USERS GROUP MEETING SET FOR MAY

Representatives from all IDIMS installations are invited to attend the second annual IDIMS Users Group meeting, set for May 23 and 24 at NASA Ames Research Center in Mountain View, and attendees are encouraged to present an activities report of their facility or any other topic of interest to the users.

"The IDIMS Users Group meeting," said chairperson Ethel Bauer, "will allow us a chance to meet at least five new members, as well as give us an opportunity to exchange ideas, applications, and solutions to common problems in the field of digital image processing and analysis."

TOURS PLANNED

The agenda includes the adoption of a charter and by-laws and a discussion of the duties of the chairperson. NASA Ames and ESL are both planning tours of their facilities. ESL will also brief the group on its display survey, contributing to the User Library, its standard array processor subsystem, and the present state of software releases. Time will be allotted for general discussions.

If you plan to attend this year's meeting, be sure to make hotel accommodations as early as possible. Karen Smith at ESL can give you information on some of the hotels available in this area.
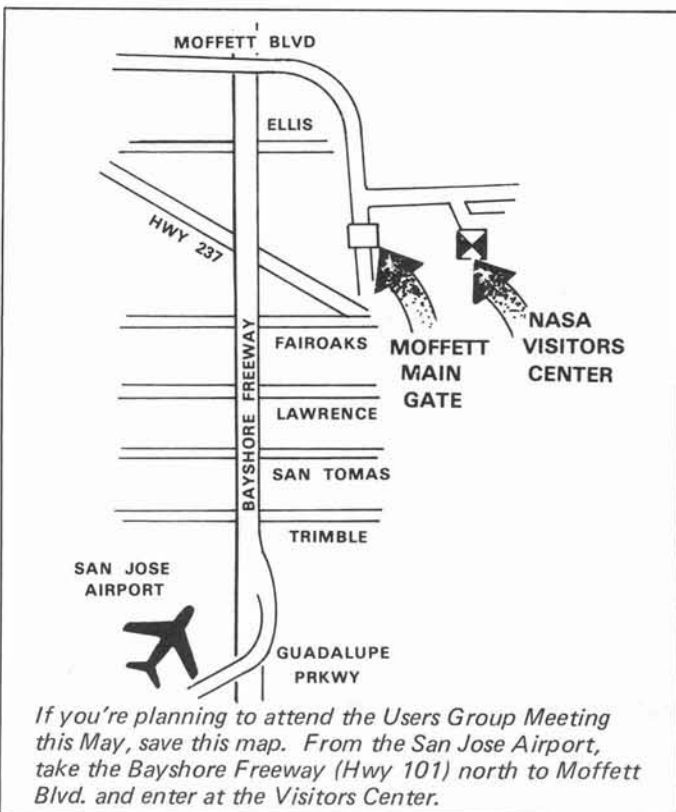
MAKE RESERVATIONS

Each installation will be contacted in April to finalize the agenda. Further information will likewise be forwarded. Questions may be addressed to Karen Smith at ESL (408) 734-2244, ext. 5251, or to Ethel Bauer, NASA Ames Research Center (415) 965-5897.

If you're planning to attend the Users Group Meeting this May, save this map. From the San Jose Airport, take the Bayshore Freeway (Hwy 101) north to Moffett Blvd. and enter at the Visitors Center.

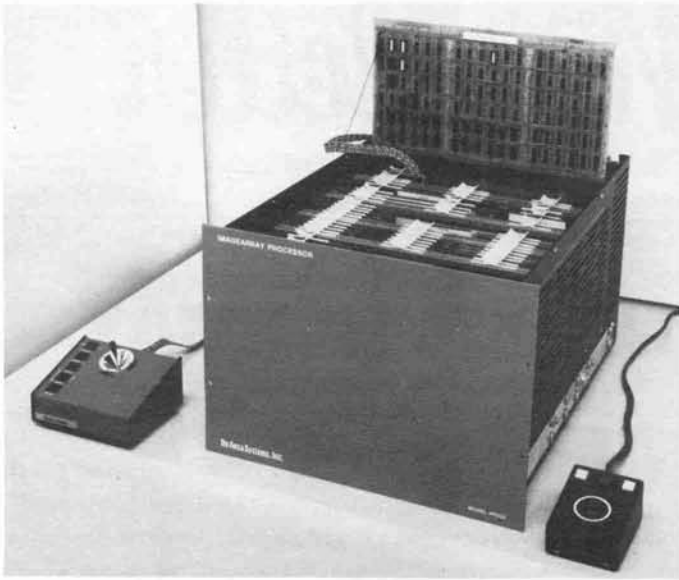# SOFTWARE TESTING IS A MATTER OF TIME

It may not seem so at a glance, but testing IDIMS software functions is an involved and time consuming process. A test cycle has five major elements:

First, the software function is tested to meet all data types specified in the design specification. Then it is tested to meet all size limitations, such as the number of lines, samples, and bands. Next tests are performed under the HP3000 and/or the HP21MX/ASAP subsystems, as required. Then we closely scrutinize the output of a tested function to ensure the results are correct. Finally, we examine the associated documentation to ensure that it is consistent with what the function does, and vice versa.

Occasionally, when fixing one bug, a new one is discovered or created. When this occurs, the new bug is corrected and the whole process repeated. As you can see, this is a very lengthy and tedious process, but one which we adhere to closely.

DeAnza's display subsystem marks a major change for IDIMS

DeAnza Display Improves IDIMS Performance

A new display subsystem offering significant improvements in both technical performance and manufacturing standards is now being offered with the IDIMS system.

The display, called the DeAnza IP5532/ESL, was chosen after investigation of the products from ten vendors. The first unit is now being installed at ESL under a development program to ensure complete integration with IDIMS software and hardware, exploitation of a considerable number of additional display features, and verification of stringent specifications in quality assurance, reliability, maintainability, and documentation.

The display design is based on a flexible and modular architecture incorporating an integral LSI-11/2 microcomputer, real-time feedback loop with image array processor, independent refresh memory control, and a special function generator.

This system design approach, together with well planned implementation of each component, has resulted in a display with several advanced programmable features.

- Flexible display manipulation, including smooth scroll in any direction, zoom with smooth pan, and two-way or four-way split screen with scroll,
- Rove of a 512 by 512 pixel window over a 1-k by 1-k pixel image,
- Display of data having greater than 8 bits dynamic range,
- Multiple color graphics with a sophisticated combination of imagery,
- Real-time video digitization and recording (525-line standard),
- Interactive real-time or near real-time image processing, and
- Unburdening of the IDIMS HP3000 host by offloading many display functions to the LSI-11.

The image array processor is a very powerful tool allowing the user to rapidly iterate sophisticated processing until a satisfactory image is obtained. For example, spatial processing such as edge enhancements (with convolution operators) will be as easy to implement and control as conventional dynamic range enhancements (look-up table operations). ESL is currently scheduled to implement several algorithms: image arithmetic (add, subtract, multiply, divide on a pixel by pixel basis); convolution (user specified kernnels up to 15 by 15 size); parallelpiped classifier; and Kahunen-Loeve Transform between spectral bands.

As an example of processing time, a three by three convolution takes approximately 3.5 seconds.

A special presentation of the subsystem will be given at the IDIMS Users Group meeting at NASA Ames Research Center on May 23 and 24.

"MAJOR ACCOUNT" STATUS BENEFITS IDIMS USERS

The synthesis of ESL's IDIMS system, based on Hewlett-Packard computer products and ESL software, has fostered a special relationship between the two companies which also benefits IDIMS users.

This "major account" status with Hewlett-Packard is of importance to IDIMS customers because it allows in-depth technical exchanges between the two companies and special HP support and service plans that cover IDIMS installations worldwide.

Major accounts are typically identified by the high volume of products purchased by the customer. ESL has achieved its distinction through this and through the highly sophisticated use of the HP3000 and HP1000 computers in its image processing and data analysis systems.

SEMINAR SPONSORED

As a recent example of this special status, six HP customer engineers from various locations throughout the country gathered at ESL's facilities in mid-January for a three-day technical seminar on the IDIMS system. This in-depth training seminar, jointly sponsored by ESL and HP, was designed specifically for customer

One of the many services provided by ESL is to offer reprints of documentation on the IDIMS system. A limited number of applicable copies is included in each system sale. If you would like to purchase additional copies, call Jackie Gabbert for information on prices at (408) 734-2244, ext. 5553 or 5536.

Here is a list of what is available.

MANUAL DESCRIPTION	MANUAL NO.
IDIMS Functional Guide, Vol. I & II	TM705
IDIMS II System Managers Manual	TM796
IDIMS System Programmers Manual	TM1041
IDIMS Application Programmers Guide	TM1047
ASAP Supplement to IDIMS System Managers Manual	TM990
ASAP Supplement to Application Programmers Guide	TM1054
ASAP Supplement to the System Programmers Manual	TM1042
ASAP Microprogramming Manual	IM145
ASAP Simulator Manual	IM161
ASAP Diagnostic User Manual	IM216
ASAP Operations & Maintenance Manual	IM179
ASAP Library of Microcoded Functions	IM243
Data Stratification and the Geographic Entry System (GES) Users Manual	TM991
ERIS Users Manual	IM237
Glossary of Statistical, Remote Sensing and Image Processing Terms	TM638
Data Analysis for Resource Management	IM748
Mini Graphics Users Guide	TM592

NOTE: Purchase price does not include local sales tax.

engineers. It dealt with the architecture of IDIMS, the interrelationships of all the various elements within the system (hardware and software), and the functional operation of the non-HP peripherals. Emphasis was placed on the diagnostic and troubleshooting techniques associated with all the non-HP peripherals attached to the system.

Topics of the seminar included MPE account structure and special capabilities, IDIMS/ASAP hardware configuration, 21MX subsystems and shared disks, hardware diagnostics, non-standard and privileged code, software modifications for shared disks, and preventive maintenance and software updates.

FIVE REGIONS REPRESENTED

The seminar was attended by senior customer engineers from each regional HP Customer Engineering Service Center representing an area where there are (or will soon be) IDIMS systems in operation. The geographic areas covered were San Francisco, Los Angeles, Washington, D.C., St. Louis and Denver. A videotape of the seminar will be distributed by HP to its service centers responsible for IDIMS systems. The tapes will be used to train customer engineers new to IDIMS installations.

Within Hewlett-Packard, major accounts receive special, individualized field service and support plans.

These plans are created and managed by the HP Area Service Manager, who has the responsibility for the major account customer. In ESL's case the area is in the HP-Nealy Sales Region, and the manager is Jim Shea. According to Jim, the plan for ESL is in the final stages of preparation. The major elements of the plan will consist of:

- centralized control and coordination (by Jim) of all field service and support activities for IDIMS installations, worldwide.

- a senior HP product specialist, trained in-depth by ESL on IDIMS and available to respond to HP problems in an IDIMS installation, whenever and wherever.

- local HP customer engineers trained on service techniques unique to HP equipment in an IDIMS environment.

- a communications system which will alert HP customer engineering of any major HP problems at an IDIMS facility.

Jim said the intent of the plan is to "let IDIMS customers know that ESL has the full support of Hewlett-Packard behind their (HP) equipment in every IDIMS installation, regardless of location."

New Software Due in April

A major change in IDIMS system software, version 4.10, is in the final stages of preparation for release. The new software package represents many man-months of effort aimed at producing a product with the user in mind.

Based on the 30 day in-house test now in progress, the software package should be ready for distribution by the end of April.

The main thrust of 4.10 was aimed at the system level software. Applications functions with histories of major problems, such as ZIP, TSSELECT, and others have been rewritten coincident with work on the display software.

It includes logical branching and looping constructs, as well as the menu, arithmetic processor, and command file operations.

SIGNALS TREATED AS ONE-LINE IMAGES

IDIMS users are finding many applications in addition to image processing for their systems. One of the non-image areas in which IDIMS has been highly valuable is processing signal data. Infrared, telemetry and radiotelescope signals have all been processed in a research and development mode.

Image and signal processing differ in that signal processing is one dimensional, while images are processed on two dimensions. But the two fields overlap significantly. Treating a signal as a one-line image makes the similarity more apparent.

Two basic elements of signal processing are evaluation and enhancement. In evaluation, the user tries to establish the characteristics of a signal. For example, an infrared signal data set processed at ESL had an interference source, which was analyzed on IDIMS. The analysis showed the frequency of the source corresponded to that of a power supply close to the infrared sensor.

The signal can be enhanced to make it easier to interpret. In one case, spatial domain filtering of another infrared signal reduced the noise level, making objects observed by the sensor more clear.

The mechanics of processing signal data on IDIMS are much the same as image processing. The user starts with a computer-compatible tape that has a format amenable to the IDIMS function ENTER. The data is read into the system and either displayed on a monitor or printed on a line printer. Applications functions are then employed and the results displayed or printed for evaluation. Trial and error processes can be iterated and reevaluated in a short time.

Numerous IDIMS applications functions have potential value in signal processing, such as CFFT1 and MAG. These two functions are used to determine signal and noise characteristics in frequency terms. GAUSS, EXPFILT, and WIENER are functions used for frequency domain filtering to enhance a signal. CONVOL is used for time domain filtering for signal enhancement.

Some care and occasional cleverness need to be exercised, since many IDIMS functions will not operate on one-line images. The use of MOSAIC line replication, however, can be used to solve the problem.

The availability of the gray level display makes IDIMS unique for processing signals. An image can be formatted as a sequence of signal traces. Displaying this image allows identification of features that change from trace to trace. The interactive capabilities of the system make it practical to try a number of processes to find the ones of most value.

Two Awards Presented

Dean Newkirk and Gerald Teter of the Bureau of Reclamation were recently recognized with a special achievement award. The awards went to them for their efforts in procuring and installing an image processing system in the Bureau of Reclamation and "assuring the bureau of one of the most advanced laboratory facilities in the nation." The Bureau of Reclamation is one of the newest members of the IDIMS community.

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