

B INTERACTIVE DIGITAL IMAGE MANIPULATION SYSTEM (IDIMS)

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The purpose of this paper is to address the experiences related to implementing IDIMS and describing some of the capabilities and attributes of the system and vendor support.

An IDIMS (Interactive Digital Image Manipulation System) was installed in the Data Analysis Laboratory (DAL) at the US Geological Survey/Earth Resource Observation System Field Office (EROS), in Anchorage, Alaska, in March 1980. The DAL provides digital image manipulation and analysis capabilities to support training for and operational inventories of Federal, State and local government agencies. IDIMS was selected to provide a variety of capabilities for digital analysis and image enhancements of Landsat Multispectral Scanner (MSS) data, including land cover mapping. However, the system can be and is used to manipulate and analyze all types of gridded data, either singularly or in combinations. IDIMS, using a combination of individual software functions and the flexibility of the Hewlett-Packard (HP) 3000 Series III minicomputer, provides a wide range of system configurations. Data can be input in raster format from computer compatible tapes (CCT's) and from point, line and polygon data which is digitized and converted to raster format on the system. Once into the system, any raster data set can be radiometrically enhanced, spatially enhanced, spectrally and geometrically corrected, rescaled and registered to a map base or another data set. Statistical descriptions can be developed for multispectral processing of the data, this is mainly used to obtain land cover information. Stratification and classification summaries of this information can be produced. Final products are output on a digital display, film recorder, line printer, printer/plotter or CCT.

IDIMS was acquired from Electromagnetic Systems Laboratories, Incorporated (ESL) of Sunnyvale, California, as a complete, stand alone digital image processing system. Purchased by the US Geological Survey for installation in Anchorage, the total cost for hardware, software and installation was slightly over \$ 500,000. This included setting up and testing the hardware in Sunnyvale, shipment to Alaska, installation and testing of the entire system.

The major problem with getting the computer system running was not installing the computer, but preparing the site. Site preparation was planned, computer flooring was built, isolated power supply was installed

and an air conditioning system installed. The components arrived on a Friday, were hand carried up three flights of stairs (no elevator), uncrated and bolted together. Over the weekend, the system was allowed to dry out and adjust to the environment. On Monday morning, the three man installation team started installing the software. On Thursday, the final acceptance tests were completed and the required forms signed. Less than 1 week was required to install and test the entire system.

There were no difficulties encountered during installation, because of the experience of the installation team and ESL's procedure of setting up and testing the system before shipment to the installation site. Since the installation, however, there has been a problem with the disc drive units, caused by radio frequency interference from a concentration of TV and FM stations near the office in downtown Anchorage. This problem was eliminated by shielding the computer room with a wire screen.

ESL provides training for application, support and system users at ESL or on-site. Users, if they meet prerequisites, may also obtain training at government sites - NASA Ames, NASA Goddard, Water & Power Resources Service (WPRS) (formally Bureau of Reclamation), EROS Data Center and EROS Field Office. The courses currently offered by ESL are — IDIMS Introduction (5 days), IDIMS Image Analyst - Reconnaissance (5 Days), IDIMS Image Analyst - Earth Resources (5 days), IDIMS Application Programmer - HP 3000 (5 days), IDIMS Application Programmer - HP 21MX (5 days), IDIMS System Programmer (5 days), IDIMS System Manager (5 days), and IDIMS Advanced System Manager (3 days).

ESL provides IDIMS users with an extensive set of manuals. They include: Users Manuals for IDIMS, Geographic Entry System (GES) and Earth Resources Information (ERIS) System; system management manuals for the overall system and for the Advanced Scientific Array Processor (ASAP), and programming manuals for the system, applications and ASAP. The manuals are updated by ESL as discrepancies are reported and as new releases are available. Currently, many of the manuals are being revised and reprinted.

ESL provides several levels of support for IDIMS. The Alaska EROS Field Office has contracts with HP for support of all HP hardware, HP software and a contract with ESL to provide hardware/software support for ASAP and software support for IDIMS. A minimal amount of hardware support has been needed from both HP and ESL, with a strong willingness from both to correct problems as they occur. ESL provides several types of support for their software system including: fixes, enhancements and upgrades to standard IDIMS software and firmware; assembling, testing and distribution of new software releases; updates and revisions to

documentation and sponsorship of the IDIMS User's Group. Two release tapes of fixes and enhancements with documentation updates have been received since installation, giving improved capabilities.

The major strength of the software is its flexibility. With over 300 functions which can be combined in a variety of ways, almost any digital image processing requirement can be accomplished. However, this requires a well-trained and sophisticated user and in some ways, may be considered a weakness. But a novice, with some preliminary training and reference to the manuals, can accomplish most projects. The flexibility to utilize a variety of peripherals, both in terms of manufacturer and models, is incorporated into much of the software. With a few exceptions, the software functions of the system operate independently of hardware peripherals. These special peripherals are handled as subsystems with special drivers, so if hardware is modified, only the drivers need to be changed.

#### Summary

IDIMS provides a complete image geoprocessing capabilities for raster-formatted data in a self contained system. ESL can install in a relatively short period of time, both hardware/software and provide a substantial amount of support once the facility is operational. ESL spends a considerable amount of effort to upgrade and fix problems with the software and attempts to keep the system state of the art, both in terms of the hardware and the software.