

Second Oceanographic IDIMS Installed

Charting a Course of the Mysterious, Deep, Blue Sea

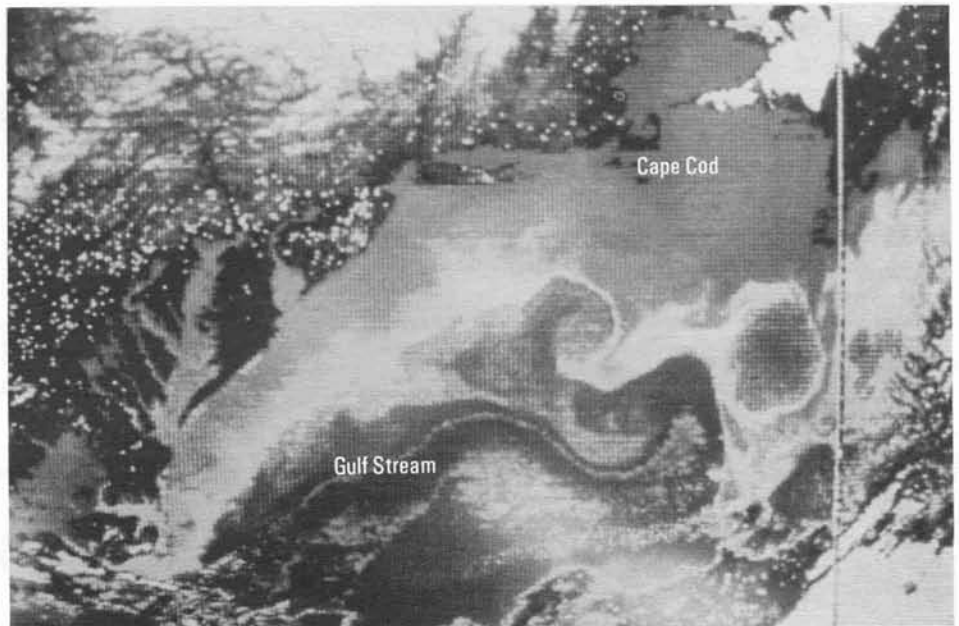
By the end of the decade, scientists all over the world may be using timely, up-to-the-minute physical oceanographic and meteorological data, without going to sea.

Through a tripartite system of remote sensing and moored and floating instrumentation employing satellite telemetry, scientists will be collecting more and better oceanographic information than ever before.

"We are potentially on the brink of revolutionizing the way we make measurements," reports Dr. Robert R. P. Chase, research specialist in physical oceanography at the Woods Hole Oceanographic Institution (WHOI), located in Woods Hole, Mass., on Cape Cod.

WHOI, with funding from the National Aeronautics and Space Administration (NASA) and the Office of Naval Research (ONR), is now designing and implementing this multi-part, satellite-based system.

WHOI will use a VAX-based IDIMS to reduce, integrate, and analyze satellite, MOIST (Moored Oceanographic Instrumentation System with Telemetry), and RELAYS (Real-time Link and Acquisition Yare System) data. Satellite data will include infrared, color scanner (visible and near-infrared), altimeter, scatterometer, and microwave derived from NOAA/Tiros, Nimbus, GOES, and DMSP.



Courtesy of Woods Hole Oceanographic Institute

This image of the northern Atlantic and adjacent U.S. coast (top left) is an example of the type of satellite data WHOI will process.

IDIMS was chosen for its ability to visually display this oceanographic data in just fractions of seconds.

Potential uses for the system include: 1) supplying data as part of research projects in progress; 2) as an aide in marine operations (i.e., to direct a ship to a specific point in the ocean such as a warm core ring or the center of a specific current, using a slow-scan video system to relay the plotted data back to the ship); and 3) as a means of integrating data on an autonomous basis with no human intervention.

IDIMS was installed in August, and software for the remote sensing project is now being written or adapted from other sources. Scripps Institution of Oceanography, the first oceanographic research facility to install an IDIMS, has shared about ten functions with Woods Hole. Kelly Luetkemeyer, IDIMS technical manager at WHOI, reports, "The functions from Scripps will save us several years of software development time." He is now converting the functions from Scripps' HP 3000-based IDIMS to the VAX-based IDIMS at WHOI.

(See page 2)

Woods Hole (from page 1)

The functional capabilities include drawing coastline boundaries, overlaying ship tracks, computing sun angles, contouring, and inputting calibrated radiance and temperature tapes. The moored (MOIST) and floating (RELAYS) in situ data acquisition platforms should be ready for field testing during the next two years.

Dr. Chase says that the system will be useful for a wide variety of projects — from navigation and operations planning, to storm warnings, environmental baseline studies, and routine oceanographic measurements.

By geometrically correcting and digitally enhancing thermal satellite images, the system can help in the analysis of warm and cold core rings — velocity, direction of motion, and surface layer temperature.

Biologists may use the system to process electron microscope photos of the internal structures of individual cells. A study of sea ice dynamics at the North Pole is on the list of planned endeavors, as well as studies of ocean circulation using acoustic tomography and geological data acquired by surface ships — such as gravity readings and ocean bottom topography — and by satellites — such as geoid data from radar altimeters on GEOS-3 and SEASAT-1 — and magnetic field information from MAGSAT. Underwater video scans of sand waves, ripples, and vents will also be processed on IDIMS to determine ocean floor structure.

In cases where in situ data fields contain fewer points than required

for a full IDIMS image, the sparse data will be interpolated to form a 512 by 512 matrix and then will be viewed as an image with IDIMS. The resulting image can be analyzed to determine specific features or map anomalies.

Says Luetkemeyer, "The system will give us more information than we have ever had and in a form not seen before. We will be able to quickly manipulate data and gain knowledge in areas that were previously unknown or unmanageable."

"We'll be using IDIMS for many established experiments, and certainly new projects will evolve here with the new capabilities," Luetkemeyer concluded.

Courtesy of Woods Hole Oceanographic Institute



Woods Hole Oceanographic Institute's IDIMS is housed a few miles inland of its main facility, shown here.

“... We think that satellites capable of observing the oceans can lead to a dramatic break-through in our understanding of how the oceans behave as an overall system. Also, we think that this can result in more effective utilization of the oceans for civil and naval purposes. If this case can be adequately made by the greater oceanographic community, I believe oceanography from satellites has a good prospect for success.”

—W. Stanley Wilson,
Woods Hole
Oceanographic Institute,
Oceanus, Fall 1981.

Has It Been Programmed Already by Another Site?

The current version of the contributed library, containing heretofore unreleased user-developed IDIMS functions, is now available to all IDIMS users upon request. ESL is now compiling, managing and distributing the contributed library, under the direction of Bob Ferrie, IDIMS quality assurance manager. Until this year, the U.S.G.S. EROS Data Center (EDC) had compiled the contributed library, while ESL handled distribution.

"Interest in the contributed library," recently wrote EDC's Bruce Quirk and Charles Nelson, key figures in the development and success of the contributed library, "has grown considerably at the EROS Data Center as more people have recognized its usefulness in software development. Increased interest has made it desirable to organize EDC-developed software and combine it with the software in the contributed library. The contributed library allows EDC

personnel easy access to a record of non-ESL software developed at EDC and other IDIMS sites. Consequently, programmers can check the contributed library to see if an algorithm or modification has already been programmed by another site."

"Sites which have programming capabilities contribute software," said Quirk and Nelson, "whereas the more operational sites supply application and managerial notes on how to utilize the software, what changes might be made, and so on. To effectively use the contributed library, each site could set up a standard set of groups and adhere to some standards, such as the program naming convention. Popular programs could also be added to the list of supported ESL programs. Finally, the contributed library can be expanded to handle user contribution to the other ESL software packages like ERIS and GES. The contributed

library's role is important in promoting communications between not only IDIMS users but users of remote sensing and image processing systems."

The contributed library, which is not a supported service, provides a means of exchanging ideas and software, which may reduce duplication of effort between the IDIMS sites. All contributions should be sent, with any available documentation, to Bob Ferrie at MS 106, ESL, 495 Java Drive, P.O. Box 3510, Sunnyvale, CA 94088-3510.

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Other New IDIMS Installations

Amoco

Amoco International has placed an order for a VAX 11/780 GEOMIPS configuration, to be delivered in the summer of 1984. However, it will use an HP3000/33 IDIMS system on an interim basis until the VAX is installed in its Houston facility. The VAX system will incorporate a variety of innovative features including a customized man-machine interface, high-speed data entry facility, and a high-speed array processor configuration. The system will be used for oil and gas exploration.

Ames

The Technology Applications Branch at NASA's Ames Research Center recently ordered a VAX/IDIMS as an upgrade to its existing HP/IDIMS. The VAX 11/780 system will be applied to a variety of application areas including agricultural inventory, forest inventory and management, geologic exploration, and land use planning.

Taiwan

The National Central University of Taiwan will soon receive a VAX/IDIMS based on a VAX 11/750. The university will use the GEOMIPS configuration, located in Chung Li, for various projects relating to meteorology, oceanography, geology, geophysics, agricultural inventory and management, and forest resource management.

Superior Oil

Superior Oil Company took delivery of a VAX/IDIMS in March. The system is based on a VAX 11/750 host with an IP8500 display. Superior Oil will use the Houston-based system for oil and gas research.

Users Gathered in Denver for Annual Meeting

The sixth annual IDIMS User's Group Meeting was held in Denver, Colorado, March 22-24. Over 45 people representing 19 IDIMS sites and seven vendors attended. Jerry Teter of the Bureau of Reclamation, the host site, and Chuck Smith of the Bureau of Land Management, also located in Denver, acted as co-chairmen of the event. A variety of presentations were given by users and vendors. "The IUG meeting was very successful," said Teter. "Those who attended found the presentations very informative, as well as the after-meeting sessions."

Dr. Rex Tracy of Floating Point Systems gave a presentation on "Array Processor Applications," in which he reported the results of a performance evaluation using an FPS AP-120B array processor as applied to a typical set of image processing problems, such as image warping or data base polygon intersection.

Bill Samayoa of Cray Research spoke on "Vectorization Techniques for Large Scale Processing." He discussed FORTRAN coding techniques that could be applied to improve the processing speed of the most computationally intensive subroutines.



Jerry Teter, shown above, of the Bureau of Reclamation was co-chairman of this year's IDIMS Users Group meeting, held in Denver in March. Some of the more than 45 people who attended are shown below.

Other presentations included updates on IDIMS and GEOMIPS systems, including HP and VAX hardware and software, and topics such as "Water Quality Prediction Using LANDSAT" by Jim Verden of the Bureau of Reclamation, "Hard Copy Product Development" by Joel Spaunburg of MATRIX Instruments, and "Thematic Mapper Data in IDIMS" by David Freeman of Sun Exploration.

Elections were held on the last day of the meeting. Robert Brovey of Exxon Production Research was elected chairman for 1984. David Freeman of Sun Exploration will be vice chairman, and Andy Failla of ESL will perform as secretary/treasurer.

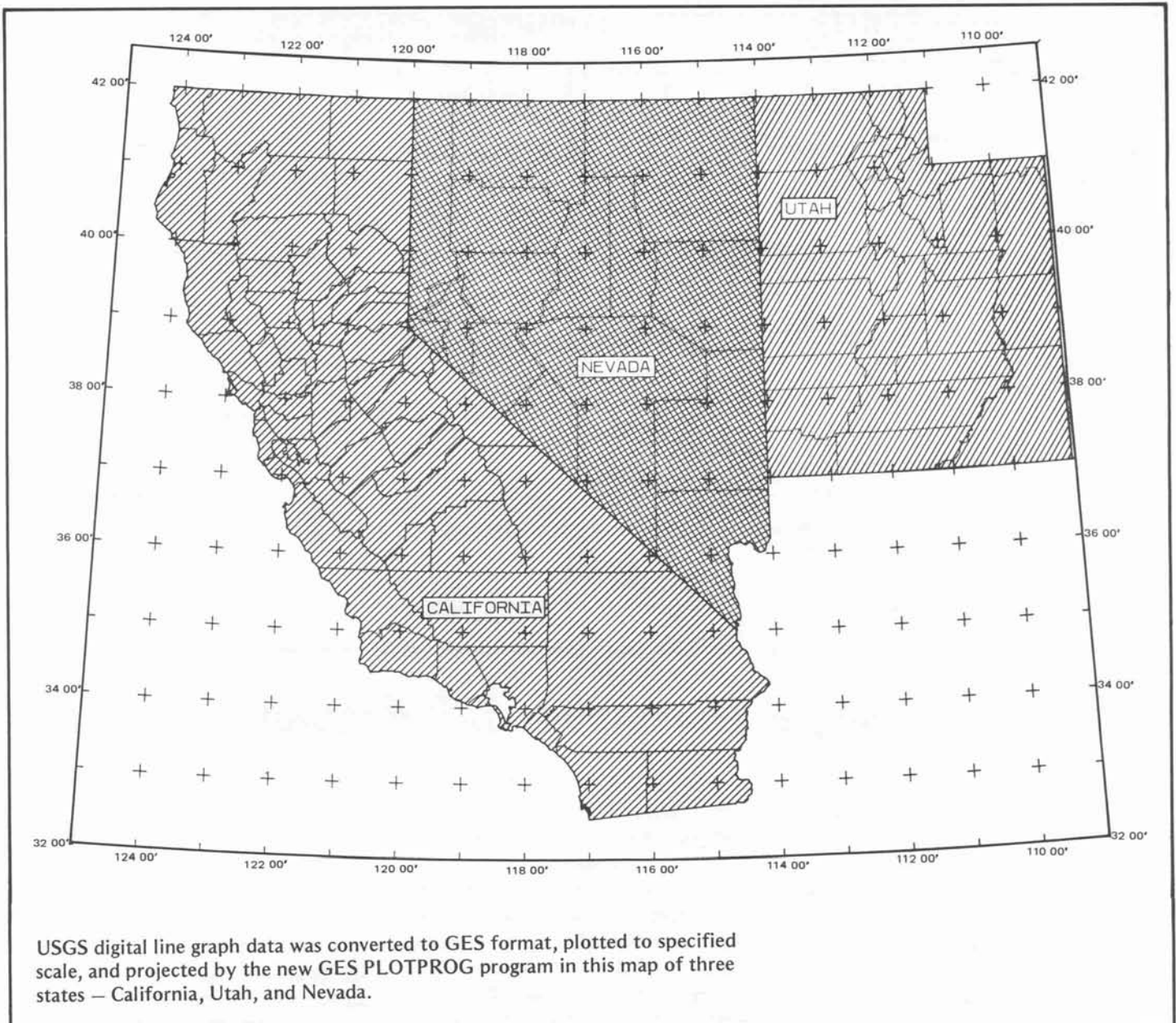
At Brovey's suggestion, the majority of users present agreed that the 1984 IUG meeting should be held again in the Denver area. Negotiations with several convention facilities in the area are currently taking place. The date for the meeting is being targeted to immediately precede the Third Thematic Conference, Remote Sensing for Exploration Geology, to be presented by ERIM April 16-19 in Colorado Springs.

Brovey, as next year's chairman, plans to alter somewhat the content of the 1984 meeting. The meeting will be more technically oriented, with an emphasis on "how to."

All IDIMS users are encouraged to attend and participate with presentations on specific topics in their area of study or application. There will be a call for papers this fall.



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New GEOMIPS Functions Are Being Developed

New functions are being developed for GEOMIPS packages which will be offered through IDIMS software support services. Said Mike Gialdini, manager of GIS development, "We have, for the first time, support prices for the ERIS, GES, Data Catalog and other packages. The more people who sign up for software support services for these systems, the quicker we'll be able to fold these new capabilities into the products."

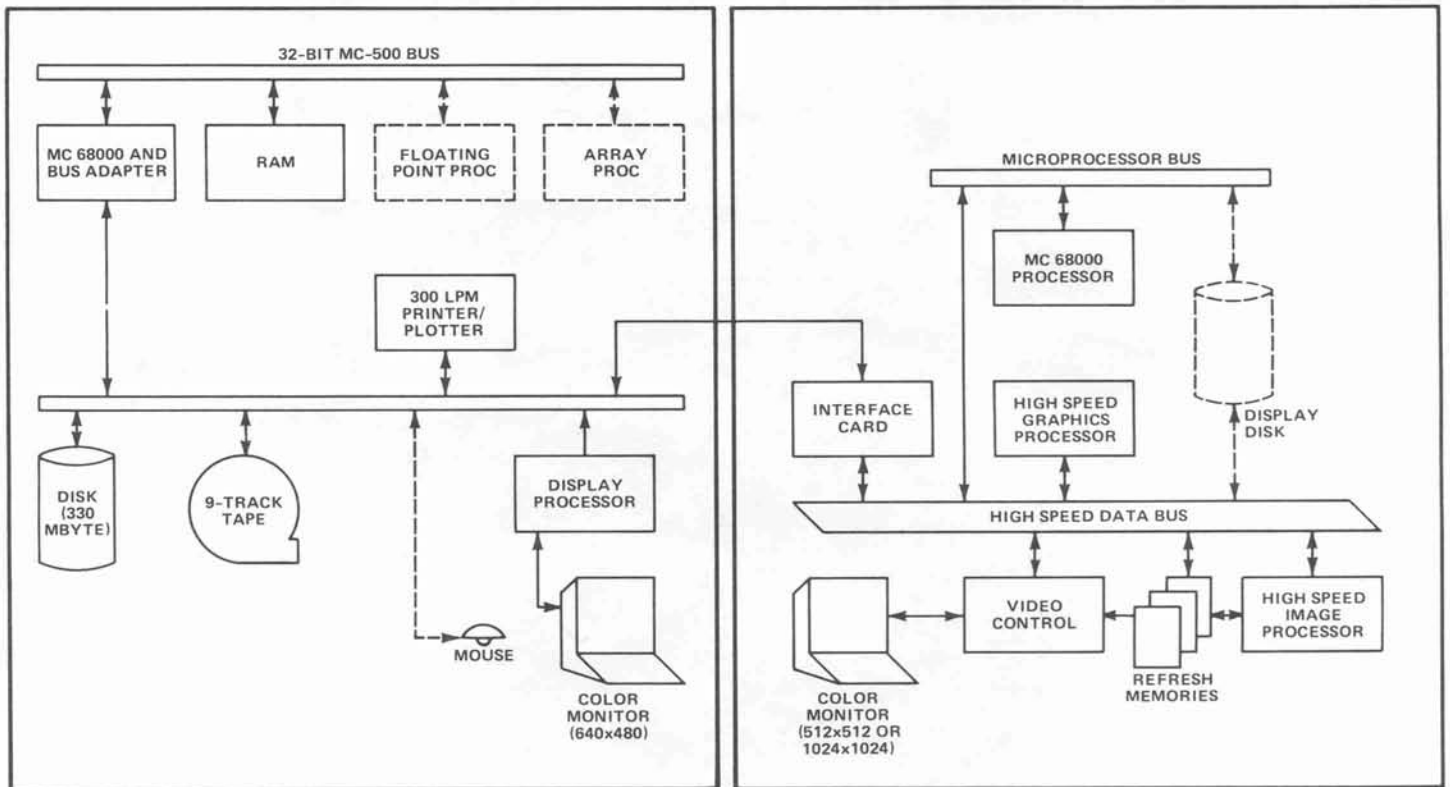
One of the functions being developed is PLOTPROG, a collec-

tion of GES plotting enhancements and modifications. This program refines the plotting routine of GES, adding certain capabilities such as polygon fill (cross-hatching), annotation, and a perimeter display modifier, which allows the user to mask areas together by classes or by ERIS attributes for display purposes.

Also in the works is a DLG conversion package, which provides the capability to unpack USGS digital line graph data (1:2,000,000 scale) and install it into GES geoblocks; a copy overlay command, which

allows users to copy overlays between geoblocks; ERIS software that has been integrated with GES to allow users to store, plot and display data by attributes; improved line and area overlay handling; and a ZETA 5400 plotter interface.

Bug fixes to appear in the future release include: improved file protection through "check for existence" before open; overlays purged correctly; the STRATA program's random line generation for line overlays; and hole purging to delink all holes from the containing area.



Multiple-task, Single Workstation Being Prototyped

Manipulation, analysis, fusion and display of imagery, graphics, and tabular data — all on a single workstation. Such a prototype spatial data workstation is now being developed at ESL.

Jim Mannos, advanced systems development manager, is working on basic capabilities of the new workstation configuration using a MASSCOMP MC500 micro-processor, with an Adage RDS-3000 display.

"We are just beginning new software development for the workstation," said Mannos, "which will include a new man/machine interface (MMI) based on the multi-window capabilities of the display and a new graphics image file structure which will allow both fast and efficient graphics display." The workstation will combine raster imagery with graphics, providing a very user-friendly MMI, which will offer multi-window menus, user help functions, parameter prompting and color display.

The MASSCOMP MC500 is a high-performance 32-bit VLSI virtual memory CPU with 6 megabytes of E.C.C. memory. MASSCOMP uses the UNIX system III as the base for system software. The system uses a quick-choice user interface, which enables operation of the system by simply making menu choices. The display processor terminal also maintains a composite multiple-window display. Multi-windows are extremely useful in data acquisition applications because they allow the user to simultaneously monitor multiple data collection processes. The MASSCOMP was chosen after a long survey, based on its special capabilities and high-price performance.

The Adage 3000 Color Raster Display system was installed in August. This high-resolution, fast-interaction system has many capabilities, including fast image generation, user programmable selection of display formats (programmable for interlace or non-

interlace resolution of 200X200 to 2000X2000 and real time multi-tasking software).

The display not only has video processing capabilities, such as the video feedback loop, but has a very fast bit-slice microprocessor for drawing graphics. The Adage 3000 should also be able to do image processing tasks, with its large image memory, complete random access to image memories, ability to process full-screen or partial-screen areas, fast look-up tables for pseudocolor image enhancement and overlay planes. Said Mannos, "The manufacturer claims to be able to rotate a 1000X1000 image in 2-3 seconds."

"Another piece that we're doing is adding a special software tools package intended to make it extremely easy to add new functions to the system," said Mannos.

Software Subscription Services

Expanded Services

ESL software support services have been expanded to include subscription services for the ERIS, GES and DATA CATALOG subsystems. Also added for subscription is GEOMIPS, a bundled support package of IDIMS, ERIS, GES and DATA CATALOG.

For GEOMIPS, a full support service package is available at a lower price than support for each element prices separately. For more information, contact Andy Failla, IDIMS products manager at ESL.

New Price List

ESL has published a new price list and leveled off prices for support services for the first time, achieving a long-desired goal. The 1984

service price list, recently released, lists the same prices as in 1983.

Updated Documentation

Documentation for VAX-based IDIMS is now in preliminary form. Over the next year, as the final version of each manual is completed, it will be distributed to all applicable users.

First to be completed is the *Functional Guide*, which will be distributed this month. *The System Manager's Guide* is scheduled for completion in December. Due in early 1984 are *The System Programmer's Guide* and *The Application Programmer's Manual*, including the array processing, ERIS-GES, operating system, and display supplements.

IDIMS and HP Releases

IDIMS release 4.37 (3180) was mailed to users in June. In addition to many bug fixes and enhancements, this release included important changes to the functions IDTRANS and IDENTER in response to user comments at the last IDIMS Users Group Meeting. The next release will be version 4.39 (3287), available in early October. This release will also include modifications and documentation changes for DeAnza LSI-11 display control functions.

The next update of MPE, the Hewlett-Packard operating system, will be released by ESL concurrently with IDIMS 4.39 in October. This version will be MPE IV CIPER and not the Q-Delta version as was previously announced. The CIPER version is described in issue number 29 of the *HP3000 Communicator* (distributed by Hewlett-Packard).

Some sites may have received information on MPE V from their local HP sales representatives. This version will not be available until November or December. The version of MPE V designed for the HP3000 series 2/3 systems is designated MPE V-R and features disc caching and increased system table sizes. There are no immediate plans for ESL to distribute MPE V-R. Customers interested in this release can contact Mark Salute, HP/IDIMS software manager, for more details.

It Needn't Be Terminal

Your comfort when you plunk yourself down in front of a video display terminal (VDT) is certainly important.

Visual and musculoskeletal discomfort are commonly associated with VDT operation.

"People working with VDTs report discomfort or difficulty with their eyes more often than other workers with visually demanding jobs," reported *The Harvard Medical School Health Letter* in April.

To minimize visual fatigue, keep the screen clean, using any window cleaner. Keep room light levels low; and adjust the brightness and

contrast controls, which most terminals have.

"Shoulder, neck, and back complaints are common in VDT operators," the health letter continued. "Sheer immobility, which weakens the postural muscles, probably contributes to these symptoms, but bad design of the work station is also a major factor."

Postural strain can be reduced by tilting the display to a comfortable angle. Tilting doesn't hurt the terminal and also reduces glare. If the display doesn't have built-in tilt adjustments, use a book as a prop.

A Minor, but Important Change of Address

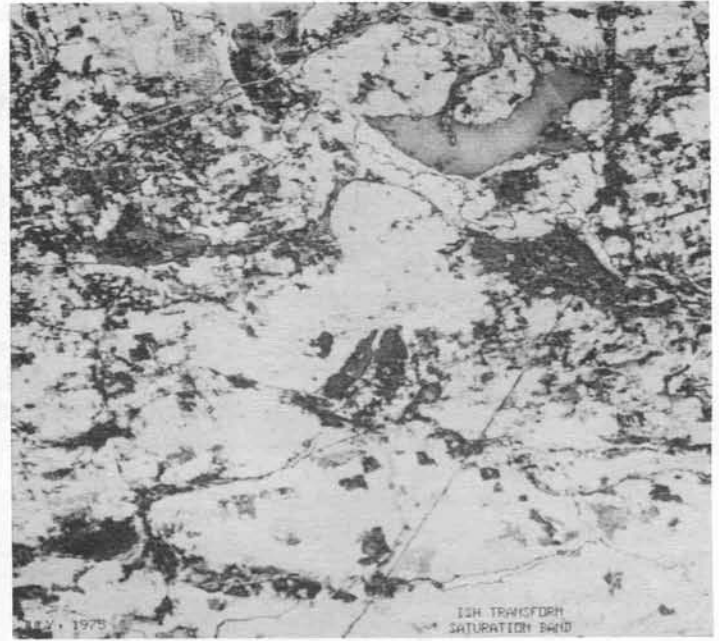
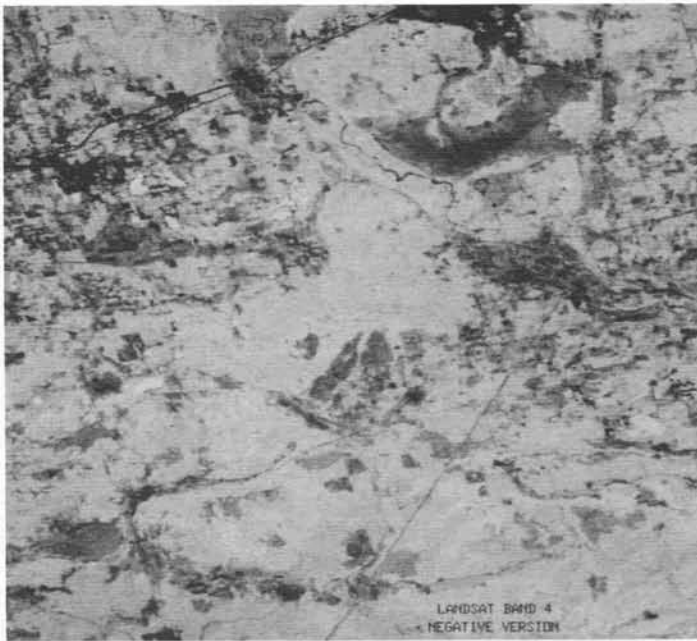
Because the U.S. Postal Service now is sorting mail in our area with optical character recognition (OCR) equipment, ESL has a new post office box number and Zip-plus-four code. Our correct address is now: ESL, 495 Java Drive, P.O. Box 3510, Sunnyvale, CA 94088-3510.

IDIMS Newsletter

October 1983

Published by ESL, a subsidiary of TRW, for members of the IDIMS Users Group.

Do you have news about your system, site, or applications that you would like to share with other IDIMS users? If so, please contact Andy Failla at ESL, (408) 743-6152.



A Glimpse of ISH: Before and After

ISH transform, a new algorithm recently installed on IDIMS, describes color in terms of intensity (I), saturation (S), and hue (H). It converts any RGB (red, green, blue) color image into ISH units.

In the Ft. Lewis, Wash., Landsat scene shown above, compare the Band 4 negative version (left) with the saturation band of the ISH-transformed image (right). Landsat bands 7, 5, 4 furnished the input

RGB image. Unfortunately, you'll have to use your mind's eye to envision it in color, since we can offer merely a black and white reproduction here.

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495 Java Drive
P.O. Box 3510
Sunnyvale, CA 94088-3510

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