

LOCAL INTERACTIVE DIGITIZING AND EDITING SYSTEM
(LIDES)

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ABSTRACT

The Forest Service has identified the need for stand-alone intelligent graphics systems to support a variety of applications to meet the Agency's timber harvesting and land management missions.

Until recently, National Forests and individual units were allowed to acquire their own graphics systems. This has cost the Agency valuable resources, however, due to duplication of effort in the area of applications development. Since many of the applications are of the same type nationally, a real need exists to standardize hard- and software systems in the Forest Service.

The Computer Sciences and Telecommunications Staff Group of the Agency's Washington Office has initiated a Service-wide procurement effort as a first step in standardizing intelligent graphics hardware.

The overall objective of this Local Interactive Digitizing and Editing System (LIDES) development effort is to furnish the Forest Service with a national software capability to interactively digitize, display, and edit graphic data--data which may be represented in the form of points, lines, and polygons with associated feature ID's. The final product of LIDES will be a clean digital file of this graphic data in a common format. The digital file can either be transmitted to a larger computer for use as an input file to another system, or retained for use by local application hardware.

LIDES will be implemented on intelligent graphics systems' hardware which will reside at all levels throughout the Forest Service. Land Management Planning, Timber Management, and Engineering units will be the largest users of LIDES. Operators will range from professional-skilled to semi-skilled personnel.

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INTRODUCTION

The Forest Service has recognized the importance of digital data bases as sources of speedy and accurate information. Today, there are five nationally supported computer systems in various stages of development and operation that use digital data. They are the TOPographic Analysis System (TOPAS), Digital Terrain Information System (DTIS), Method of Scenic Alternative Impacts by Computer (MOSAIC), Resource Information Display System (RIDS) and Calplotpac.

All these systems have documentation to varying degrees. Most, if not all, are concerned with describing the procedure of how to use the system, and have very little to say about how to collect the digital data they use. The documentation spells out the requirements of the digital data, but does not help the user in creating the data base that meets these requirements. Also, each system requires a data base of a different format and each requires slightly different identification codes. Therefore, the most time consuming and costly phase of processing any of these programs is the creating of the digital data file. Obviously, this data base must properly represent the information it is suppose to portray, ie. it must be correct. Also it must be acceptable by the computer application program through which the data is intended to be processed, ie., it must be in the proper format. The Local Interactive Digitizing and Editing (LIDES) software development project has been directed at reducing the time consuming process of creating that data base.

The LIDES development effort was begun in August 1980 at the request of our Regional Office in Albuquerque, NM. A work session was conducted with the Regional and Forest personnel to develop a project proposal and feasibility study for LIDES. The Functional and Program Specifications were completed in April 1981. A draft User and Maintenance manual were prepared, as was a Pilot Test Plan for testing LIDES in a user environment. The Pilot Test will take place as soon as the Intelligent Graphic System hardware procurement has been completed and the hardware delivered to Forest Service field units.

DATA COLLECTION AND EDIT

Hardware Components. The Intelligent Graphic System (IGS) will consist of the following mandatory features:

- o Central Processing Unit (CPU)
- o Video Graphics Display (CRT) w/keyboard
- o Plotter
- o Digitizer
- o Printer
- o Magnetic Data Storage
- o Telecommunications Interfaces
- o Display Screen Copy Device
- o Operating System and Utility Software
- o Text Editor

It is intended that the IGS hardware, with the appropriate software, will provide the National Forest and/or Ranger District with the capabilities to support the many graphics applications software packages which have been developed within the Forest Service over the years, ie. Logging System Analysis, Visual Management Planning, Low Standard Road Design, etc., and to perform local interactive digitizing and editing.

Functions to be Performed. The following functions are to be performed with LIDES:

- o Generate a management report of project status information via the CRT screen or printer
- o Initialize the digitizer tablet
- o Digitize graphic data
- o Locate, modify, and/or delete text labels via CRT screen
- o Display graphic data and/or text labels via CRT screen
- o Line plot graphic data
- o Generate data listings via printer or CRT
- o Aggregate and link segments of graphic data into polygons
- o Edit and record text information
- o Link polygon and text information
- o Reformat and transmit digital graphic data

Structure. The flow chart in Figure 1 depicts the structure of the LIDES in a logical flow to collect and prepare digital data for input into a graphics applications system on a remote computer. For local applications, the flow can be interrupted at any stage of data manipulation needed for the particular application. The LIDES software has been designed and coded in a modular format for ease in adapting to changes in systems requirements and hardware configurations within the constraints of the IGS specifications.

REQUIREMENTS

LIDES Requirements. The following requirements were used in developing the LIDES software:

Output. The proposed output product from LIDES will be a clean digital file of the graphic data which was digitized. This file will be produced in the existing Forest Service Modified Data Exchange Format. Several of our national systems (RIDS, DTIS,.. etc.) presently accept this format.

Input. The input document for LIDES can be in the form of maps, other line graphics, photographs, or documents which depict graphic data. Using LIDES, the graphic data can be collected, edited, and stored in a digital file.

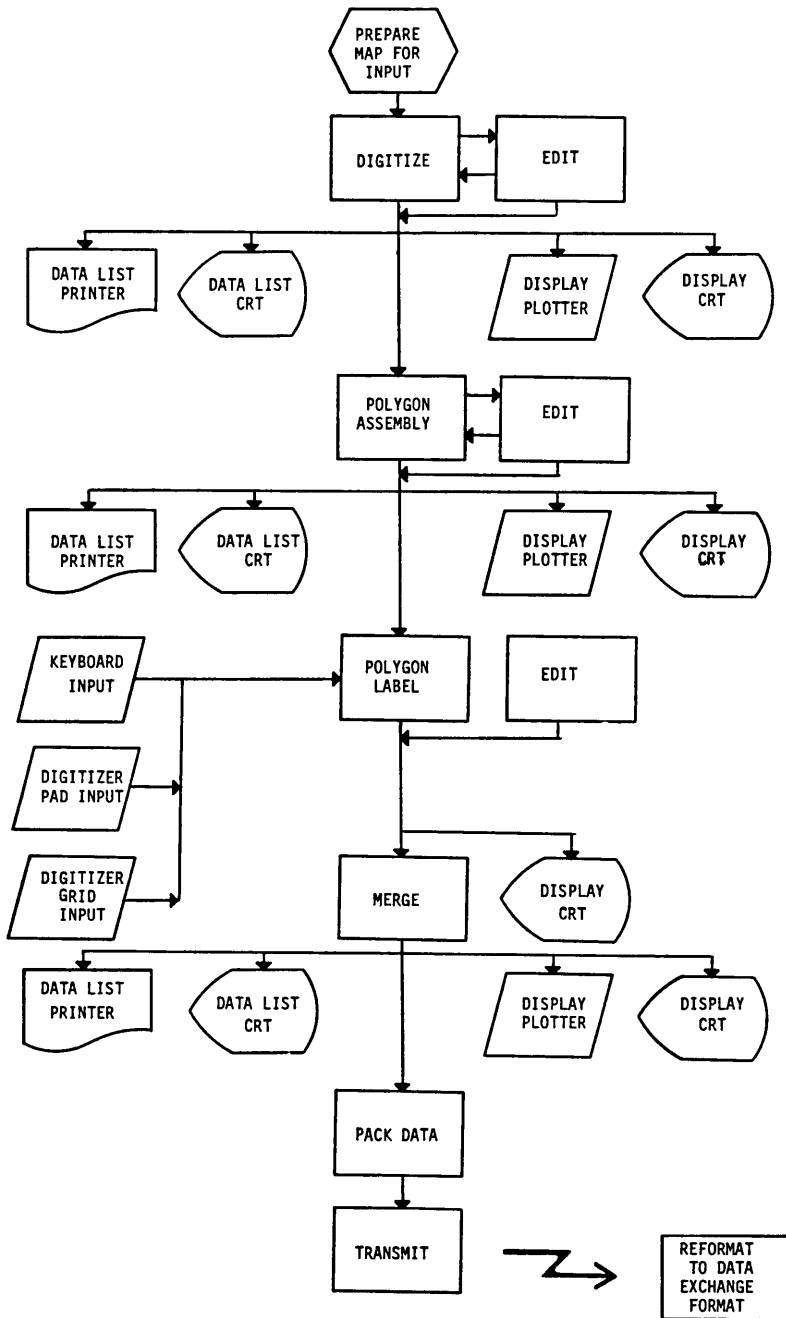


FIGURE 1

Data Sets. The LIDES digital file can either be transferred to a larger computer such as the UNIVAC main frame located at the USDA Fort Collins Computer Center in Fort Collins, CO., for processing with national systems or retained at the local site for use with local applications software. A copy of the digital file may be retained at the local level for ease of updating as required.

Processing and/or data flow. Since the IGS equipment has stand-alone capabilities, all processing and data flow for interactive digitizing and editing will be performed within the system at the local site.

Security, Privacy, and Control. There are no Privacy Act restrictions that apply to this software development. The Forest Service field units will have to establish a routine for making backup tapes if they transmit their LIDES digital file to another site for use in a national or other system.

Information Storage and Retrieval. The IGS hardware will consist of various combinations of hardware components. It is recommended that a ten (10) megabyte magnetic data storage device be a part of the IGS when using LIDES. This will sufficiently support any complex map layer or input document existing or planned within the Forest Service. Either a floppy diskett or magnetic tape may be used to store backup digital files at the local site.

Interfaces with other systems. The clean digital file produced by LIDES may be used as input to other systems. Software will be developed by the Forest Service Engineering Staff to accept the clean LIDES digital file and reformat the data if needed.

Objectives. The LIDES objective is to provide all levels throughout the Forest Service with the software capabilities to perform interactive digitizing and editing on-site and the capability to produce a clean digital file of the input data in a standard format.

EXISTING METHODS AND PROCESSING

The current methods and procedures for digitizing support vary considerably throughout the Forest Service. At present there is little or no digitizing hardware available at the Ranger District or the National Forest. If a Forest needs digitizing support they must send their source documents to the Regional Office or in some cases to another Region for this support. However, digitizing services are also obtained from commercial vendors. It should be noted that the field units are very reluctant to send their source documents outside their unit for digitizing since it may be the only copy and additional effort would be needed to duplicate the sources for digitizing only.

PROPOSED METHODS AND PROCEDURES

The IGS procurement effort is a first step in standardizing the intelligent graphics hardware within the Forest Service. This LIDES development effort will standardize the interactive digitizing and editing software. The hardware and planned software will furnish all levels throughout the Forest Service with stand-alone digitizing and editing capabilities. Field units with IGS hardware can accomplish their digitizing on-site and therefore will retain the use of their source documents within the unit.

Documentation in the form of user manuals are being developed and will be distributed to field users. The maintenance manuals will be furnished by the Washington Office staff responsible for Operations and Maintenance of LIDES.

CONCLUSION

The implementation of LIDES software on the IGS hardware will provide the users with a much needed capability to produce clean digital data files at the local level. These data files can then be utilized with either local applications software or transmitted to a central site such as the USDA computer facility located at Fort Collins, CO. The consequences of not developing a national LIDES package with standard output format, will be an extensive duplication of effort by the field in applications software development to support the digitizing needs required by the field units.

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