see below), and about the status of the LITER hardware and software.

  If you have not attended one of these sessions before, we especially invite you to come and spend a few minutes even if you cannot afford to stay for the entire session (which usually lasts for an hour or a little more).

FOR 2780/DATA-100 TERMINAL USERS

* You can now send a message directly to the computer operator from the card reader of a Data-100 or 2780. All you need is a single card with MSG CP punched in columns 1-6 and your message punched in columns 8-80. (Note that MSG cannot be abbreviated to M.) This card is to be read into the card reader all by itself - no ID card or no batch job header cards are needed. Your message will appear on the operator's console immediately, instead of 10-20 seconds (or more) later as required by the current rather clumsy procedure of running a short batch job in the BATQUICK batch machine to send a message to the computer operator.

LITER

* Usage of the Varian plotter has been quite heavy during the past month as more and more users experiment with it to evaluate its effectiveness. The standard procedure now is for an operator to begin running off plots each night beginning at midnight. There have been days where the machine was continuously busy from midnight until 4 pm the following afternoon and even then all the accumulated plot requests had not been completed. Obviously a problem area that seems to be developing is one of capacity - of the machine being able to produce all the output that it is asked to produce.

  One practice that has caused a large share of the problem is that of users requesting many multiple copies of their output. In most such cases this has been a reasonable thing to do, especially if such multiple copies are being sent outside of LARS to demonstrate our new capabilities and/or to support contract proposals or discussions. Unfortunately, if the overload situation continues, we may be forced into somehow limiting the practice of producing multiple copies. Your thoughts or ideas on the subject are welcome.

  It is certainly true that the throughput capacity of the machine can be appreciably increased if funds could be allocated to support such work. In addition, the capabilities of the software could be enhanced to meet special needs. Proposal writers, please take note!

  If you are interested in experimenting with pixel sizes (and hence, output scales) and/or gray tone patterns different from the standard ones currently available to the *GDATA and *GRESULTS programs, you are invited to contact HOWARD GRAMS for more information about how to proceed. Since only a new data file needs to be defined and created, one does not need to make any changes to the software and the procedure is relatively straight forward.

  We are aware of problems with the boundary feature of *GRESULTS, although as yet no sample decks have been received to allow us to investigate the problem.

NEW COMPUTER INSTALLATION

* As most readers are probably aware, we will be replacing the nearly-seven-year-old IBM 360/67 with a new IBM 370/148 system in September. You will find further information on the status of the conversion and installation effort in the following sections, and we will be presenting further information in the August newsletter. Watch for it! If you have any questions about the conversion, or about its possible impact on your own work, you are encouraged to call HOWARD GRAMS and/or to attend the Information Exchange Session scheduled for late July. (See above section.)

370/148 INSTALLATION SCHEDULE

* The 370/148 is currently scheduled to be shipped from the factory near Poughkeepsie, New York by September 2. After it arrives at LARS it will be assembled in the computer room and checked out. This process will not necessitate shutting down production on the 360/67.

  Production on the 360/67 will be shut down at 8:00 am Saturday morning September 17 and there will be no computer available for use during that weekend. By scheduling the installation for a weekend, we hope to minimize the inconvenience to most computer users.

  We plan to have the new 370/148 system in full operation by 8:00 A.M. on Thursday, September 22. If, due to unexpected problems, we do not have the IBM 370/148 available for full production by 8:00 A.M. on Thursday, September 22, then we will be back in production on the IBM 360/67 by that time, under our contingency plan. Under this plan, the IBM 360/67 would be available between 8:00 A.M. and 5:00 P.M. each working day for as long as necessary, while it would be down at night and on weekends to allow IBM to resolve the problems.

  There is a good chance that users of keyboard terminals may have access to the 148 system as early as Tuesday, September 20. Data-100 terminals and 2780 terminals may not be operational until a day or so later than that, since it is unlikely that we will be able to test the operation of the software that supports those terminals until our 148 is actually installed. In the same vein, it is possible that the Digital Display unit may not be operational until September 22 - or even later, since there is absolutely no way for us to test the operation of its software support and its hardware modifications until the 148 is actually installed.

  Apart from the software for supporting Data-100/2780 terminals and the digital display, we will be able to test all the other software prior to actual installation of our own machine. Some of this testing has already occured at the Administrative Data Processing Center on campus, and part will take place at an IBM Data Center in Chicago.

IMPACT OF NEW COMPUTER ON USER PROGRAMS (GENERAL INFORMATION)

* Although the 370/148 CPU will require a new operating system (called VM-370), it is a direct descendent of the CP-67 operating system we currently are running, and hence, very similar to it. In addition we will continue to use the exact same version of CMS we are using now to run in virtual machines. Hence, LARSYS Version 3 will run exactly as it does now -- we expect to make the procedure for logging in and running LARSYS jobs identical to that used now.

  In general, you can expect that any programs currently available to users and supported by the Applications Programming Group will still be available after the new computer is installed and they will still work the same way they did before.

  If you are a programmer who has your own programs, you will want to examine to see if they will require any changes before they run on the new machine. More information can be found later in the section entitled "Software Considerations for the New Computer."

IMPACT OF NEW COMPUTER ON KEYBOARD TERMINAL USERS

* The environment that a keyboard terminal user will see (whether at LARS or at a remote site) will be slightly different since the CP component of VM370 will differ slightly from CP67. However, these differences will be the obvious kinds of things (e.g. messages like "VM-370 ONLINE" instead of "CP-67 ONLINE", and slightly different formats of answers to CP function requests), and hence, are not expected to cause any problems.

  Since CMS/360 will be available and will be identical to the CMS used on the 360/67, users should see no re-learning problems in this area at all.

  Since LARSYS Version 3 is based on CMS/360, LARSYS users will also experience practically no changes in their accustomed environment.

IMPACT OF NEW COMPUTER ON DATA-100/2730 TERMINAL USERS

* The CP2780 software currently used to support the IBM 2780 and DATA-100 terminals will be retired. A new software component of VM-370, called RSCS, will take its place on the IBM 370/148. Among the advantages of RSCS to the user are several new capabilities, including:

  - If several printer and punch files are stacked up to come out, one can query and get a list of how many there are, who they belong to, how long each one is going to be, etc.
  - One can then re-arrange the order so that files come out in any desired order.
  - An output file can be purged before it even starts to be printed or punched.
  - An output file (say a printer file) can be stopped, and then restarted several pages back (in case forms get messed up or something) or several pages forward (in case one wants to skip printing the middle part but wants to print information at the end).
  - One can easily arrange for multiple copies of a file to be printed.

  The current capabilities of CP2780 will still be available, but the names and format of the control cards to invoke them will be changed. These are:

  - Cancel printing or punching of the current file.
  - Dry up and don't print or punch any more files after the current one is finished.

  In summary, a new and greatly enhanced control over what a remote terminal does will be available, and the new commands and procedures will need to be learned. However, this should not cause any inconvenience to users since instructions and documentation will be prepared as part of the conversion preparations.

WHY ARE WE INSTALLING A NEW COMPUTER, ANYWAY?

* There are many reasons that led to the decision to change computers - some of them long-term and some of them short-term. We mention here just a few of these:

  1. Although the 370/148 is less powerful than the 360/67, it is also slightly less costly. Since LARS does not expect to need any more computer power than the 148 can supply, and since we have been having trouble keeping the 67 busy enough to pay for itself, it makes sense to go to a less costly system.
  2. We expect improved hardware reliability from the technologically more advanced hardware of the 370/148.

The new storage technology is more reliable than the current core storage (besides requiring less power, cooling, and space). The machine operator's console (a weak spot and aggrevation on our current system) will be a fast, reliable CRT and associated matrix printer. Improved hardware reliability boils down to fewer system crashes per month and hence, reduced reruns, user inconvenience, and aggravation associated with each crash, no matter how brief it is.

3. The current bottleneck in disk storage space will be relieved. The 370/148 will provide LARS with 600 additional megabytes of disk storage capacity - thereby quadrupling the current capacity of 200 megabytes!

4. The system and user documentation available for VM370 is so much superior to that for CP67/CMS that it defies comparison. The sheer volume of documentation available is much greater; it is better written (it has to be since it is addressed to and used by a large user community); there is beginner's documentation as well as reference documentation. Good system documentation has important ramifications in terms of user and programmer training time and effort, and productivity once trained.

5. We will receive software support from IBM for the system's control programming - CP, CMS, terminal support software. This will free our own limited resources for other tasks.

6. A very considerable number of user and system capabilities and functions and miscellaneous software that are useful and needed (for example, accounting to disk) are available to us for free from other VM370 users via the SHARE organization. The basic reason they are available is because other users have needed them enough to implement them. Although few of these functions and capabilities are individually indispensible to us, collectively they represent a very valuable resource - especially compared to the extra time and effort required for us to do without them or to implement some of them ourselves. To our knowledge there are only six other installations in the country still running CP-67 - and all of them would migrate to 370's if they didn't own their machines. On the other hand, the VM370 user community numbers several hundred installations and is growing. Collectively they can have (and have had) considerable influence on IBM's direction and support. Together they are very helpful to each other in terms of sharing software, problems, ideas, and information. The

wheel turns rapidly and covers a lot of ground if it does not need to be continually re-invented.

7. In the 370 family there is ample room to expand capabilities or to contract capabilities. The range of available CPU's covers a processing capability perhaps 1/5 that of the 360/67 processor to perhaps 5 times it. Storage capabilities are nearly as broad. Changes require no software conversion. The 360/67 offers no such versatility. In principle, a second CPU could be installed - if there were space. One cannot go the other way. Maximum real storage and disk storage available now is severely restricted, and is too expensive to consider. (The only thing we really have enough of is CPU power.)

HOW POWERFUL IS THE 370/148 COMPARED TO THE 360/67?

* Last February, benchmark runs were made on a 370/148 at IBM's Washington Systems Center in Gaithersburg, MD. One of the goals of the benchmark runs was to evaluate the power of the 370/148 CPU compared to the 360/67 CPU for a number of representative and important LARSYS, reformatting, and other programs currently in use at LARS.

  The results were that, in general, the 370/148 shows up to best advantage in data manipulation types of jobs (e.g. reformatting, *PRINTRESULTS, *PICTUREPRINT), where its power is 65-100% of the 360/67. The 370/148 turns out to be less ideal for number crunching jobs (e.g. *CLASSIFY AND *CLUSTER), where its power is 42-45% of the 360/67. The overall average power of the 370/148 CPU turns out to be 71% of the power of the 360/67 CPU, as measured by a suitable weighted average of all the types of benchmark jobs run.

  The results of running combinations of up to 6 separate jobs at once show that the 370/148 can handle such loads (and presumably greater loads) more gracefully than the present 360/67 can. For example, 5 classifications running together gave 99% problem state - no degradation at all from 1 classification running by itself. Also, significantly, a geometric correction job running against a combination of 5 classifications and clusterings gave 98% CPU utilization. This should be compared with the fact that the 360/67 is not really able to run much of anything at all at the same time as it is running a geometric correction job.

  One thing that these results imply is that the rate that will be charged for an hour of CPU time on the 148 will be approximately 71% as much as it would have been for an hour of CPU time on the old 360/67 if we had kept that machine. On the other hand, since the average job will require 1/.71 = 1.4 times as many hours of CPU time to run on the 148 as it would have required to run on the 67, we see that on the average the change in CPU's will not have any direct influence on the cost of getting a given computing job done.

SOFTWARE CONSIDERATIONS FOR THE NEW COMPUTER

* Although the 370/148 CPU will require a new operating system (called VM-370) to replace our current CP67, it is a direct descendent of CP67, and hence, very similar to it. Although VM-370 also comes with its own version of CMS, at the beginning we will not use the new CMS, but will continue to run the current CMS in all our virtual machines.

  The use of the current CMS (hereafter called CMS/360) greatly simplifies the task of making LARSYS and our other supported programs operational on the 370, and it similarly simplifies your job of making your own programs operational on the 370.

  A little thought will convince one that the major difficulties involved in running CMS/360 under VM-370 are in the area where the program in the virtual machine interacts with CP itself - i.e. issues CP commands. These difficulties include:

  a) new names for old CP commands,
  b) modified syntax for CP commands,
  c) deletion of previously existing CP commands,
  d) different return codes or messages from CP commands.

  Although some users may have programs that issue CP commands from FORTRAN or ASSEMBLER routines, most likely all CP commands are issued from EXEC routines. Hence, the main area of concern is EXEC routines that include CP commands.

  We have made some modifications to CMS/360 itself to minimize these problems (for example, we will be translating 370 return codes into the corresponding 360 return codes), and we are also making modifications to VM-370 to minimize these problems (e.g. to define synonyms so that the old as well as the new names for most CP commands can be used). Because of those modifications, we will not need to make any changes to any of the EXEC files in LARSYS to make it run on the 370.

  Here is a list of the known incompatibilities that will remain between CP/67 and VM/370 CP commands. Note that few of these are the kind of commands likely to be found in user programs or EXEC files

CP/67 Command	VM/370 Equivalent
DISPLAY L-hexloc2	DISPLAY L0-hexloc2
DISPLAY T-hexloc2	DISPLAY T0-hexloc2
DISPLAY K-hexloc2	DISPLAY K0-hexloc2
DUMP L-hexloc2	DUMP L0-hexloc2
DUMP T-hexloc2	DUMP T0-hexloc2
DUMP K-hexloc2	DUMP K0-hexloc2
IPLSAVE xxx	IPL xxx NOCLEAR
LOGOUT xxx	LOGOUT HOLD
PSWRESTART	SYSTEM RESTART

CP/67 Command	VM/370 Equivalent
QUERY VIRTUAL CORE	QUERY VIRTUAL STORAGE
RESET	SYSTEM RESET
SET ADSTOP xxx	ADSTOP xxx
SET ADSTOP OFF	ADSTOP OFF
SET ATTN ON	TERMINAL ATTN ON
SET ATTN OFF	TERMINAL ATTN OFF
SET CARDSAVE ON	SPOOL READER HOLD
SET CARDSAVE OFF	SPOOL READER NOHOLD
SET TRACE devtype	TRACE type dev
SET TRACE OFF	TRACE type OFF
SET TRACE END	TRACE END
SPOOL xxx ON yyy	SPOOL yyy CLASS z
SPOOL xxx OFF	SPOOL xxx NOCONT

It is important to note that the minimum abbreviations of some CP commands may be different. It is strongly recommended that all CP commands be fully spelled out in programs or EXEC files. This is perhaps the most important consideration for you to keep in mind when you are examining your programs and EXEC files.

A limited number of well-defined test decks will be accepted from programmers to be run on the 370/148 at Chicago during the August test period. Such test decks should comprise a master EXEC file that can be invoked from a CMS terminal, and then run unattended. This master EXEC may call any other EXEC or TEXT files that are included in the test deck. The complete test deck will be read into a CMS disk using "offline read * * P1". Samples of the expected terminal output (and printer output if any) will need to be supplied with the test deck.

Any such test decks should be submitted to HOWARD GRAMS before August 20. Howard will be available for a reasonable amount of consulting concerning test deck preparation and submission.

SUMMARY OF 360/67 COMPUTER USE FOR JUNE 1977

* Usage of the computer system during June was up by 24% compared to May, but it was down by 10% compared to June last year.

We present the usual summary of possibly interesting statistics:

Overall Usage -		
	Basic Rate CPU Time used	20.43 Hrs.
	Priority Rate CPU Time used	161.05 Hrs.
	Total CPU Time used	181.48 Hrs.
	Terminal Sessions	3989
	Batch Jobs	703

Batch Job Usage - Batch Machine	Jobs Run	Avg. Clock Time	Avg. CPU Time
BATQUICK	126	1.1 Min.	0.1 Min.
BATSHORT	266	7.7 Min.	0.7 Min.
BATMED	164	41.8 Min.	7.1 Min.
BATONITE	57	14.0 Min.	1.5 Min.
BATLONG	72	38.1 Min.	13.2 Min.

Local & Remote Terminals - Location	Cards Read	Lines Printed	Cards Punched
Flexlab2	15292 (2%)	712040 (98%)	1402 (0%)
Flexlab1	41242 (5%)	806535 (95%)	4317 (1%)
Houston	71060 (16%)	327617 (74%)	41767 (9%)
ISU	12328 (5%)	221649 (95%)	-
Wallops	0 (0%)	2160 (100%)	0 (0%)

Keyboard Terminals - Location	Port	Terminal Type	Logins	Total Time in Use	Avg. Time Per Session
Comp. Room	78	2741	173	62 Hrs.	0.36 Hrs.
Flexlab2	79	Hazeltine 1200	199	132 Hrs.	0.66 Hrs.
Flexlab2	7A	Hazeltine 1200	115	76 Hrs.	0.66 Hrs.
Flexlab2	7B	Hazeltine 1200	171	153 Hrs.	0.89 Hrs.
Flexlab2	7C	Infoton GTX	278	246 Hrs.	0.88 Hrs.
Flexlab2	7D	2741	40	36 Hrs.	0.91 Hrs.
Flexlab2	7E	Infoton GTX	249	251 Hrs.	0.88 Hrs.
Flexlab2	7F	Infoton GTX	308	266 Hrs.	0.86 Hrs.
Flexlab1	80	Infoton GTX	300	207 Hrs.	0.69 Hrs.
Flexlab1	81	Infoton GTX	304	268 Hrs.	0.88 Hrs.
Flexlab1	85	2741	202	166 Hrs.	0.82 Hrs.
Flexlab1	86	2741	240	204 Hrs.	0.85 Hrs.
Dial-Up	8D	Third in Use	2	3 Hrs.	1.62 Hrs.
Dial-Up	8E	Second in Use	27	27 Hrs.	0.99 Hrs.
Dial-Up	8F	First in Use	84	87 Hrs.	1.04 Hrs.
Houston	91,92,93	(various)	519	356 Hrs.	0.69 Hrs.
Wallops	94	2741	9	49 Hrs.	5.41 Hrs.
ISU	96,97	(various)	342	163 Hrs.	0.48 Hrs.

SCAN LINES

LARS · Purdue University · VOL. 3 · NO. 2 · August 12, 1977

* LARS responded to a recent call for proposals from the NASA Office of Applications. Sixty-eight proposals were received from various research centers as a result of this request by the NASA Earth Resources Department, and of the 18 which were placed in Category I by a peer review group, four were from LARS.

* At the request of Congressman CHARLIE ROSE, DAVE LANDGREBE and MARION BAUMGARDNER made a television videotape for presentation to the House Agriculture Committee on the value and future of Remote Sensing to Agriculture.

* STEVE WHITSITT, graduate student under DAVE LANDGREBE and former LARSian from 1972-74, completed his final Ph.D. examination in Electrical Engineering on August 3. Dr. Whitsitt also gave a special LARS seminar, August 4, on "Error Estimation in Feature Selection."

* TERRY PHILLIPS was recently elected to senior-grade member of IEEE.

* A special issue of the IEEE Transactions, Geoscience Electronics, featuring PAUL ANUTA as guest editor and contributions by DAVE LANDGREBE, BILL SIMMONS and LARRY BIEHL, "An Empirical Study of Scanner System Parameters" and PHIL SWAIN and HANS HAUSKA,

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Prepared by the Laboratory for Applications of Remote Sensing for distribution at Purdue. Contact Susan Ferringer, SCAN LINES editor, to be placed on the mailing list (749-2052, ext. 273).

"Decision Tree Classifier: Design and Potential" is now available.

PERSONNEL CHANGES

* Changes in Flex Lab I and II include the following: KIM and TAMI THOMPSON will be leaving August 5 to attend Brigham Young University, Salt Lake City, Utah. Kim will be majoring in Civil Engineering while Tami will resume her studies in Drama Education.

  CATHY AXTELL will be leaving LARS on August 12 to attend Indiana University and major in Business. JULIE HANOVER is leaving her summer position as secretary at Flex I on August 26 to return to her studies at Purdue.

  CHRIS METTES joined the LARS clerical ranks on August 1 as secretary in the Ecosystems area.

* Two Computational Facility personnel have recently been promoted. MIKE COLLINS is now the Supervisor of Computer Operations responsible for all aspects of operations, which largely means keeping the hardware system running and providing dependable operators to serve computer users. Mike will be the local contact when users have a system problem. Mike replaces BILL HOCKEMA who joined LADS, Lafayette Automated Services, Inc., August 1.

  JEANNE ETHERIDGE has been promoted to Manager of Systems Analysis filling the vacancy created when BILL SIMMONS accepted a position for Electrical Engineering as Manager of their computer systems. The position that Jeanne is accepting has changed from an emphasis on Applications Systems, LARSYS Version 3.1, etc., to an emphasis on problem solving and project support. Her primary responsibilities will be to provide interface between the Computational Facility and sponsored projects and to assist in developing new projects to help support the Facility. She will also retain, within the group, the responsibility for minimal support of the existing Applications Systems.

* SCOTT AURENZ began working at LARS as a computer operator on July 5. He is a Freshman at Purdue and will major in Engineering.

TRAVEL: SEMINARS & ADDRESSES

* JOHN PETERSON has recently returned from seven weeks assignment with the United States/Saudia Arabia Joint Commission on Economic Development (JECOR). While in Saudia Arabia Dr. Peterson prepared recommendations for a three year program for

the Kingdom using Landsat data as an aid to mapping soils, vegetation, land use and water resources. Dr. Peterson worked closely with IVAL PERSINGER, who cooperated with LARS on the study of Missouri soils.

* Recent travel for DAVE LANDGREBE includes a trip to Denver, Colorado on July 19 to attend the USRA Board of Trustees Executive Committee Meeting. August 1, Dr. Landgrebe was in Washington D.C. to visit with JIM MORRISON and BILL STONEY at NASA Headquarters, and on August 2, Dr. Landgrebe travelled to Ottawa, Canada to present an invited seminar at the Canadian Center of Remote Sensing.

* PHIL SWAIN was kept busy on July 20, as registration chairman for the 1977 INDY MICROCOMPUTER SHOW. Over 850 computer professionals, students and hobbiests attended the show at the Indianapolis Holiday Inn East, viewing live exhibits by many computer companies and attending technical seminars. Based on the success of the 1976 and 1977 versions, the show is likely to be repeated in 1978, probably in larger quarters.

* FRANK KIRSCHNER is in Syria helping the Soil Conservation Service (SCS) to evaluate the Syrian government soil survey program until the middle of August.

* MARION BAUMGARDNER and DICK WEISMILLER attended the annual meetings of the Soil Conservation Society of America (SCSA) in Richmond, Virginia on August 8-11. Weismiller will be participating in the National Land Use Committee as well as the general sessions of the meetings. Dr. Baumgardner will give the opening address at the Plenary Session entitled: "Earth Resources, Computers, Satellites--Prospects for Century Three".

* PAUL SPENCER spent two weeks in LaPaz, Bolivia implementing the PICTUREPRINT and PRINTRESULTS processors on the DEC System 10 computer at the National Computing Center, CENACO for the Bolivian Landsat program.

  He also observed their Landsat programs and made recommendations to Dr. CARLOS BROCKMANN concerning future implementation of these LARSYS processors: CLUSTER, SEPARABILITY, CLASSIFYPOINTS and MERGE-STATISTICS.

* SUE SCHWINGENDORF and DONNA SCHOLZ will spend August 15-18 at Goddard Space Flight Center conducting an intensive training course on the LARS Remote Terminal System and LARSYS software usage.

VISITORS

* CHARLES MATHEWS, former Associate Administrator of the NASA Office of Applications, visited with DAVE LANDGREBE on July 28.

* On July 20, R. K. PETERSON, from Goodyear Aerospace, was hosted by PAUL ANUTA as he consulted with the Wallops Island radar registration study team and presented a seminar on synthetic aperture radar.

VISITING SCIENTISTS

* Two polish visiting scientist have begun their training at LARS under the sponsorship of MARION BAUMGARDNER and STEVE KRISTOF. ZBIGNIEW BOCHENEK and WALDEMAR MADEJ, from the Institute of Geodesy and Cartography, Warsaw, Poland will be at LARS for three months of training in the digital processing of multispectral data, including the analysis of a portion of a Landsat frame over an area west of Warsaw.

COMING ATTRACTIONS

* The famous SAMBO'S TIGERS plan to bowl again at Rose Lanes, 6:30 pm on Mondays this fall and spring. They field a seven man team, five "regulars" and two "subs". The "subs" are pretty busy, though, because of out-of-town commitments, etc., of the regulars. PHIL SWAIN, MIKE COLLINS, DOUG MORRISON, BILL SHELLEY, DAVE FREEMAN and KEITH SCHWINGENDORF make six. They need a seventh. Anyone interested in joining the Sambo's Tigers should contact PHIL SWAIN.

RECENT ACQUISITIONS IN THE LIBRARY

* A new publication from the ASCS is now available in the LARS Library. The Agricultural Stabilization and Conservation Service, Aerial Photography Field Office, has compiled, and will periodically update these two reference volumes.

    1. Comprehensive Listing of Aerial Photography
       July 1, 1975

    2. Aerial Photography Status Maps
       December 31, 1975

* The July 1977 issue of Photogrammetric Engineering and Remote Sensing, is now available. This issue differs from the usual format as it is a yearbook issue. Topics range from general information on the American Society of Photogrammetry to Membership, Awards and Citations, and Publications of the Society, to the text of the Opening Address: "Modern Land Data Systems--A National Objective" presented by W. A. RADLINSKI.

* A brief survey of the contents of the newest IBM Systems Journal, Volume 16, Number 2, 1977 are:

    The information management system IMS/VS
    Part I: General structure and operation
    W. C. McGee

    The information management system IMS/VS
    Part II: Data base facilities
    W. C. McGee

    The information management system IMS/VS
    Part III: Batch processing facilities
    W. C. McGee

    The information management system IMS/VS
    Part IV: Data communication facilities
    W. C. McGee

    The information management system IMS/VS
    Part V: Transaction processing facilities
    W. C. McGee

    A high performance DB/DC system
    J. E. Siwiec

INFORMATION NOTES

062277 Evaluation of Change Detection Techniques for Monitoring Coastal Zone Environments by R. A. Weismiller, S. J. Kristof, D. K. Scholz, P. E. Anuta, and S. M. Momin.

Development of satisfactory techniques for detecting change in coastal zone environments is required before operational monitoring procedures can be established. In an effort to meet this need a study was directed toward developing and evaluating different types of change detection techniques, based upon computer-aided analysis of LANDSAT multispectral scanner (MSS) data, to monitor these environments.

The research reported in this paper was sponsored by NASA under Contract No. NAS9-14016.

063077 Crop Identification and Area Estimation by Computer-Aided Analysis of Landsat Data by M. Bauer, M. Hixson, B. Davis and J. Etheridge.

This report describes the results of a study involving the use of computer-aided analysis techniques applied to Landsat MSS data for identification and area estimation of winter wheat in Kansas and corn and soybeans in Indiana. Key elements of the approach included use of aerial photography for classifier training, stratification of Landsat data and extension of training statistics to areas without training data, and classification of a systematic sample of pixels from each county. Major results and conclusions are: (1) Landsat data was adequate for accurate identification and area estimation of winter wheat in Kansas, but corn and soybean estimates for Indiana were less accurate; (2) computer-aided analysis techniques can be effectively used to extract crop identification information from Landsat MSS data, and (3) systematic sampling of entire counties made possible by computer classification methods resulted in very precise area estimates at county as well as district and state levels.

The research reported in this paper was sponsored by NASA under Contract No. NAS5-20793.

072277 The Decision Tree Classifier: Design and Potential
by P. H. Swain and H. Hauska.

This paper presents the basic concepts of a multistage classification strategy called the decision tree classifier. Two methods for designing decision trees are discussed and experimental results are reported. The relative advantages and disadvantages of each design method are considered. A spectrum of typical applications in remote sensing is noted.

The research reported in this paper was sponsored by NASA under Contract No. NAS9-14016 and Contract No. NAS9-14970.

System Services August 12, 1977

LITER

* MISCELLANEOUS INFORMATION On the whole, production of plotter output from LITER has been a pretty smooth operation during the past month. The occasional backlogs mentioned in this newsletter last month are no longer a serious problem. (Thank you for understanding the problem and helping to eliminate it.)

One interesting topic that has arisen again is that of the effect of humidity on plotter output. We recently discovered that sometimes it is difficult, or impossible, to put plotter output on the table digitizer and digitize coordinates from it. After some headscratching, we established that the problem is a humidity effect. When the humidity is high, the digitizer does not respond through the plotter paper. (The digitizer works on an electrostatic principle, sensing potential differences between the cursor and wires buried in the table surface.) If we dry the paper out somewhat, it again works quite well with the digitizer. (We have tried using a hairdryer after the paper is taped to the digitizer; that takes a long time to work very well. PHIL SWAIN suggested that we try using a photographic print dryer at Flexlabl, and that sounds like the ideal solution although we have not yet tried it.)

I have previously described the effect of humidity on the quality of the output produced by the Varian plotter -- when humidity is high we get very good quality output -- dark blacks, good contrast, etc. On the other hand, when it is very dry (such as last February) the quality is much poorer. The correct explanation of this effect is probably the following: The plotter works by passing the paper between a set of electrically charged nibs arranged on one side of the paper and an oppositely charged backplate on the other side of the paper. At each position on the paper, an electric charge is deposited if the point is to be plotted black, and no charge is deposited if the paper is to be left white. The paper subsequently passes through a liquid toner bath, containing pigment particles in suspension that are attracted to the places on the paper that have received electric charge. We can consider the special plotter paper as forming the dielectric of a capacitor, the plates of which consist of a nib and its corresponding backplate electrode. Since water has a very high dielectric constant,

paper containing a large amount of water (with its higher dielectric constant) is capable of accepting perhaps twice as many coulombs of charge at each point as is dry paper. And it is the magnitude of the electric charge deposited -- how many coulombs -- that determines how much pigment is attracted to the paper in the toning step.

So we need high humidity to make the plotter work best; we need low humidity to make that plotter output work well on the digitizer -- that's a problem that we may not be able to solve with software! I hope the photographic print dryer works out well!

* PLOTTER OUTPUT SCALES Users interested in knowing what the scale of output from the GDATA or GRESULTS programs is may be interested in the following information. (Remember that page 3 of the control card reference listings gives tables showing output scales for the standard pixel patterns. That information comes from the information discussed here.)

Basically the problem is to relate the size of a pixel on the plotter paper to the size of the same pixel on the earth's surface. For example, for uncorrected Landsat data, the pixel width is 57 meters. If we use the H7W5 pattern in the GDATA program we will produce a pixel on the plotter paper that is 5/200 of an inch wide. The pixel width on the paper is 5/200 inch x .0254 meters/inch = .000635 meters. The scale of the output is then the ratio of the pixel size on the ground (57 meters) to the pixel size on the paper (.000635 meters), or approximately 89,000:1.

The following two formulas express the relationship:

$$S = \frac{x}{.000127n} \qquad n = \frac{x}{.000127S}$$

In these formulas, x = the height (or width) of the pixel on the ground (measured in meters)

n = the height (or width) of the pixel on the plotter paper (measured in plotter nibs -- the dots that make up the plot)

S = the resulting scale

Plugging in the values from our example above, we have

$$89{,}000 \simeq \frac{57}{(.000127)(5)} \qquad 5 \simeq \frac{57}{(.000127(89000)}$$

What does all this imply if you are interested in producing a plot having some specific scale? You potentially have two parameters available to manipulate: the number of nibs or dots high and wide that you use for each pixel on the plotter

paper (although you have to keep the width in the right ratio to the height), and the width and height on the ground represented by each pixel. You can influence the ground size of each pixel by having the data geometrically corrected. And you can alter the number of nibs used for the width and height of each pixel by creating your own pixel definition files on your CMS disk so they can be used by the plotter programs. As mentioned, last month, details about how to do this can be obtained from HOWARD GRAMS.

Finally, speaking of creating your own pixel definition files, one of the neatest ideas I have seen lately was a user who created a special pixel definition file so that he could plot a results map with the GRESULTS program using symbols representing little trees, little waves of water, little houses, and so forth to represent his classes.

I'd like to encourage all users who have been experimenting with new pixel pattern definition files to consider submitting a copy of any file that you think might be generally useful to other people so that it could be included on the system disk and so that information about it could be included in the control card reference listings. After you've developed and debugged the patterns, and are happy with them, please send a copy to HOWARD GRAMS. (We'll give credit to originators when we put them into the system.)

TERMINALS

* PRINCETON Some of you may remember the Princeton graphics terminal that we acquired several years back. (Since it has been down for a long time and since we had until recently been unable to get the necessary part to try to repair it, some of the rest of you may never have seen it or heard of it!) When operational, the terminal is potentially capable of on-line display of graphics such as plots and even half-tone images on a CRT screen. At the moment, due to the impetus given by LARRY BIEHL, it is being worked on under the supervision of BARRETT ROBINSON by ANDY TEETZEL and JOE WOJDA. Although there is no assurance of success, there is considerable optimism.

* HARDWARE TIDBITS Until very recently, each remote terminal attached to the LARS computer has been attached using dedicated telephone lines leased from the phone company and used for no other purpose than servicing its attached terminal. Beginning in early July, however, the people at the Goddard remote terminal site have helped us pioneer the concept of using dial-up telephone connections for 2780-type terminals. Their 2780 now uses a special dial-up modem, and is attached to the system by an ordinary telephone call. Since the telephone call can be terminated when the 2780 is no longer needed, the total cost is much less that the cost of a dedicated phone line.

  Apart from some problems encountered a couple of weeks after initial installation, we have tentatively concluded that the arrangement seems to work quite well, and may indeed be well

suited for supporting other remote terminals in the future.

* Early in August we finally found and corrected a problem with one of the three modems that serve dial-up keyboard terminals such as the TI-735's. This intermittent problem had apparently gone unreported for some time, and then was reported nearly simultaneously by users here at LARS, at Houston, and at Goddard. The symptom that the unfortunate user encountered was that the call would be answered, the high-pitched beep would be heard, but then nothing would happen -- the terminal could not be made to work.

  It is perhaps worth restating that in the case of unusual hardware problems like that, it is important for a user to report it to MIKE COLLINS or HOWARD GRAMS so that it can be investigated. The problem just described apparently had existed for some time before we found out about it.

370/148 INSTALLATION SCHEDULE

* The schedule for the installation of the new 370/148 computer has not changed from that announced last month. At the moment there is every reason to believe that the machine will be shipped on time and installed on time.

  For your convenience, we repeat the schedule printed last month. The 370/148 will be shipped from the factory by September 2. We expect it to arrive at LARS sometime during the next week (the week following Labor Day). After it arrives, it will be assembled and checked out in the computer room. This process will not necessitate shutting down production on the 360/67.

  Production on the 360/67 will be shut down at 8:00 am Saturday morning, September 17 and there will be no computer available for use during that weekend. By scheduling the installation to take place over a weekend, we hope to minimize the inconvenience to most computer users.

  We plan to have the new system in full operation by 8:00 am on Thursday, September 22. If we are not able to get the new system into full operation by then due to unexpected problems, we will be back in production on the 360/67 at that time, using our contingency plan. Under this plan the 360/67 would be available between 8 am and 5 pm each working day for as long as necessary, while it would be down at night and on weekends to allow IBM to resolve the problems.

  There is a good chance that users of keyboard terminals may be able to log in to the 148 system as early as Tuesday, September 20. Data-100 terminals and 2780 terminals may not be completely operational until a day or so later than that, since we will not be able to test the software that supports them until after the 148 is actually installed.

* ATTENTION DIGITAL DISPLAY AND LITER USERS ! ! ! It is strongly suggested that if you have work to do on the digital display or if you have plotter printouts you need to get from the LITER system during the month of September, you should try to get as much as possible done before the 360/67 is shut down on September 17. There is the possibility that the digital display may be down for several days before we are able to make it work with the new system. Until the 148 actually gets here and is running, there is no way for us to test whether the hardware modifications that were made to the display work, and to test whether our software support for it works. At the present time, we do not plan to go back to the 67 under the contingency plan mentioned above if the only thing that does not work is the digital display. Hence, it is possible (but not probable) that the display may be unavailable until September 22, or even later.

  Essentially the same situation is in store for LITER. We know that a system software change will be required before plotter files can be passed from the 148 to LITER, and this software cannot be debugged until after the 148 is installed. Since LITER currently isn't a supported capability, we will have to give it a low priority, compared to getting other things to work (like remote terminals and the digital display). This means that there is a distinct possibility that LITER output may be unavailable for a week or so after the 360/67 goes down on September 17. Accordingly, if you need to get LITER plotter output, you will be safer if you can get it done before the 17th.

* INFORMATION EXCHANGE HOWARD GRAMS held the latest in his semi-regular series of question-and-answer sessions on Thursday, July 28. The turnout was gratifying. The majority of the discussion was devoted to questions about the 370/148 and the effect that its installation would have on users, programmers, and their programs.

  Watch for the announcement of a special seminar designed to acquaint computer users with the new 148. It will be held sometime in early September -- probably about two weeks before the new computer arrives. We will probably hold another informal information exchange session in October.

* USER TEST DECKS Do you have a program that you are not sure will run without change on the 148? If you would like to submit a test job deck, we will be happy to take it to Chicago and run it on a 370/148 during the August test period. Such a test deck could be an interactive job or a batch job (batch jobs are encouraged). In case of an interactive job to be run from a terminal, we strongly recommend that you make it as idiot-proof as possible (draw your own conclusions) by setting up an exec file to do everything possible. Consult with HOWARD GRAMS if you would like to submit a test deck.

(The sooner we receive it, the more likely it is that there will be time to run it for you.)

* BATCH MACHINES Question: Will the same batch machine set-up exist on the 148 as presently exists on the 67?

Answer: It sure will. All jobs will be read into the same controller machine (BATCH). BATCH will be able to answer the same questions about queues and positions as it does now. And batch jobs will continue to be run in the same individual batch machines as now (BATQUICK, BATSHORT, BATMED, BATONITE, and BATLONG). We will adjust the time limits for the individual batch machines to reflect the difference between a 148 CPU hour and a 67 CPU hour.

* CMS ON THE NEW COMPUTER As most of you are probably aware by now, two different versions of CMS will be available after the new computer is installed. The CMS we have all come to know and love during the past several years on the 360/67 will continue to be available. To alleviate confusion, we will henceforth, refer to it as CMS/360. (The letters CMS stand for "Cambridge Monitor System", in recognition of the fact that it was originally developed many years ago at Cambridge, Massachusetts.)

VM-370, of course, comes with a new version of CMS. This CMS is an outgrowth of CMS/360 -- updated and enhanced, with a lot of things made more coherent, more reasonable, and easier to understand and remember. Henceforth, we will refer to this new version of CMS as CMS/370. (For CMS/370, IBM, in all their infinite wisdom, decided it would be nicer to have the letters CMS stand for "Conversational Monitor System" instead of "Cambridge Monitor System.")

Since nearly everyone at LARS is used to CMS/360 and all our existing programs run with CMS/360, there is no reason for us to push the use of CMS/370. On the other hand, we do not want to discourage you from looking at CMS/370 or trying it out. In fact, it will be quite convenient for you to switch back and forth between CMS/360 and CMS/370 within the same terminal session by merely re-ipl'ing the system you want to use. If you are interested in CMS/370, watch for further information in a forthcoming issue of SCAN LINES. If there is sufficient interest, we will probably schedule some kind of introductory course on CMS/370, perhpas during the months of October or November.

* VM-370 DOCUMENTATION AVAILABLE One of the nice things about VM-370 is the amount and quality of the documentation that is available. We list below some of the most important user manuals. If you would like a copy of any of these manuals, you should contact MIKE COLLINS (extension 226). They are listed here more or less in order of importance for a general user.

- CP COMMAND REFERENCE FOR GENERAL USERS (GC20-1820)
  This manual contains an introduction to and description of the general concepts behind VM-370. It then contains a general introduction to the VM-370 Command language (structure

of commands, command environments, and the like. Finally, it contains detailed reference information about all of the CP commands available to general users.

This manual replaces the part of the old CP67/CMS User's Manual that describes CP commands. (You will still need to keep the old manual for its information about CMS/360.)

- QUICK GUIDE FOR USERS (GX20-1926)
  This handy, pocket-size book is a brief reference description of all VM-370 Commands for the General user (CMS/370 as well as CP.) It assumes only a limited prior knowledge of the system since it also contains an introductory section.
- REFERENCE SUMMARY - VM370 COMMANDS (GX20-1961)
  This is a fold-up reference card listing all VM-370 commands for the general user (CMS/370 as well as CP). It is very handy to have for reference while you are actually using a terminal, since it gives formats and parameters for all commands.
- SYSTEM MESSAGES (GC20-1808)
  This manual contains the text of all error messages and informative messages issued by VM-370, together with much supplementary information. Besides an explanation of the message itself, it tells what the system does in each case after issuing the message, and what you should do after receiving the message.
- CMS USER'S GUIDE (GC20-1819)
  This manual is written for applications programmers and nontechnical personnel who want to learn how to use CMS/370 to create and modify data files and programs, and to compile, test and debug programs under CMS/370. It is a tutorial manual, an introductory manual, the likes of which we have never had but have sorely needed for CMS/360.
- CMS COMMAND AND MACRO REFERENCE (GC20-1818)
  This manual contains detailed reference information about each CMS/370 command. It is equivalent to the CMS portion of the old CP67/CMS Users Manual.

* TELL ME ABOUT SOME OF THE NEW CP FEATURES The new CP part of VM-370 will be able to do all the things that we are used to doing with CP-67, and you will find that names and Syntax of CP-67 are very similar if not identical to their VM-370 counterparts. Some of the really nice features of VM-370 are in extensions to capabilities of the old CP commands, or in new CP commands to do things that you couldn't do before. We present here a brief potpourri to whet the appetite of experienced CP-67 users and programmers.

Problem: I'd like to use a CRT terminal, but I need a hard-copy of my terminal output.

Solution: Under VM-370 you can issue the CP command SPOOL CONSOLE START. After that, all input and output to your terminal will also be put into a special spool output file to be printed later on a line printer. You can

turn this off and on at will using the SPOOL CONSOLE STOP command. If you have been producing the hard copy file, and decide afterwards that you really don't want to have it printed, you can say SPOOL CONSOLE STOP PURGE to take care of it. You can have the system print the accumulated file up until the present time with SPOOL CONSOLE CLOSE. And there are many other variations on the theme. Pertinent commands to look under in the manual are SPOOL, CLOSE, and QUERY.

Problem: I'd like to get three copies of my printer output (or my console spooled output, or my punch output, etc.). It's an awful pain to have the operator repeat it the right number of times.

Solution: You can say SPOOL 00E COPY 3 before you start producing printer files (or SPOOL 009 COPY 3, etc.). Then after the file is closed, that many copies will be printed by the system automatically. Or if you wish, you can close the printer file with CLOSE 00E HOLD and then follow with a CHANGE command with the COPY 3 parameter and then a CHANGE command with the NOHOLD option to release the files. Again, there are several other variations on the same theme that you might want to experiment with. Pertinent commands to look at are SPOOL, CLOSE, CHANGE, QUERY.

Problem: I've been producing a printer file and now I decide I don't want it. What's the best way to get rid of it?

Solution: Use the CP command CLOSE 00E PURGE. (Again, there are several variations on the theme, for example CLOSE PRINTER PURGE.)

Problem: I have four reader files. I need to read the third one first. I don't want to purge them all and read them back in again.

Solution: No problem! There is a new CP command called ORDER that is just what the doctor ordered. (Groan!) It also works for printer and punch files.

Problem: I have four reader files. I want to get rid of the second one and keep the rest.

Solution: There is a version of the PURGE command that allows you to get rid of one or more files selectively, instead of all files.

Problem: Normally a virtual machine with 512K of storage is what I need, but occasionally I need 768K of storage.

Solution: We can set up the directory so that you normally get a 512K machine when you log in, but you can redefine your machine anytime you need to get more storage (up to a preset limit) using a CP command DEFINE STORAGE.

Problem: The system seems sluggish. How can I find out how heavy the load is? How can I find out how heavy my own program's contribution to the load is?

Solution: The new CP commands INDICATE LOAD and INDICATE USER can print out for you several measurements relevant to the question.

Problem: I wish CP wouldn't immediately log me off if the program issues a console read after I disconnect.

Solution: The new CP will wait for 15 minutes after a disconnected virtual machine issues a read to the console before logging it off.

Problem: Boy, it would be nice if you could issue the CP SLEEP command and specify some number of seconds or minutes or hours that you wish to wait, before having the program "wake-up" again after the time has elapsed and continue processing.

Solution: Now you can!

If you are interested in hearing more about these and other new features (they are available if you want to use them and can be ignored if you don't), be sure to come to the seminar that will be announced for early September. Or get a copy of the CP Command Reference manual ahead of time and just browse through it.

* DETAILED INFORMATION FOR DATA-100/2780 TERMINAL USERS In reading through the CP Command Reference Manual you will find references to RSCS in connection with using a 2780 type terminal. There is a RSCS User's Guide manual that is available; however, we do not recommend that you obtain a copy or spend too much time worrying about those procedures yet. We intend to make some changes in the procedures to simplify them, and we will be publishing a set of instructions for operating the terminals before the new machine gets here.

In reading the CP Command Reference Manual, you will note references to the use of SPOOL plus TAG commands to send files to 2780's. To make life simple, we are implementing a REMOTE command that takes the place of a TAG plus a SPOOL, and works just like the REMOTE command does under CP-67. (How about that?)

* THINGS THAT ARE NOT DESCRIBED IN THE REFERENCE MANUAL A few CP-67 commands that we have all gotten used to and that are contained in many existing exec files have different names or do not originally exist in VM-370. To keep life simple, we are implementing them into VM-370. These include:

- XFER is treated as a synonym for the new SPOOL command. (Syntax and effect are compatible with the XFER command of CP-67.)
- REMOTE is treated as a synonum for the new CP commands TAG plus SPOOL. (Again, Syntax and effect are compatible with the REMOTE command of CP-67.)

- M CP and MSG CP commands will be accepted for messages to the computer operator just like M OP and MSG OP as described in the VM-370 reference manual.
- There will be a QUERY REALUNIT command that acts just like the QUERY REALUNIT command of CP-67.

* Just as in CP-67 we have implemented a feature into VM-370 to allow labelling all output with the user's name (entered at login time). If you are reading the CP Command Reference Guide, you may be interested in knowing that we are using the "Distribution Code" field to contain the user's name. In addition, we will have available the commands SET NAME XXXXXXX and QUERY USERID NAME, just as we do in CP-67.

ORDERING LANDSAT DATA

* In spite of the lack of a formal support services data librarian, Landsat data and imagery may still be ordered for project managers through the reformatting group. All coordination for this effort can be completed by contacting KEN BROWN of the reformatting group on Monday, Wednesday, and Friday afternoons from 3 to 5 pm. If this time is inconvenient, please give the appropriate information (search request, Landsat scene identifier, products desired, project to be billed) to BILL SHELLEY or DAVE FREEMAN.

  Reformatting will appropriately change your master account for the products and services required. We intended, with this system, to better control the bulk tapes entering the Laboratory as well as satisfying the immediate data needs of LARS funded projects. Bulk tapes will be returned to their owners upon completion of reformatting unless other written instructions are provided.

NEEDING HELP WITH HARDWARE?

* If you have ever had a misfortune of experiencing a data-100, keypunch, terminal or other computer related problem and didn't know who to turn to, assistance is available. Those in Flexlab1 should contact BARB DAVIS who in turn will contact MIKE COLLINS at Flexlab2 for possible repair service. Problems at Flexlab2 should be reported to MIKE COLLINS directly as well as those at Flexlab1 if Barb cannot be reached. In the event neither Barb nor Mike can be reached, a message should be left with one of the computer operators on duty.

EXOSYS NEWS

* NANCY FUHS and JEANNE ETHERIDGE have been digging into the voluminous memorandums written by LARRY BIEHL and MARILYN HIXSON. These memos contain a thousand and one suggestions for changes to the EXOSYS system. The programming changes that have been made so far are:

    1) The option to suppress the rewinding of an EXOSYS data tape at $IDLIST REENTRY, $GSPEC REENTRY, and $DSEL REENTRY. To choose this option, simply add a
    $REWIND NO
    monitor card to your deck. A $REWIND YES monitor card turns off the option. Hopefully, this change, along with the use of the STOP parameter, will make EXOSYS runs much more efficient.

    2) The STOP parameter did not work properly; a STOP (15) would actually stop after run sequencer 16, so at re-entry time, run sequence 16 could not be used. This problem was corrected so that the combination of $REWIND and STOP could be used effectively.

    3) It seems that EXOSYS users feel that correct spelling is important. MAXIMIM is now spelled MAXIMUM and EXPERIMENTOR is EXPERIMENTER.

    4) In the IDLIST one-line listing, users working with agronomic data preferred to have the plot number, if it exists, printed out instead of the field number. If it does not exist, the field number should be printed. There is not enough room to print out both. In order to indicate whether a plot or field number is printed, a 'P' or 'F' follows the number.

    5) Users have strongly felt the need for some time now to be able to punch header information separately or concurrently with band means. The header information is required for use in statistical analysis of the data. Up until now, it had to be keypunched from $IDLIST printer output and combined with $DSEL punched decks of band means. With the volume of data for the Field Measurements project, keypunching and verifying would have taken an inordinate amount of valuable time. Marilyn and Vern decided upon a set of agronomic and a set of geometric variables that should be punched by $IDLIST and $DSEL. To request either one or both of these sets of punched cards, use
    OPTIONS AGRONOMIC and/or OPTIONS GEOMETRIC
    in either one of these processors. Cards containing the EXOSYS mnemonics for the variables and the format used to punch this header information are punched at the beginning of the deck. Variables that contain no data for a run are punched as 9999 for numeric data and blanks for alphanumeric data.

SUMMARY OF 360/67 COMPUTER USE FOR JULY 1977

* Usage of the computer system during July was down by 21% compared to June, and it was down by 12% compared to July last year.

We present the usual summary of possibly interesting statistics:

Overall Usage

Basic Rate CPU Time used	9.50 Hrs.
Priority Rate CPU Time used	133.24 Hrs.
Total CPU Time used	142.74 Hrs.
Terminal Sessions	3519
Batch Jobs	535

Batch Job Usage

Batch Machine	Jobs Run	Avg. Clock Time	Avg. CPU Time
BATQUICK	87	1.0 Min.	0.1 Min.
BATSHORT	214	8.8 Min.	0.7 Min.
BATMED	95	46.6 Min.	8.9 Min.
BATONITE	42	63.8 Min.	2.1 Min.
BATLONG	94	17.0 Min.	4.6 Min.

Local & Remote Terminals

Location	Cards Read	Lines Printed	Cards Punched
Flexlab2	14856 (2%)	648773 (96%)	9959 (1%)
Flexlab1	36611 (5%)	712009 (95%)	3902 (1%)
Houston	22759 (7%)	234685 (77%)	49177 (10%)
ISU	18088 (10%)	161336 (90%)	-
Wallops	0	0	0
Goddard	89 (1%)	6516 (99%)	0

Keyboard Terminals

Location	Port	Terminal Type	Logins	Total Time in Use	Avg. Time Per Session
Comp. Room	78	2741	180	74 Hrs.	0.41 Hrs.
Flexlab2	79	Hazeltine 1200	181	149 Hrs.	0.82 Hrs.
Flexlab2	7A	Hazeltine 1200	103	75 Hrs.	0.73 Hrs.
Flexlab2	7B	Hazeltine 1200	152	133 Hrs.	0.88 Hrs.
Flexlab2	7C	Infoton GTX	260	247 Hrs.	0.95 Hrs.
Flexlab2	7D	2741	75	62 Hrs.	0.82 Hrs.
Flexlab2	7E	Infoton GTX	239	225 Hrs.	0.94 Hrs.
Flexlab2	7F	Infoton GTX	209	284 Hrs.	1.36 Hrs.
Flexlab1	80	Infoton GTX	184	161 Hrs.	0.88 Hrs.
Flexlab1	81	Infoton GTX	297	255 Hrs.	0.86 Hrs.
Flexlab1	85	2741	223	135 Hrs.	0.61 Hrs.
Flexlab1	86	2741	149	118 Hrs.	0.79 Hrs.
Dial-Up	8D	Third in Use	4	15 Hrs.	3.75 Hrs.
Dial-Up	8E	Second in Use	33	51 Hrs.	1.53 Hrs.
Dial-Up	8F	First in Use	53	92 Hrs.	1.74 Hrs.
Houston	91,92,93	(various)	275	384 Hrs.	1.39 Hrs.
Wallops	94	2741	7	3 Hrs.	0.41 Hrs.
ISU	96,97	(various)	323	188 Hrs.	0.58 Hrs.

SCAN LINES

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TRAVEL: SEMINARS & ADDRESSES

* At the Agronomy Club sponsored exchange, September 3, between staff and students of Purdue University, University of Illinois, and University of Southern Illinois, DICK WEISMILLER presented a brief overview of remote sensing.

* DAVE LANDGREBE travelled to MacLean, Virginia, on September 8, to give a presentation to MARS, Inc. in the morning and then to tour the facilities of the U. S. Army Engineer Topographic Laboratories in Fort Belvoir, Virginia, in the afternoon.

* The SR&T quarterly project review was held on September 12-16, by NASA in Houston, Texas. LARS staff attending included MARVIN BAUER, BARBARA DAVIS, MARILYN HIXSON, and MARION BAUMGARDNER.

* PAUL ANUTA visited Santa Barbara, California, on September 12-15, to contribute to a panel discussion on future formats for earth imaging systems at a Geobase Information Systems Conference sponsored by NASA.

* On September 19, PHIL SWAIN presented a seminar in the University of Illinois Computer Science Department Colloquium Series. He discussed multi-image data analysis and pattern recognition as applied to earth resources.

Prepared by the Laboratory for Applications of Remote Sensing for distribution at Purdue. Contact Susan Ferringer, SCAN LINES editor, to be placed on the mailing list (749-2052, ext. 273).

* TERRY PHILLIPS and JIM KAST were in Minneapolis, Minnesota, from September 19-22 visiting CDC to evaluate the CDC CYBER/ICON system capabilities. They were joined on September 20, by ROYAL SAND, DAVE FREEMAN, BARBARA DAVIS, and PHIL SWAIN.

* JOHN LINDENLAUB will be in Chicago, Illinois, on September 23-25, to participate in a meeting of the IEEE Educational Activities Board.

* STEVE WHITSITT will present a paper entitled, "Error Estimation & Sample Design", by Drs. WHITSITT and DAVE LANDGREBE at the 1977 IEEE International Symposium on Information Theory in Ithaca, New York, on October 10-14.

* The School of Agriculture Committee on Remote Sensing appointed by Drs. BERNARD LISKA and ARVIN HILST held their first meeting at Flex II on September 6. The committee is comprised of the following: JOHN PETERSON, MARION BAUMGARDNER, MARVIN BAUER, WILLIAM MCFEE, DONALD PAARLBERG, MARSHALL MARTIN, ROBERT PEART, ROGER HOFFER, JOHN MOSER, DONALD HOLT, JOSEPH YAHNER, PAUL FARRIS, MASON CARTER, GERALD ISAACS, ELDON ORTMAN, and THOMAS HODGES. The committee is to make an assessment of remote sensing and to prepare a report on both the teaching and research potentials and possible programs.

VISITORS

* NICHOLAS SHORT and FRED GORDON, NASA-Goddard Space Flight Center, visited LARS Technology Transfer area on September 15-16, to review various educational and training materials.

* Visitors to the Ecosystems area included: CARLOS CALDERON, Director of Peru's National Agency for Space Studies, on September 7. ERNEST TOLIN, Engineering System Coordinator, and JOHN GREENWALD, both of the U. S. Forest Service, visited on August 29.

* Congressman FLOYD FITHIAN visited MARION BAUMGARDNER on August 12, to receive a briefing on present remote sensing projects in Indiana and the development of global information systems.

* GROVER TORBERT, Bureau of Land Management, visited LARS on August 17, to discuss the placement of BLM personnel here for graduate study at Purdue. DON POST and EMIL HORVATH, former LARSians now at the University of Arizona, also visited LARS.
Post was here August 16-17 to discuss the BLM project of setting up a remote terminal at the University of Arizona. Horvath worked on a classification study for BLM on August 15-19.

VISITING SCIENTISTS

* SHRI AMRENDRA N. SINGH, Scientific Assistant, National Remote

Sensing Agency of India, will be studying at LARS under the United Nations Development Project of the U. S. Department of Agriculture from September 7 - November 30, 1977. Mr. Singh will use Landsat and airborne multispectral scanner data for classifying and mapping soils, monitoring soil moisture, delineating saline/alkali soil areas, and crop identification and yield prediction. He will work under DICK WEISMILLER (sponsor) and STEVE KRISTOF.

NEW PROJECTS FUNDED

* DETERMINING THE CLIMATIC & GENETIC EFFECTS ON THE RELATIONSHIPS BETWEEN MULTISPECTRAL REFLECTANCE AND PHYSICAL/CHEMICAL PROPERTIES OF SOILS - This project is scheduled to begin in November with MARION BAUMGARDNER and DICK WEISMILLER as principal investigators. ERIC STONER, STEVE JORDAN, and TERRY WEST will also be working on this project which is sponsored by NASA - Office of Applications.

* BLM - WINKELMAN, ARIZONA - To determine the possibility of mapping the soils in arid regions. Sponsored by the Bureau of Land Management (BLM) until December 31, 1977. Personnel involved include DICK WEISMILLER, principal investigator, and LARRY HUMPHREY, a former short course participant.

* EXPERIMENTAL AGRICULTURAL DATA CENTER - Sponsored by Control Data Corporation (CDC), this project will determine how a CYBER/ICON system would be used as the nucleus of an Experimental Agricultural Data Center. Principal investigator is TERRY PHILLIPS, with other personnel including: JIM KAST, PHIL SWAIN, DAVE FREEMAN, BARBARA DAVIS, ROYAL SAND, SUE SCHWINGENDORF, and HOWARD GRAMS. Project duration is scheduled from August 22 to December 31, 1977.

* LARSYS IMPLEMENTATION - PHASE II - Implementation of SEPARABILITY and MERGESTATISTICS in a Bolivian DEC system 10 computer facility. LUIS BARTOLUCCI is principal investigator for this project sponsored by the Bolivian ERTS program. PAUL SPENCER is also working on this project.

  LARSYS IMPLEMENTATION - PHASE III - Implementation of CLUSTER and CLASSIFYPOINTS in a Bolivian DEC system 10 computer facility. LUIS BARTOLUCCI, principal investiagor, and PAUL SPENCER are also working on this portion of the Bolivian ERTS project.

RECENT ACQUISITIONS IN THE LIBRARY

* ITC Journal 1977-2 — A brief summary of the contents are as follows:

ITC Jubilee Speeches, December 17, 1976

ITC International Symposium 1976: Surveys for Development

Plotsize and stability of variance investigated in a tropical rainforest tract in East Kalimantan - Versteegh & Banyard

Developments in automation in cartography - van Zuylen

An integrated survey of the region Sousse, Tunisia - Nossin

INFORMATION NOTES

022277 A Mathematical Basis for the Detection of Jaundice by Skin Reflectance Analysis by E. J. Hanley.

The objective of this study is to provide a physical basis for the method of optically detecting jaundice. The skin is treated as a homogeneous scattering medium in which bilirubin is dispersed. The model determines in what manner the optical properties of the bilirubin affect the observed reflectance of the skin.

The research reported in this paper was supported by the National Institute of Health, National Institute of Arthiritis, Metabolism and Digestive Diseases, Grant Number 1 ROl AM18871-01.

LARS System Services 092377

ATTENTION USERS OF PLOTTER SUBROUTINES

* Programmers who use the plotter subroutines found in PLTLIB TXTLIB may be interested to know that PLTLIB TXTLIB has been moved from the LITER 199 disk to the CMS 190 disk (the S-disk). A link to LITER 199 is no longer required, and in fact the LITER 199 disk will disappear September 19.

  This affects users of GCS, who will need a new copy of GCS EXEC if they have not gotten one in the past few weeks.

  This does not affect users of the *GRESULTS or *GDATA programs.

LOGMESSAGES

* VM-370 has an improved logmessage facility compared to CP-67. Under CP-67 each time you would login, the system would type the whole logmessage, even if it were lengthy and even if you had just seen it an hour ago. Under VM-370, we have a two-level logmessage. Each time you login to the system, you are told the date and time the logmessage was last changed, and you see any part of the logmessage that has been flagged as important. If you wish to see the rest of the logmessage, you can do so by issuing the CP command QUERY LOGMSG.

BATCH MACHINE TIME LIMITS

* Because of the fact than an hour of 370/148 CPU time is not as powerful (on the average) as an hour of 360/67 CPU time (it also costs less), we have adjusted the previously published batch machine time limits, as given in the following table:

Batch Machine	New Time Limit	Old Time Limit
BATQUICK	1 min. CPU time	1 min. CPU time
BATSHORT	15 min. CPU time	10 min. CPU time
BATMED	45 min. CPU time	30 min. CPU time
BATONITE	30 min. CPU time	20 min. CPU time
BATLONG	500 min. CPU time	360 min. CPU time

As before, BATQUICK, BATSHORT, and BATMED are generally running any time the system is up. Expected turnaround time is relatively quick, and the priority service rate is charged. BATONITE and BATLONG are generally only run at night, and the priority service rate is not charged.

IPL CMS

* As most CMS users have already found out, one no longer gets CMS on the LARS computer by typing in the command IPL CMS. Instead you must indicate which version of CMS you want by typing either IPL CMS360 or IPL CMS370. The former is, of course, the same old CMS that we have come to know and use all these many years. It is expected that a brief seminar to introduce CMS370 will be scheduled sometime in the next month or so. (Priority for this will depend somewhat on the demand.)

  None of this affects the use of LARSYS, or LARSYSDV, etc. The LARSYS user still issues the command I LARSYS, for example.

SUPPLEMENTAL INFORMATION TO CP COMMAND REFERENCE MANUAL (GC20-1820)

* Defaults. Contrary to the information in the CP Command Reference Manual, the default mode for terminal operation will be TERMINAL MODE CP and TERMINAL ATTN OFF. We have chosen to change the defaults to these so that the default environment will match the environment that we are all used to from CP-67. A full discussion of TERMINAL MODE appears on pp. 13-16 of the manual, while information about TERMINAL ATTN is found on page 138.

  Equivalences. To ease the transition to VM-370 for users experienced in CP-67, we have implemented some new synonyms for CP commands into VM-370.

  1. XFER is a new synonym for the VM-370 SPOOL command, and it works the same way that XFER did under CP-67.
  2. REMOTE is a new synonym for the VM-370 commands TAG plus SPOOL. The command:

     REMOTE x TO nnnnnnnn

     is equivalent to the two commands:

     SPOOL x TO RSCS
     TAG DEV x nnnnnnnn

     The important thing is that REMOTE has the same effect under VM-370 that it did under CP-67.
  3. M CP or MSG CP is a new synonym for M OPERATOR or MSG OPERATOR.

New Commands. Some commands that were LARS additions to CP-67 have also been added to VM-370 so that you will continue to be able to use them.

1. QUERY REALUNIT
2. QUERY userid NAME
3. SET NAME nnnnnnnnn

HOW 2780's ARE HANDLED UNDER VM-370 - A BRIEF INTRODUCTION

* Under CP-67, you will recall, each 2780 or Data-100 terminal was associated with a separate disconnected virtual machine. For example, a virtual machine named FLEXLAB1 controlled all operation of the terminal at FLEXLAB1.

  Under VM-370, on the other hand, there is only one virtual machine to handle all of the terminals. This virtual machine is named RSCS, and it also normally runs disconnected. RSCS has separate links defined, with names like FLEXLAB1, HOUSTON, etc.

  On the one hand, this change will be transparent to users since the same REMOTE command will take care of details of transferring printer and punch output to a remote terminal.

  On the other hand, this change will be quite noticeable to the user in two ways. First, the physical details of operating the terminal are slightly different from before. (You will find full information posted on or near your terminal.) Secondly, RSCS will have a tendency to issue messages to inform you of its progress as it accepts, enqueues, and finally processes your output files. You will see these messages from RSCS on your own terminal.

HOW TO PRODUCE MULTIPLE COPIES OF PRINTER (OR PUNCH) FILES

* VM-370 provides a convenient way for the user to request and control production of multiple copies of output files. This means that it is no longer necessary for you to make special requests of the operator to repeat files.

  It is hoped that perhaps soon LARSYS and other applications software might be slightly modified to take advantage of this facility, but in the meantime, it is still very easy for you to go to CP mode and make the requests yourself.

  Question: Sounds great. What do I do to get 2 copies of printer output?

  Answer 1:
  1. Hit ATTN or BREAK to go to CP mode.
  2. Issue command SPOOL 00E COPY 2.
  3. Type BEGIN to go back to your program. Run your program.
  4. Hit ATTN or BREAK, then issue CP command SPOOL 00E COPY 1 to reset printer for normal single copy of output.

ANSWER 2: There's another easier way that does not ever require you to explicitly go to CP mode.
1. Enter the command #CP SPOOL 00E COPY 2.
2. Run your program.
3. Enter the command #CP SPOOL 00E COPY 1.

HOW TO PRODUCE A HARD COPY OF YOUR TERMINAL OUTPUT

* VM-370 allows a user to request a hard copy of his console or terminal output to be produced on the line printer. You can start and stop its production any time you wish.

Question: Just what I wanted. How do I do it?

Answer:
1. If not already there, go into CP mode by hitting ATTN or BREAK.
2. REMOTE 009 TO FLEXLAB1 (or wherever your printer is).
3. SPOOL 009 START.

Question: How to turn off the spooling?

Answer: Use CP command SPOOL 009 STOP.

Question: How to print what I have so far?

Answer: Use CP command SPOOL 009 CLOSE (or CLOSE 009).

Question: I asked for a hard copy of terminal output but now I don't need it. How can I get rid of it without printing it?

Answer: Use CP command CLOSE 009 PURGE.

As you probably concluded, the 009 in all of these commands is the virtual address of your terminal. Also note that if you want your output at the central computer site, you omit the REMOTE command.

Final closing remark: The default output class for spooled console output is CLASS A (not CLASS T as listed in the CP Command Reference Manual). This influences how and when it is printed, as described in the next section.

SPOOL FILE CLASSES - PRINTER OUTPUT

VM-370 allows you to assign a CLASS to your printer or punch files. The CLASS is a single letter (A through Z) or number (0 through 9). You can assign it (and change it) in a large variety of ways - using the CLASS option on the SPOOL, CHANGE, CLOSE, and other commands. If you do not assign anything, the default class is class A.

We will use this capability to simplify the procedure for you and for the computer operators when you want special printer file handling, or special color cards punched. (Of course the operations staff has no direct involvement over files printed or punched at a remote site.)

Any printer files you create will be processed according to the following table:

CLASS A - The printer will print CLASS A files at all times except when some other class is being processed.

CLASS F - The printer will use photo-quality paper to print all accumulated CLASS F output on the normal regular schedule, at 7:30 AM, 12:30 PM, and 4:30 PM. (Note that the same procedures previously used on the 67 to produce photo-quality output will work without change to produce CLASS F photo-quality output on the 148.

CLASS N - The printer will not produce CLASS N output except during the midnight to 8 AM shift. If you will use CLASS N for output you don't need until tomorrow, it will help alleviate congestion on the printer.

Question: If I produce printer output of a class different from those listed, when will it be printed?

Answer: Never. Before it can be printed, it is up to the owner of the file to change the class to one of those listed.

SPOOL FILE CLASSES - PUNCH OUTPUT

* The CLASS option will be used to control handling of punch output in the following way. If you do not do anything, CLASS A will be assigned by default.

CLASS A - The punch will punch CLASS A output on white cards.

CLASS Y - Yellow cards will be used for CLASS Y punch files.

CLASS O - Orange cards will be used for CLASS O punch files.

CLASS N - Brown cards will be used for CLASS N punch files.

CLASS E - Blue cards will be used for CLASS E punch files.

Again, the operations staff has no direct involvement over files printed or punched at a remote terminal site.

SPOOL FILE CLASSES - HOW DO I DO IT?

* Problem: OK, I'm a CMS360 user, and I want to punch one file on Yellow cards. How do I make it come out as Class Y, and then reset so that any later output is punched again on white cards?

  Solution: Issue the commands

```
CP SPOOL 00D CLASS Y
OFFLINE PUNCH filename  filetype
CP SPOOL 00D CLASS A
```

NOTE FOR VARIAN PLOTTER USERS

* A new version of the *GDATA program was put on-line in mid-August. The new version features much fancier histogram plots when you include the PRINT HIST control card in your control card deck. Also included is a table listing the data from which the histogram was derived. The histogram is plotted using the full vector-plotting capabilities of the Varian instead of using alphanumeric characters for the plot as before.

SUMMARY OF 360/67 COMPUTER USE FOR AUGUST 1977

* Usage of the computer system during August was up by 6% compared to July, and it was up by 15% compared to August last year.

We present the usual summary of possibly interesting statistics:

Overall Usage

Basic Rate CPU Time used	11.45 Hrs.
Priority Rate CPU Time used	139.48 Hrs.
Total CPU Time used	150.93 Hrs.
Terminal Sessions	3447
Batch Jobs	685

Batch Job Usage

Batch Machine	Jobs Run	Avg. Clock Time	Avg. CPU Time
BATQUICK	99	1.0 Min.	0.1 Min.
BATSHORT	307	7.4 Min.	0.8 Min.
BATMED	119	14.7 Min.	1.9 Min.
BATONITE	53	15.1 Min.	1.2 Min.
BATLONG	101	19.2 Min.	3.7 Min.

Local & Remote Terminals

Location	Cards Read	Lines Printed	Cards Punched
Flexlab2	19687 (3%)	552531 (96%)	3238 (1%)
Flexlab1	20766 (3%)	633360 (96%)	3174 (1%)
Houston	14638 (5%)	266759 (86%)	28887 (9%)
ISU	27830 (22%)	97269 (78%)	-
Wallops	2063 (9%)	21792 (90%)	261 (1%)
Goddard	3831 (11%)	29324 (87%)	591 (2%)

Keyboard Terminals

Location	Port	Terminal Type	Logins	Total Time in Use	Avg. Time Per Session
Comp. Room	78	2741	193	109 Hrs.	0.57 Hrs.
Flexlab2	79	Hazeltine 1200	173	175 Hrs.	1.01 Hrs.
Flexlab2	7A	Hazeltine 1200	118	95 Hrs.	.80 Hrs.
Flexlab2	7B	Hazeltine 1200	121	150 Hrs.	1.24 Hrs.
Flexlab2	7C	Infoton GTX	221	180 Hrs.	.82 Hrs.
Flexlab2	7D	2741	98	104 Hrs.	1.06 Hrs.
Flexlab2	7E	Infoton GTX	320	260 Hrs.	0.81 Hrs.
Flexlab2	7F	Infoton GTX	249	266 Hrs.	1.07 Hrs.
Flexlab1	80	Infoton GTX	329	244 Hrs.	0.74 Hrs.
Flexlab1	81	Infoton GTX	68	64 Hrs.	0.95 Hrs.
Flexlab1	85	2741	230	170 Hrs.	.74 Hrs.
Flexlab1	86	2741	211	169 Hrs.	.80 Hrs.
Dial-Up	8D	Third in Use	24	17 Hrs.	.73 Hrs.
Dial-UP	8E	Second in Use	69	57 Hrs.	.83 Hrs.
Dial-UP	8F	First in Use	110	96 Hrs.	.87 Hrs.
Houston	91,92,93	(various)	249	392 Hrs.	1.57 Hrs.
Wallops	94	2741	13	15 Hrs.	1.12 Hrs.
ISU	96,97	(various)	138	84 Hrs.	.61 Hrs.

Interlab Notes

ITEMS OF INTEREST

* A new graduate student in Geosciences will be working at LARS under DON LEVANDOWSKI and PAUL ANUTA. DAVID L'HEUREUX will conduct geophysical data analysis and applications research for the NSF grant in the data processing area.

* SUE FERRINGER is presently spending two half-days a week at Flex I. She can be contacted at her Flex I office (near the darkroom) TUESDAY MORNINGS and THRUSDAY AFTERNOONS. All other times Sue can be reached at ext. 215, Flex II.

* SHIRLEY DAVIS and family are now in residence in England until January 1978. Her address is:

  #6 High Street
  Eynsham, Oxford OX8 1HA
  England

* The name "Information Note" has now been officially changed on all published material. There are three categories of publications: (1) LARS Technical Reports, (2) LARS Reports, and (3) LARS Publications. Duplicating Form 26 now has these categories listed and it is up to the author to decide on the proper category. For further information contact JIM KAST.

SCAN LINES

LARS · Purdue University · VOL. 3 · NO. 4 · October 19, 1977

TRAVEL: SEMINARS & ADDRESSES

* MARV BAUER travelled to Washington D. C., September 28, to report on current project results and to plan analyses of field measurement data with NASA Headquarters' staff.

* Potential user's output products and the needs to be met by these products of remote sensing technology were discussed by TERRY PHILLIPS and representatives of Control Data Corporation (CDC). The meeting was held in Minneapolis, Minnesota on October 12.

* DAVE LANDGREBE will be attending a meeting of the USRA Board in Chicago, Illinois on October 26.

* JOHN LINDENLAUB will be attending two meetings in the near future: On October 23-26, he will attend the IEEE/ASEE sponsored 1977 Frontiers in Education Conference in Urbana, Illinois. On October 27-28, Lindenlaub will participate in the CAUSE Project Directors Conference of the National Science Foundation (NSF) to be held in Washington, D.C.

* EROS Data Center is the site of the Pecora III Symposium to be attended by DONNA SCHOLZ. This symposium will be held from October 31-November 2, and is co-sponsored by the American Association of Petroleum Geologists.

Prepared by the Laboratory for Applications of Remote Sensing for distribution at Purdue. Contact Susan Ferringer, SCAN LINES editor, to be placed on the mailing list (749-2052, ext. 273).

* DICK WEISMILLER travelled to the southwestern United States during October 10-14. He presented a seminar at the University of Arizona, at Tucson, to the Department of Soils, Water, and Engineering. While in Arizona he conducted field observations in the Winkelman area in connection with the Bureau of Land Management (BLM) project. Weismiller also discussed soils problems with the New Mexico state soil scientists in Albuquerque, New Mexico.

  Furthur travel for Weismiller will include a trip to St. Louis, Missouri, with DOUG MORRISON, on October 20-21, to participate in a workshop on remote sensing sponsored by the National Conference of State Legislatures, and a visit to Indianapolis, Indiana to brief the Indiana Legislature Joint Committee on Energy about land use conflicts in energy plant sitings.

* ROGER HOFFER and DICK MROCZYNSKI travelled to Jacksonville, Florida, on October 17-18, to meet with representatives of St. Regis concerning the upcoming project.

  Hoffer continued on to Little Rock, Arkansas, on October 19-20, to present a report to the Board of Directors of the American Society of Photogrammetry.

* DAVE LANDGREBE gave a seminar on October 22, to the EE 400 class entitled, "Electrical Engineers and Earth Resources", and another seminar to the EE 694 class entitled, "Observation of the Earth's Surface from Space: Where Do We Stand?"

VISITORS

* PAUL TRAVIS, Systems Analyst with CDC, visited with TERRY PHILLIPS on October 6, to discuss the cost of converting LARSYS to a Control Data computer.

* Visitors from NASA/JSC, KEITH HENDERSON and DON HENINGER, were at LARS on September 26-30, to work on proposal preparation and management with various departments on campus in gathering input for the Food & Fiber project.

* Dr. RICARDO ISLA-MARCO spent October 3-10, at LARS studying the fundamentals of remote sensing technology. His training was sponsored by the Inter-American Development Bank (IDB) as an aid in his role as project leader for ten scientists from Central America projected to spend several months in training at LARS beginning March 1978.

NEW PROJECTS FUNDED

* INVENTORYING NATURAL RESOURCES OF SAUDI ARABIA - JOHN PETERSON, principal investigator, will be working with the Saudi Arabian government and DONNA SCHOLZ and NANCY FUHS from October 1 - December 31, in preparing a gray-scale printout of 20 classes of spectral reflectance from the Wadi Dawasir area. This study will be used as an aid to IVAL PERSINGER's soil survey program.

* ST. REGIS - Principal investigator, DICK MROCZYNSKI, will be working on research under the Ecosystems program area with the following personnel: ROGER HOFFER, BUD GOODRICK, DAVE LANDGREBE, DONNA SCHOLZ, PAUL ANUTA, BARBARA DAVIS, and S. NOYER. This project is funded for 3 years.

INFORMATION NOTES

070777 The LARS Visiting Scientist Program by J. C. Lindenlaub and D. B. Morrison.

The LARS Visiting Scientist Program is described and illustrated by means of a number of example programs and a description of the types of services provided. Participant's qualifications and instructions for applying to the program are given, necessary financial arrangements are explained and advanced planning requirements are given. Appendices provide the reader with an advance planning check list, application form, guidelines for estimating costs and a listing of current visiting scientist rates.

082377 Error Estimation and Separability Measures in Feature Selection for Multiclass Pattern Recognition by S. J. Whitsitt and D. A. Landgrebe.

The ability to estimate pattern classifier error rates a priori is important in processing steps such as feature selection, algorithm and system design and other phases of information systems design and operation. This work reports several new results on this problem; these results include methods for reducing the variance in error estimation when Monte Carlo simulation techniques are used, the use of separability measures which approximate rather than bound the error rates, use of optimum linear reduction transforms, and empirical tests of these procedures.

The research reported in this paper was sponsored by NASA under Grant No. NGL 15-005-112.

082477 Comparing Soil Boundaries Delineated by Digital Analysis of Multispectral Scanner Data for High and Low Spatial Resolution Systems by S. J. Kristof M. F. Baumgardner, A. L. Zachary and E. R. Stoner.

Aircraft and Landsat data were used with computer-aided techniques to delineate soils patterns of a field of 40 hectars. The limited spatial resolution of the satellite scanner made difficult to delineate those soil features with widths less than the spatial resolution of the scanner. However, spatial resolution of the aircraft scanner was adequate to recognize each soil type boundary in the test site.

The work reported in this paper was sponsored by NASA under Contract No. NAS9-14016.

090177 A Case Study Using ECHO for Analysis of Multispectral Scanner Data by D. Scholz, J. Russell, J. Lindenlaub and P. Swain.

This Case Study is a component of the LARSYS Educational Package. It is designed to introduce the ECHO processing function which may be implemented on a variety of computer systems. The typical steps in the analysis of remotely-sensed data using ECHO are illustrated through discussion, an illustrative example and exercises. The exercises have been written for implementation of a computer using LARSYS: however, they may be modified for other analysis systems.

The work reported in this paper was sponsored by NASA under Contract No. NAS9-14970.

090677 Computer-Aided Analysis of Landsat Data for Surveying Texas Coastal Zone Environments by S. J. Kristof and R. A. Weismiller.

A study was conducted to determine the feasibility of using machine-aided processing of Landsat data to inventory environmental units within the Texas coastal zone. The analysis was conducted on Landsat data collected on November 27, 1972 and February 25, 1975 over the Matagorda Bay area of the Texas coastal estuarine system. The following terrestrial and aquatic environments were discriminated: alternating beach ridges, swales, sand dunes, beach birms, deflation surfaces, land-water interface, urban, spoil areas, fresh and salt water marshes, grass and woodland, recently burned or grazed areas, submerged vegetation and waterways.

The work reported in this paper was sponsored by NASA under Contracts NAS9-14016 and NAS9-14970.

090777 Land Use Classification of the Warsaw, Poland Area by Digital Analysis of Landsat Data by Z. T. Bochenek and W. A. Madej.

Landsat data collected over the central part of Poland were analyzed by computer-implemented techniques to evaluate the usefulness of these data for land-use classification. Several land use classes were identified with reasonably good accuracy. Computer-aided analysis proved to be useful in discrimination of many subclasses.

The work reported in this paper was sponsored by the Institute of Geodesy and Cartography, Warsaw, Poland.

Interlab Notes

ITEMS OF INTEREST

* Wheels are turning to present the Advanced Topics in the Analysis of Remote Sensing Data Short course in April 1978. Watch for the brochure to be mailed about November 1.

* The Annual Report to the University has been distributed. It contains contributions of LARS to professional and academic educational programs and scientific contributions of LARS in the field of remote sensing. Copies were delivered to the President, Provost, Executive Vice-President and Treasurer, Policy Committee, and the Management Committee.

* LARS RESEARCHERS: Paper or poster presentations for the ERIM Symposium in 1978 must be received in summary form by DR. COOK by December 1. This 12th International ERIM Symposium will be held in Manila, April 20-26, 1978.

* LARS short course/visiting scientist alumnus, PIERRE-MARIE ADRIEN, authored an article in the September 1977 issue of the IDB News on applying remote sensing techniques to developmental projects in Latin America.

PERSONNEL CHANGES

* BONNIE MISNER has transferred from the School of Aeronautics & Astronautics to fill the position of secretary of the Data Processing group at Flex I.

SCAN LINES

LARS · Purdue University · Vol. 3 · No. 5 · November 30, 1977

TRAVEL: SEMINARS AND ADDRESSES

* Several LARS staff members attended the American Society of Agronomy 1977 Annual Meetings held in Los Angeles, California, from November 13-18. JOHN PETERSON presented one of the keynote speeches at the general session entitled, "Agronomists and the Food Chain."

  Other papers authored by LARS personnel included the following (*indicates person presenting paper):

  "Relation of Crop Variables to the Multispectral Reflectance of Small Grains" by JOHN AHLRICHS*, CRAIG DAUGHTRY, and MARVIN BAUER

  "Determination of the Statistical Separability of the Relative Spectral Reflectances for Soil Drainage Classes" by ERIC HINZEL, SUE KAMINSKY*, FRANK KIRSCHNER, and MARION BAUMGARDNER

  "Assessment of Mapping Unit Composition by Digital Analysis of Landsat Data" by FRANK KIRSCHNER, SUE KAMINSKY*, ERIC HINZEL, H. SINCLAIR, and DICK WEISMILLER

Prepared by the Laboratory for Applications of Remote Sensing for distribution at Purdue. Contact Susan Ferringer, SCAN LINES editor, to be placed on the mailing list (749-2052, ext. 273).

"A Quantitative Comparison of Soil Delineations Produced by Digital Analysis of Landsat Spectral Data for Three Dates" by STEVE KRISTOF* and MARION BAUMGARDNER

"Applications of Machine Processed Satellite Data to Soil Survey Operations in the Arid Southwest" by EMIL HORVATH, DON POST, W. LUCAS, L. HUMPHREY, and DICK WEISMILLER

* JOHN PETERSON also travelled to Corvallis, Oregon, on November 8-11, to present soils seminars at the University of Oregon. Dr. Peterson then met with the Governor of Oregon and presented two seminars to state officials at the Oregon State House.

* MIDCON/77, IEEE Electronic Show and Convention, was held in Chicago, Illinois, on November 10. PHIL SWAIN chaired the session entitled, "Processing and Applications of Data from Satellite Based Remote Sensing." The following papers were presented and copies can be borrowed from Phil if interested.

  Application of Satellite-Based Microwave Observations of the Earth by JEROME ECKERMAN, NASA/Goddard Space Flight Center, Greenbelt, MD

  High Volume Digital Image Processing - Fact or Fiction by BERNARD PEAVEY, NASA/Goddard Space Flight Center, Greenbelt, MD

  Processing and Enhancement of Landsat Imagery by DAVID E. ULMER, U.S. Geological Survey, EROS Data Center, Sioux Falls, S.D.

  Lacie: A Proof of Concept Experiment in Global Crop Monitoring by R. B. MACDONALD and F. G. HALL, National Aeronautics and Space Administration, Lyndon B. Johnson Space Center, Houston, TX

* TERRY PHILLIPS, LUIS BARTOLUCCI, and PHIL SWAIN travelled to Minneapolis, Minnesota, on November 2, to present a progress report on the development of an earth resources data processing capability for the Control Data Corporation (CDC) project.

* Travel during the recent months for STEVE KRISTOF has been varied. On October 3-5, Dr. Kristof attended the International Symposium of Image Processing Interactions with Photogrammetry and Remote Sensing in Grax, Austria. He presented a paper, co-authored with DICK WEISMILLER, entitled, "Computer-Aided Analysis of Landsat Data for Surveying Texas Coastal Zone Environments."

  Steve also attended the American Society of Agronomy meetings in Los Angeles, California, and the joint Annual Meetings of the Indiana Academy of Science and the Junior Academy of Science in Indianapolis, Indiana, on October 27-28. He presented a paper entitled, "Applications of Satellite Remote Sensing Data for Mapping Vegetation" by STEVE KRISTOF and DICK WEISMILLER.

VISITORS

* MARION BAUMGARDNER and DAVE LANDGREBE met with Secretary of Agriculture BERGLAND during his recent campus visit. They discussed with him the need for future agricultural survey systems and acquainted him with the LARS programs in this area.

ITEMS OF INTEREST

* On display in Flex II are brochures about digital analysis capabilities and services for numerical remote sensing applications available from Industry. Companies such as CDC, ESL, and Comtal are included, with additional information to be posted as it is received. Copies of these brochures are also available in the Flex II Courtes Corner.

NEW TECHNICAL REPORTS

081777 Techniques for Estimating Scales and Areas for Landsat Data by Pierre-Marie Adrien and Vern Vanderbilt.

The report describes mathematically the scaling processes used in both the optical and digital techniques applied to Landsat data. The following numerical properties of each method are summarized as a function of scale in two tables: Landsat pixels/square centimeter of image, surface area represented by each square centimeter of image (in hectares, acres, and square kilometers), number of pixels represented by each displayed data point, and surface area represented by each displayed data point (in hectares, acres, and square kilometers).

The work reported in this paper was sponsored by the InterAmerican Development Bank under the Visiting Scientist Program.

092377 Soil Map Unit Composition Assessment by Digital Analysis of Landsat Data by F. R. Kirschner, S. A. Kaminsky, R. A. Weismiller, H. R. Sinclair, and E. J. Hinzel.

Digital analysis of Landsat MSS data collected June 9, 1973 was used to prepare a spectral soil map of a 430-hectare area in Clinton County, Indiana. Spectral identification of soil drainage characteristics enabled soil map units, inclusions, and complexes to be readily identified and quantified.

The work reported in this paper was sponsored by the National Aeronautics and Space Administration, Office of University Affairs under Grant NGL-15-005-186.

NEW LARS PUBLICATION

092177 Weismiller, R. A., and D. K. Scholz. A Satellite View of Indiana.

Indiana mosaic and narrative.

The work reported in this paper was sponsored by the National Aeronautics and Space Administration, Office of University Affairs under Grant NGL-15-005-186.

System Services 113077

THE 370/148 INSTALLATION - A LOOK BACK

* October marked the first full month of operation of the new 370/148 computer system. The system was installed on schedule during the weekend of September 17-18, and was up and running and available to all users as scheduled Monday morning, September 19.

  The first couple of weeks of operation of the new system were spent in tying together minor loose ends on the system software and in having IBM track down and eliminate some minor hardware problems. Throughout the month of October, we have been quite pleased with the performance and stability of the new system.

WHY NOT RECONSIDER RUNNING OVERNIGHT BATCH JOBS?

* Fact 1: As has been amply documented, the 370/148 is only 1/2 to 3/4 as powerful as the old 360/67 CPU. This sometimes leads to quite heavy loads during popular times of the day, such as Tuesday and Thursday afternoons.

  Fact 2: As you can see from looking at the summary on the last page, our overall system utilization has been very low. Although we averaged a CPU utilization of 41% during the daytime shift in October, we averaged only 20% utilization during the evening shift - and only 5% utilization during the midnight-to-8 AM shift!

  Solution!: Instead of sitting at a terminal and stewing because of slow response at 3 o'clock in the afternoon, why not put the job into the BATLONG or BATONITE batch machines and "leave the driving to us!"

YOUR NAME - WE'D LIKE TO USE IT

* As you no doubt know, the reason the system asks you to enter your name when you login is so it can use the name on your printer output, your punch output, and your plotter output.

  Plea: Please enter a full name - first name and last name. "Bob" really isn't complete enough to allow us to do a good job of getting plotter or printer output to you.

(Parenthetical suggestion for CMS users: If you include a line like

CP SET NAME JANE DOE

in your PROFILE EXEC, then you can type in a short form when logging in, and have it replaced by the full version when you ipl CMS).

RECENT CP MODIFICATIONS OR FIXES

* One early problem with VM370 was that if the computer operator happened to hit his ATTN key just as a message from a user (say a request to mount a tape) was beginning to come out, it would suppress printing the rest of the message. The result was numerous lost tape request messages. A fix to this problem was put on-line October 14. As a result of this fix, users will notice that there is a delay before their own terminal again unlocks for more input after sending a message to the operator. Your terminal will wait until the message has been successfully printed on the operator's console before you can do anything else. This may take several seconds in the event that the operator's console is already occupied (for example printing a message from some other user).

* An enhanced version of the TRANSFER command was put online during October. See below for more information.

RECENT CMS360 MODIFICATIONS OR FIXES

* The only serious problem that we encountered in running CMS360 under VM370 was one whereby a user's virtual machine would occasionally hang up and refuse to do anything - most commonly this would occur just after "ipl larsys". This problem was traced to a missing interrupt, and a fix was placed online October 14.

* A new version of TAPMOUNT is now online that accepts the optional parameter NOWAIT, which you can use if you just want to request the computer operator to mount the tape, but you want to be able to do something else in the meantime instead of waiting for the tape to become ready. An example of such a request might be

TAPMOUNT 865 TAP2 RI NOWAIT

RECENT RSCS MODIFICATIONS OR FIXES

* Of all the components of VM370, we have had the most headaches with RSCS. A considerable amount of effort was expended during October to fix problems with RSCS and to make RSCS able to talk to LITER (see next section). These

efforts have been quite productive - we have eliminated some annoyances, we have RSCS talking to LITER quite well, and we have made considerable progress in reducing the number of occasions where RSCS gets hung up talking to a terminal, and then RSCS gets the 3705 hung up, and then that gets CP hung up.

* On October 21, we put modifications to RSCS online to suppress the messages that originally were sent to all terminal users informing them whenever an output file had been accepted by RSCS and then informing them whenever the file had finished printing (or punching) on the remote 2780 or Data-100. This change was requested by many users - the messages were particularly annoying to users of 2741 terminals.

* On October 30, we put a modification to RSCS online to add additional information to the response to the QUERY XXXX QUEUE command card that can be read into a 2780 or Data-100 card reader. The DMTCMX6S5I messages now include all of the following information for each file that is queued up to be printed or punched on the remote terminal.

    a. The file ID number (spoolid)
    b. The link for which it is queued (same as XXXXX on the QUERY command)
    c. The word SYSTEM
    d. The output class (usually CL A)
    e. The priority (usually PR 99)
    f. The number of lines or cards (REC xxxxxxxx)
    g. Whether it is active (A) or in-queue (I). Active means presently coming out or trying to come out
    h. Whether it is a printer (PRT) or punch (PUN) file
    i. How many copies (COPY xx)
    j. Whether the file is in HOLD status or not (HOLD means that user put it in hold status, ----means that is not hold)
    k. The ID that created the file
    l. The name of the user who owns the file

  This expanded information from the query command makes possible more intelligent use of other RSCS commands such as FLUSH, PURGE or CHANGE.

* You will find more information about using RSCS commands a few pages later.

* Remaining RSCS Problems/Annoyances

    - The response to nearly all commands also includes (at the end) the misleading line ID CARD MISSING ON LINK XXXXXXXX -- INPUT FILE PURGED
    - RSCS does not recognize all formats of ID cards (hopefully fixed by the time you read this).
    - SIGNON card should be unnecessary, except for dial-up 2780's.
    - RSCS should be less prone to "getting hung up".

LITER

* There have been no procedural changes for users of the *GDATA and *GRESULTS programs, or for users of GCS. Just as on the old 360/67, a user would send his output to LITER, using either the PRINT LITER command of LARSYS, or the CP command REMOTE 00E TO LITER, or the BATCH OUTPUT LITER control card of a batch job. Output sent to LITER in this way is plotted by the computer operations staff on an overnight basis, and the plots returned to users the next morning.

  If you want multiple copies of a plot, you should use the COPY nn option of the SPOOL command before your file is sent to LITER.

* On the other hand, procedures used by people who use the PDP-11 themselves to receive or send digitizer data to the 370 or receive plotter data from the 370 have changed a great deal. Any previously authorized users of the PDP-11 who want to do those kinds of things again should check with HOWARD GRAMS before doing so. In particular, LITERDV has been abolished. A user who would have used LITERDV before now sends his files to LITER, but he creates them to be some output class other than CLASS A or CLASS 0 (zero). The operations staff is instructed to process all CLASS A files that are sent to LITER and to leave all other files to be processed by their respective owners.

ADDITIONAL DIAL-UP PORTS

* If you've been a user of the dial-up ports into the LARS computer, in recent weeks you've no doubt been often frustrated to dial-up and find that no ports are free. A number of users at Houston are now making very heavy use of dial-up ports. When added to the usage we already had, the original three ports were overwhelmed. GOOD NEWS, though. During October we installed two more such ports, raising the total to five. That should help, but things may still be a bit tight for a while.

ON BEING DISCONNECTED FROM THE SYSTEM

* There are several ways a logged-on user can be disconnected from the system:

  a. The user issues a DISCONNECT command
  b. A glitch on the telephone line causes a dial-up user to be disconnected
  c. A 3705 problem causes all users to be disconnected

After you are disconnected, you have a 15-minute grace period to log back in and reconnect. If you do reconnect within that time interval, you can go back to whatever you were doing. Therefore, if you ever find yourself mysteriously disconnected, or if the system has apparently crashed, you should pay close attention when you log back on. If the system says

RECONNECT AT XX:XX:XX

then all you should do is type BEGIN and go back to whatever you were doing. If the system says

LOGON AT XX:XX:XX

then you will have to start over by re-ipling.

ENHANCED TRANSFER COMMAND

We have installed a new version of the TRANSFER command that is completely compatible with the original IBM command, but that has two new optional operands added to it. These allow a user to specify which queue (PRT or PUN or RDR) is to be searched for the specified file(s), and also which queue (PRT or PUN or RDR) the files are to be transferred to. Both operands can be omitted, in which case they default to RDR, making the command identical to the original IBM command. Only the following combinations are valid:

1) 'RDR' type files may be transferred to a RDR queue
2) 'PRT' and 'CON' type files may be transferred to a RDR or PRT queue
3) 'PUN' type files may be transferred to a RDR or PUN queue

The enhanced format of the TRANSFER command is as follows:

```
                                      { FROM    { userid }        }
TRANSFER   [RDR]   { spoolid }        {         { ALL    }        }
           [PRT]   { CLASS c }        {                           }
           [PCH]   { ALL     }        {                  [RDR]    }
                                      { [TO]   userid    [PRT]    }
                                      {                  [PCH]    }
```

Example 1: You have a printer file that has been sent to RSCS to be printed on the FLEXLAB2 Data-100. You want to retrieve it, and have it printed instead on the computer printer

TRANSFER 1749 FROM RSCS
TRANSFER RDR 1749 TO SP2 PRT

The file will now be printed at the computer site. (In this and the following examples, if your own ID isn't SP2, then use your own ID instead of SP2 in the command)

Example 2: You may have XFERED a printer file into your own card reader, then changed your mind and decided you wanted to print it after all.

```
QUERY READER    (to find spoolid of PRT type
                 file)
TRANSFER RDR 1738 TO SP2 PRT
```

The file will now be printed at the computer site.

Example 3: Same as above, but you want to print it at the FLEXLAB1 Data-100:

```
QUERY READER    (to find spoolid of the PRT
                 type file)
TAG FILE 1743 FLEXLAB1
TRANSFER RDR 1743 TO RSCS
```

Example 4: You have created a printer file that is set to be printed in the computer room. You want to retrieve it and send it to be printed on the FLEXLAB2 Data-100.

```
QUERY PRINTER   (to find spoolid of PRT file)
TRANSFER PRT 1827 TO SP2 RDR
TAG FILE 1827 FLEXLAB2
TRANSFER RDR 1827 TO RSCS
```

CMS370 INFORMATION

* The following information may be helpful for persons interested in trying out some of the features of CMS370. It supplements the information found in the IBM Documentation (see August Scan Lines, pg. 14-15).

a. The CMS370 S-disk is at address 290. If it is not already attached to your virtual machine, you can link to it using the command:

```
LINK LARSLIB 290 290 RR
```

You can have a permanent directory entry made so that you will always have it when you log in - see MIKE COLLINS. After you have a 290 disk attached, you can IPL CMS370.

b. If you have a PROFILE EXEC on your 191 disk, it probably contains CMS360 EXEC commands that are not compatible with CMS370. This problem can be solved by structuring your EXEC as in this example:

```
&COMMENT FOLLOWING CODE IS VALID FOR EITHER
&COMMENT CMS360 OR CMS370
    CP SET EMSG ON
    CP REMOTE 9 TO XXXXXXXX
    .
    .
    .
&COMMENT NOW WE MUST BRANCH, DEPENDING ON WHICH
&COMMENT VERSION OF CMS
    &IF  X&DISKS EQ XCMS &GOTO  -CMS370
```

```
-CMS360 &TYPEOUT OFF
   EXEC WHERE
   LOGIN XXX X
   &EXIT
-CMS370 &CONTROL OFF
   ACCESS XXX X
   GLOBAL MACLIB CMSLIB
   GLOBAL TXTLIB FORTRAN CMSLIB
   FILEDEF 5 READER
   FILEDEF 6 PRINTER (RECFM FA)
   FILEDEF 7 PUNCH
      :
&COMMENT FOLLOWING DEFINES ; AS TAB CHARACTER FOR
&COMMENT EDITOR
   SET INPUT ; 05
   &EXIT
```

Note that prefix is needed for carriage control if control characters are interpreted.

c. We have installed the same Fortran G compiler on CMS370 that we had on CMS360. You can invoke it the same way, namely FORTRAN filename. If you type FORTRAN ? you can get a list of options available.

d. To execute Fortran programs you need to issue FILEDEF's for all I/O units used by the program - including units 5, 6, 7, 15 and 16. If you do not issue a FILEDEF for any unit, it defaults to disk. You may want to include suitable default FILEDEF's in your PROFILE EXEC. Also, unlike CMS360, FILEDEF's are not cleared after execution of a Fortran program.

e. Unlike CMS360, there are no default GLOBALs. This means that you must issue the command GLOBAL TXTLIB FORTRAN CMSLIB before you can execute a Fortran program. You may want to include that GLOBAL in your PROFILE EXEC also.

f. Text decks that have been compiled under one version of CMS can be used under the other version of CMS. However, MODULE's and TXTLIB's are not compatible.

g. The programs TAPMOUNT, GETDISK and BACKUP are presently available under CMS370, and work the same as their CMS360 counterparts. (However, the heading of listings produced by BACKUP is not as complete as it is for the CMS360 version.

h. We have installed an enhanced version of LISTFILE that was written at the University of Maine and obtained through SHARE (an IBM computer user's organization). This version of LISTFILE can do everything that the standard IBM version can do, and in addition, it has numerous additional options to provide expanded capabilities:

   - File Sorting. Default sort is by filetype, filename. Other sorts include creation date, time and block/record counts (filesize). The sort can be in ascending or descending order.

- Creation date selection allows specification of a file created within a range of dates. BEFORE, AFTER, FROM and THROUGH options may be specified alone or together.
- PREFIX/SUFFIX options allow users control of the number of &1 &2 EXEC-type tokens to either precede or follow output if creating file CMS EXEC.
- Most uses of asterisks in file specifications are now allowed - e.g. *001, or ABC*, or A*01.

You can obtain full information on the expanded LISTFILE command by using the CMS370 command PRINT LISTFILE DOCUMENT S or TYPE LISTFILE DOCUMENT S.

i. The CMS370 editor has no TABDEF command. You can use the SET INPUT command (in CMS environment, not EDIT environment) to define a logical tab character as follows:

```
SET INPUT $ 05
```

(This defines $ to be the logical tab character).

j. If you expect to do any conversion of CMS360 programs or EXEC files into CMS370, you should request a copy of a 16-page information sheet entitled "Appendix E: Compatibility of CM/370 with CP-67/CMS". The sheets are available from HOWARD GRAMS, and are worth their weight in gold.

To get you started:

CMS360 Command	CMS370 Command
alter	rename
combine	copyfile
login	access
offline print	print
offline read	readcard
printf	type
stat p	query disk a
stat ?	query search

RSCS COMMANDS FOR DATA-100 AND 2780 USERS

* A user at a Data-100 or 2780 terminal site can make use of a number of commands that can be read into the card reader. In most cases, these commands will produce printed output (or at least a confirmation message) on the line printer. These commands can be read in at any time. The printer output will be produced (nearly) immediately unless a file is currently being printed, in which case it will wait until the current file finishes.

* Note that all of these RSCS commands must be input from the card reader. They cannot be input to a keyboard terminal you are logged in at.

* It should not be necessary to point out that some of the capabilities described below should only be exercised using good judgement, paying full attention to the interests of the other users at your terminal site. For example, good sense dictates that you not purge or change characteristics of files belonging to other users. "Do unto others as you would have them do unto you."

Situation	Command Card
•You want to terminate printing or punching the file that is currently coming out. Note: Leave out the ALL if you want to terminate only the current copy of a multiple-copy file. Note: FLUSH only works for the file currently active. Use PURGE to get rid of a file that hasn't started to come out yet.	FLUSH * ALL
•You want to terminate printing or punching the current file, but want to save the file so it can later be started over. Note: Later, when you want to restart the file, use the CHANGE spoolid NOHOLD command.	FLUSH * ALL HOLD
•You want to backspace the current printer (or punch) file nnn pages (or cards).	BACKSPACE nnnn
•You want to backspace back to the beginning of the current printer (or punch file).	BACKSPACE FILE
•You want to skip forward in the current printer (or punch) file by nnn pages (or cards).	FWDSPACE nnn
•You want to send a message to the computer operator Note: To send a message to any logged-in user's terminal, replace CP with the user's ID.	MSG COMPUTER CP message-text
•You want to send a message to be printed on the printer of a Data-100 or 2780 terminal (for example at Houston).	MESSAGE HOUSTON message-text
•You want to obtain a listing of all the files in the queue to be printed or punched at your Data-100 or 2780 terminal (for example at Flexlab1) Note 1: See item about RSCS modifications (a few pages back) for a description of the information listed for each file.	QUERY FLEXLAB1 QUEUE

Situation	Command Card
Note 2: The active file (if any) is listed at the bottom, while the rest of the list is in the order in which the files will be produced, with the first one being listed at the top.	
●You want to change one or more of the attributes of a file listed by the QUERY XXXXXX QUEUE command. Note 1: The "spoolid" is listed for the file on the output from the QUERY command. Note 2: More than one item can be included on the same command card. Note 3: Priority 99 is the system default and is lowest priority. Highest priority is 0. Note 4: If a file was in HOLD status when created and sent to RSCS, this is the only way it can be unheld.	CHANGE spoolid COPY nn CHANGE spoolid CLASS c CHANGE spoolid PRIORITY nn CHANGE spoolid HOLD CHANGE spoolid NOHOLD
●You want to change the order in which files will be printed (or punched). Note 1: The "spoolids" are listed on the output from the QUERY command. Note 2: The files you mention will be moved to the top of the queue so they will come out first, in order.	ORDER spoolid1 spoolid2 spoolid3.....
●You want to get rid of a file before it is printed or punched. Note 1: PURGE only works for files that are not active. If the file is listed as active, you use the FLUSH command to get rid of it. Note 2: You can list more than one file on the same PURGE command.	PURGE spoolid

THE AGONY AND THE ECSTASY

* It happened again. On Tuesday, November 8, we had yet another crash of one of our aging 2314 disks. About a dozen users' disks were lost this time, but because of our new program of weekly backup, we were able to restore two-thirds of the users' disks that were on that pack.

* As we have been promising, now that we have the VM370 software, we have been able to institute a standard practice of backing up all disks to tape at least once a week. This will allow us a better chance to recover whenever we have a disk crash. In addition, a user who accidentally destroys his own disk files can contact HOWARD GRAMS and we will probably be able to recover the files as of the last backup.

APPLICATIONS NEWS FROM JEANNE ETHERIDGE

* LARSYS If you are going to run the PHOTO or COLRCHRT programs, use LARSYSDV for a while longer. A minor change was made to correctly detect whether or not the digital display is attached to your virtual machine. The problem has occurred since the IBM 370 was installed.

* BILL SHELLEY repaired GLPRINTRESULTS in LARSYSDV so that the total number of points classified and the percentage of points in each class are correct. This problem also appeared since the 370 installation. MIKE FLEMING ran across this one.

* SALEEM MOMIN discovered that the control card reference file for the DESIGN processor on LARSYSDV is incorrect. He will be sending me an edited copy so that the file can be updated.

* BUD GOODRICK, when working with someone during the "Hands-On" for the Monthly Short Course, found that a class can be inserted into more than one pool since LARSYS does not check for this error. Be aware of this until it is corrected.

* You may or may not know that CLUSTER on LARSYSDV has a control card that allows you to replace the characters "NS" that appear as the first two characters of class names when field cards or a statistics deck is punched. The control card begins with the keyword IDNAME. Check the CLUSTER control card references file for more information. You should find this helpful if you have more than one statistics deck, run MERGESTATISTICS, and then run SEPARABILITY.

* EXOSYS Changes were made to DSEL and GSPEC so that two decimal places were printed for data run statistics and no E-type format is used for the numbers.

  Also, in DSEL, three minor problems were corrected. If there were over a certain number of wavelength bands selected, an extra page with only header information was printed. The second problem was the intermittent absence of the class name when the statistics were printed. Thirdly, the new feature to punch agronomic header information was not working correctly.

* UNSUPPORTED LIBRARY BARB DAVIS and PHIL SWAIN have suggested that there be a user program library which would make available the wide variety of data handling, data analysis, and display capabilities which have been developed by individuals at LARS. A goal would be to facilitate communication among system users about these capabilities, both to increase their usefulness and to avoid duplication of programming effort. Any program that was written for a specific project but will be or could be used by future projects should be put in a library rather than just passed along from one userid to another.

One candidate that I know of is a program written by JIM KAST for the Forestry Applications project. Input to the program is a LARSYS results tape. Output is a tape which is used by the CALCOMP plotter on campus. The plotter outlines sets of points belonging to the same class, labels each outlined area with a symbol specified by the user, and prints a legend.

I have decided that the Unsupported Library, which has existed since April 1969, is a suitable place for user programs. The documentation is minimal and the programs are stored on magnetic tape. A student named DAVID A. LANDGREBE contributed his "Angular Prolate Spheroidal Function" program to the library in December 1969. There are also some programs written for the corn blight experiment. Some of the programs, like the tape dump routine, are now part of the supported program library.

If you are using or have written a program that you feel should become part of this user library, give me a call or come over to discuss it with me. I will be willing to help you write the minimal documentation by advising, editing and/or revising. I will publicize additions to the library in Scan Lines and issue updates to the documentation. I will also periodically remind you in Scan Lines that the library is available for your contributions. If it becomes active enough, I would consider placing some of the programs on disk so that they can be more easily accessed.

SUMMARY OF 370/148 COMPUTER USAGE FOR OCTOBER, 1977

Overall Usage -		
	Basic Rate CPU time used	2.59 Hrs.
	Priority Rate CPU Time used	114.98 Hrs.
	Total CPU Time used	117.56 Hrs.
	Terminal Sessions	3146
	Batch Jobs	364

Usage by Time of Day - Time Period	Hours of CPU Used	Average Percent CPU Utilization
Mon-Fri midnite-8AM	8.26	5%
Mon-Fri 8AM - 4PM	65.76	41%
Mon-Fri 4PM - midnite	32.69	20%
Weekend	10.84	8%

Batch Job Usage - Batch Machine	Jobs Run	Avg. Clock Time	Avg. CPU Time
BATQUICK	47	1.1 Min.	0.2 Min.
BATSHORT	199	6.6 Min.	0.6 Min.
BATMED	67	25.8 Min.	4.8 Min.
BATONITE	25	33.8 Min.	0.7 Min.
BATLONG	25	19.9 Min.	5.4 Min.

Keyboard Terminals - Location	Port	Terminal Type	Logins	Total Time in Use	Avg. Time Per Section
Flexlab2	30	Hazeltine 1200	85	80.4 Hrs.	0.95 Hrs.
Flexlab2	31	Hazeltine 1200	139	117.1 Hrs.	0.84 Hrs.
Flexlab2	32	Hazeltine 1200	233	148.7 Hrs.	0.64 Hrs.
Flexlab2	33	Infoton GTX	257	209.7 Hrs.	0.82 Hrs.
Flexlab2	34	2741	83	103.0 Hrs.	1.24 Hrs.
Flexlab2	35	Infoton GTX	200	209.7 Hrs.	1.05 Hrs.
Flexlab2	36	Infoton GTX	140	134.7 Hrs.	0.96 Hrs.
Comp. Room	37	2741	96	42.5 Hrs.	0.44 Hrs.
Flexlabl	40	Infoton GTX	236	198.0 Hrs.	0.84 Hrs.
Flexlabl	41	Infoton GTX	177	189.1 Hrs.	1.07 Hrs.
Flexlabl	42	2741	144	92.2 Hrs.	0.64 Hrs.
Flexlabl	43	2741	113	87.6 Hrs.	0.78 Hrs.
Dial-Up	50	First in use	119	113.2 Hrs.	0.95 Hrs.
Dial-Up	51	Second in use	72	59.7 Hrs.	0.83 Hrs.
Dial-Up	52	Third in use	41	40.2 Hrs.	0.98 Hrs.
Dial-Up	53	Fourth in use	30	19.2 Hrs.	0.64 Hrs.
Dial-Up	54	Fifth in use	28	16.5 Hrs.	0.59 Hrs.
Houston	61,62,63	(various)	347	290.0 Hrs.	0.84 Hrs.
Wallops	64	2741	6	4.6 Hrs.	0.77 Hrs.
ISU	66,67	(various)	518	162.9 Hrs.	0.31 Hrs.

Interlab Notes

ITEMS OF INTEREST

* The Committee has met and, based upon your voting, is planning a Christmas Party at the 4-H A-frame on (note this change) FRIDAY, DECEMBER 16. More details forthcoming, but mark your calendars and reserve that date NOW.

  While you're marking the 16th, also mark THURSDAY, DECEMBER 22. A party most predominately aimed at the children is being planned for that Thursday afternoon at LARS. Spouses are invited and Santa is expected.

  The Committee is most appreciative for the cooperation displayed and the suggestions made. Some of the ideas which proved to be unfeasible this year will be placed in the file for consideration next year. Do not hesitate to pass along any other ideas or suggestions to the committee, regarding the Christmas Party, that is!

* STEVE KAISER is working on an EE696 project on the use of Spatial Correlation in Classifiers.

* JIM MARIGA reports work is progressing in Unit D at Flex II.

* The LARS bowling team (Sambo's Tigers) are staying in "the first division" of their league. On November 7, they were in 6th place (out of 12), but only 4 points behind the league leaders - and proceeded to WIN 4 from the leaders! Come out and root!! Mondays at 6:30-8:30 at Rose Lanes.

PERSONNEL CHANGES

* JOANNE RAYBURN was recently promoted to Computer Operator filling the position left by ROBERT MEYER. Joanne has been with LARS for about 14 months working as a secretary in the Computer Facility.