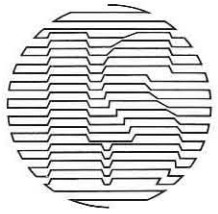
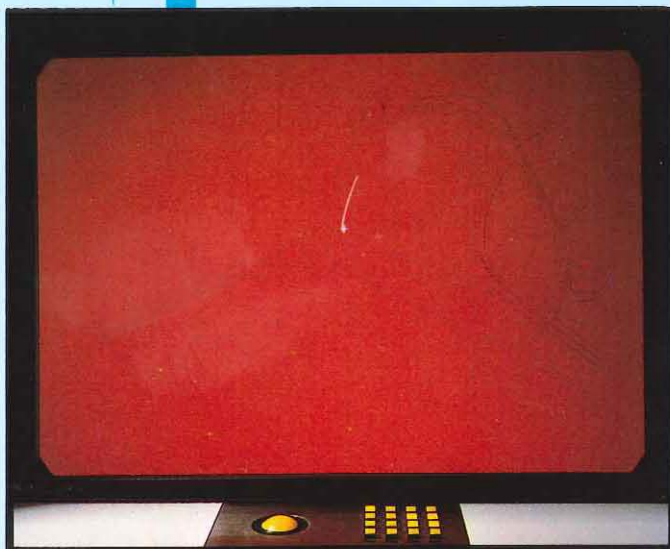
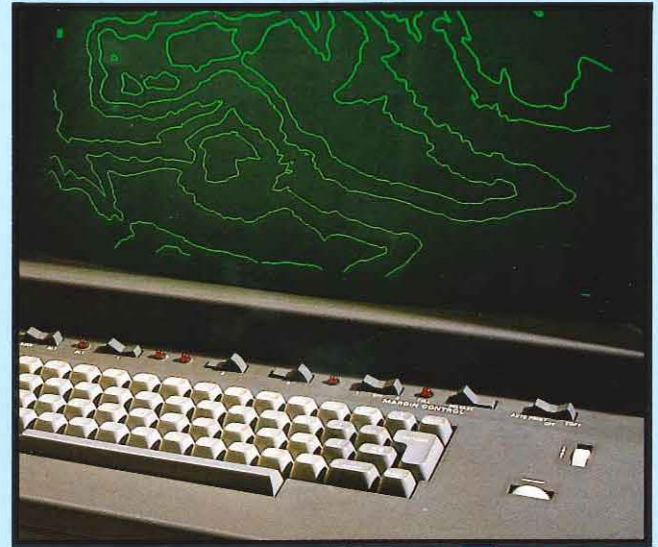
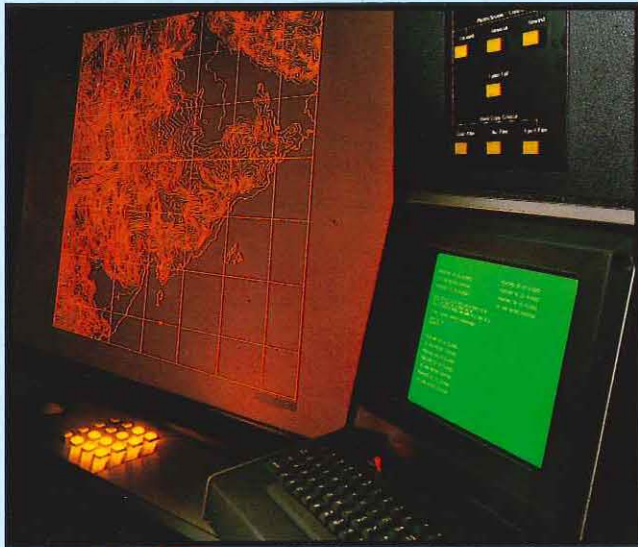


Laser-Scan L.A.M.P.S.



Laser-Scan Automated Map Production System



Introduction

Laser-Scan offer a complete range of automated cartographic hardware and software systems for digitising, editing and plotting maps and plans in a vector format and for database creation. Existing digitising tables, hard copy devices and plotters can be linked as work stations operating very efficiently over single serial lines to a host computer.

At the other end of the scale Laser-Scan can provide a high throughput database creation or map production system with multiple FASTRAK automatic digitising stations, large or small screen editing stations and a variety of film or paper plotters.

All Laser-Scan systems are based on DEC VAX-11 or PDP-11 computer systems and use the highest quality hardware whether manufactured by Laser-Scan or other suppliers.

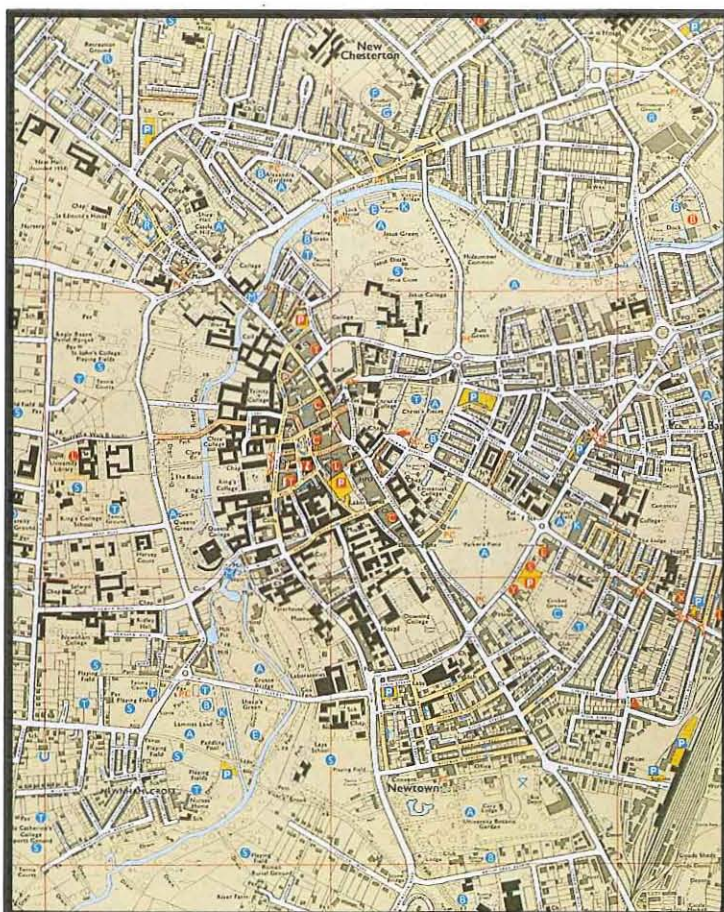
All customers can be sure of excellent after sales service world wide. Laser-Scan have computer graphics systems in over 16 countries.

Laser-Scan software has a very high reputation for efficiency and versatility. It is based on a simple database format known as IFF (Internal Feature Format). Many utility programs operate on the data including editing (graphic or non-graphic), display, plotting, transformation, sorting, clipping, merging etc. The heart of the FASTRAK system is the LASERAID line-following software which is constantly being developed to cope with many different maps from town plans to contours.

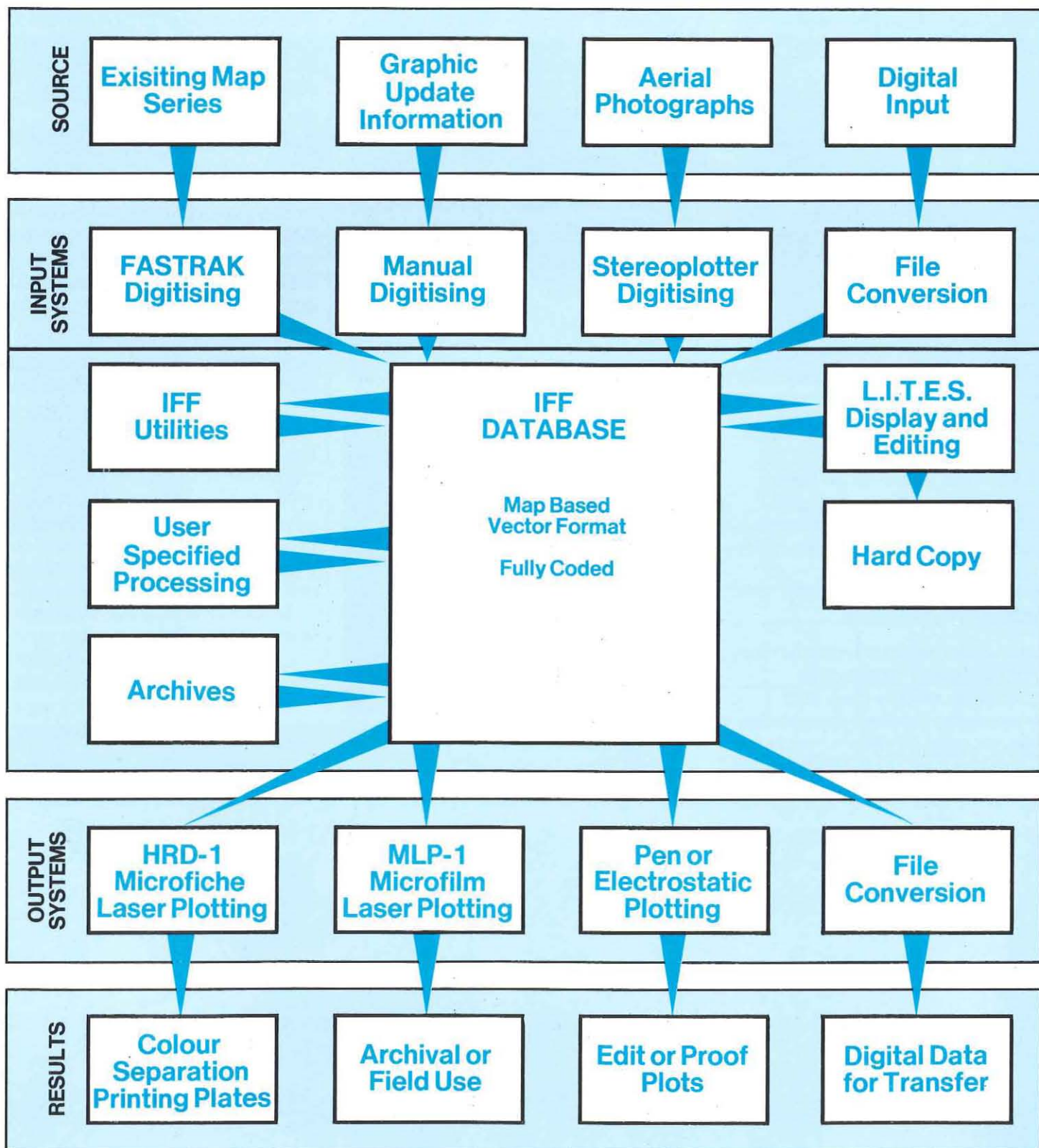
Whichever components of L.A.M.P.S. are used, a customer is assured of a flexible, efficient system with excellent service facilities and a

strong, experienced software department willing to meet specific requirements and advise on further development or current operating procedures. Full training is provided on site, together with documentation suitable for operators, managers and users.

Laser-Scan continues to develop new hardware and software suitable for cartographic applications and the latest product is the Liquid Crystal Display featuring flicker-free black lines on a white screen with whole frame or selective erase, red refresh and optional 35 mm slide overlay. Laser-Scan research and development resources can be employed to assist you in solving your specific problems. Innovation, manufacture, customer support and an in-depth knowledge of surveying and cartographic requirements blend to produce the finest products and service available.



Full L.A.M.P.S. System Outline



Philosophy

A modern cartographic production system is built around a central mini computer with one or more general purpose work stations and special purpose data capture and plotting devices.

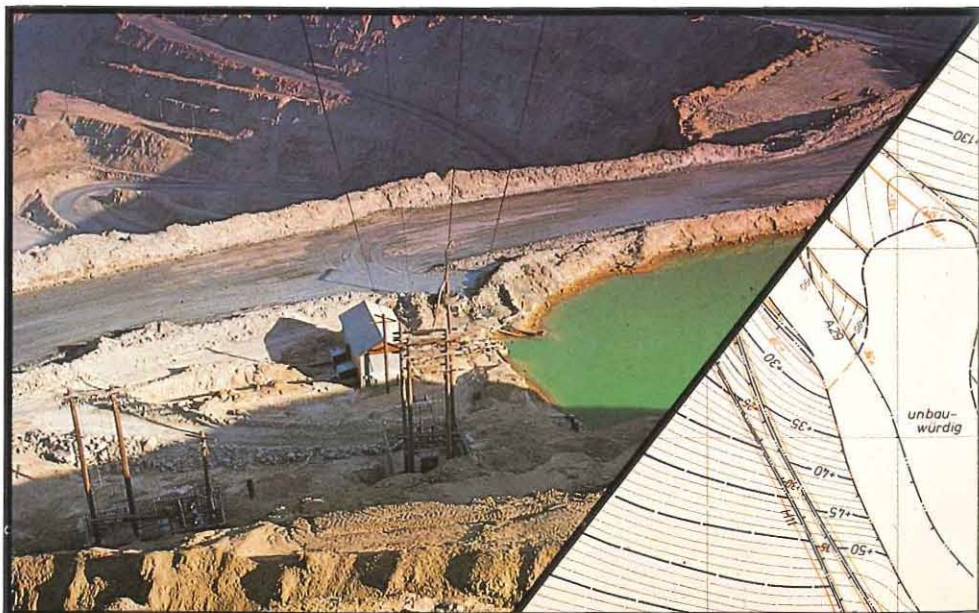
Laser-Scan's philosophy is to combine the best features of both human beings and computer systems. FASTRAK digitising allows operators to use their cartographic judgement and experience while automating the boring repetitive process of following lines by hand. Interaction at the work stations is provided by selectively lit function buttons and a tracker ball or by a menu selection with cursors on digitising tables. Full alphanumeric keyboards are always available as a back up for less frequent commands or for input of text and numerals to the map data.

In FASTRAK Laser-Scan have developed a unique 'paint-out' facility which removes digitised lines from the view of the operator and the scanning system. Thus completeness is assured and duplication is negligible.

Laser-Scan, while offering turnkey systems based on previous experience, realise that most cartographic production agencies have specialised requirements for map or chart production and require systems that can be tuned to specific map series or components. Laser-Scan have continuing liaison contracts with all major customers to facilitate such developments although details of data structure and algorithms are available to all customers for their own use.

Installations

Laser-Scan Map Production Systems are in use with 10 agencies in the UK, Europe and North America. These include the Ordnance Survey of Great Britain, the Mapping and Charting Establishment in the UK and the Admiralty Hydrographic Department. FASTRAK is also used for bureau operations at Cambridge and at SAD AB in Sweden over a very wide range of mapping. In Canada, Holland and Sweden, Laser-Scan systems are in use for mapping from aerial photos and design of road layouts. FASTRAK systems are digitising all types of maps from contours to town plans, from census district polygons, to woodland areas. Laser-Scan has full UK Ministry of Defence approval to quality assurance DEF STAN 05-21



Map Data Structure

All Laser-Scan systems use the IFF (Internal Feature Format) database structure. The basic unit of storage is the maps which have sections, overlays (or layers) and features with individual numbering, coding and associated text. All graphic data is held in a compact vector format.

Thus a 'map' might be an International Map of the World or an urban utility map. Access to random areas (covering parts of one or more 'maps') is easily achieved with user defined command files. Access via overlays, groups of codes or other attributes of features is provided to customer specification.

Management information on the progress of production is available and can be defined. Input data for any map is acquired from one or more input devices at one or more data capture sessions. Data is readily transferred to magnetic tape for off-line storage but can be retrieved at very short notice and immediately revised by addition, deletion or modification.

IFF Database Utilities

In addition to the standard cartographic editing software there are many utility programs.

Conversion programs

Data can be converted to various output formats including plotter drive files, national exchange standards or specific customer-defined formats.

Merge/split

IFF maps can be merged to form new maps or split into part maps.

Listing

The IPF print program produces listings of IFF maps with various levels of detail as specified by the user.

Editor

IED allows non-graphic editing of maps and header information.

Recovery and rearrangement

These utilities allow for recovery from hardware or software failures and ensure that such files are tidy.

Co-ordinate transformations

These programs convert raw digitised maps into the chosen co-ordinate system after correction for machine calibration. Optional statistics can be produced from the captured map data. Common projections can be obtained, either geographicals to grid or reverse.

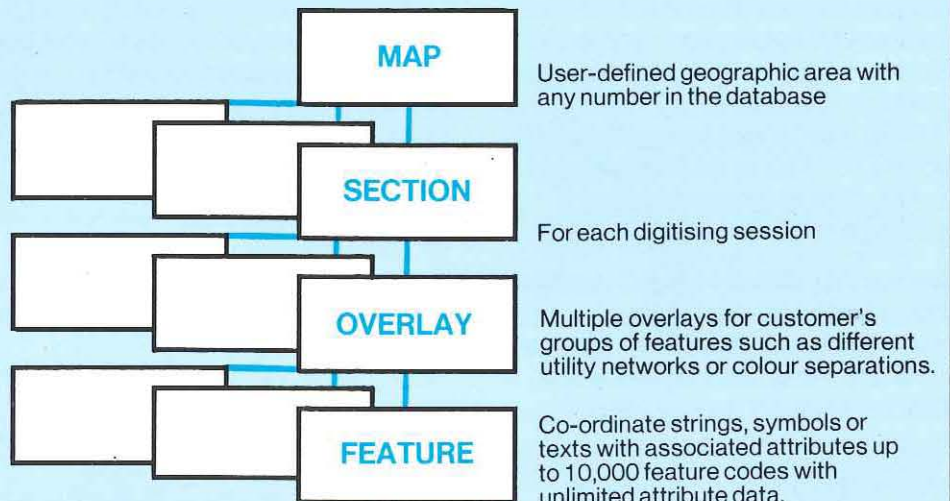
Clipping and sorting

Maps can be clipped to an exact rectangular outline in map space and sorted into logical order of overlays and features for output to magnetic tape.

IFF comparator

Differences between files can be used as a confidence check, for an edit log or for updating.

IFF Database Structure



	FASTRAK	HRD-1	L.I.T.E.S.	MLP-1
Automatic Digitising	S			
Large Screen Display	S	S		
Standard Work Station			S	
Manual Digitising		O	O	
105 mm Microfiche Plotting	S	S		
35 mm Microfilm Plotting				S
Laseraid Software	S			
Carto Editing Software	S	S	S	
On line/Off line	ON	ON	ON	ON/OFF
IFF Database Utilities	O	O	O	O
S = Standard O = Optional				



Computers

FASTRAK

HRD-1

Laser-Scan install all systems on Digital Equipment Corporation (DEC) computers and all complete new systems include the VAX 11 series and the VMS operating system. The minimum configuration for a system including FASTRAK is a VAX 11/730. Larger configurations will require 11/750 or 11/780 based configurations depending on customer requirements.

Laser-Scan can also install hardware and software on a customer's existing VAX 11 or PDP 11 system providing the latter has a current RSX 11-M operating system.

Fixed or removable disc drives and other standard peripherals are configured to customer requirements.

Further details of VAX or PDP systems can be obtained from the standard DEC literature available from Laser-Scan. It should be noted that all DEC systems supplied by Laser-Scan are standard with no modification to hardware or operating software. Laser-Scan has an OEM (other equipment manufacturer) agreement with DEC and has wide experience and a successful record of overall system responsibility.

Some systems can be installed on other computers – please contact Laser-Scan for details. The MLP-1 and the new Liquid Crystal Display can also be run off line.

FASTRAK is an automatic line-following digitiser based on the HRD-1 with extra hardware and the LASERAID software. A single FASTRAK thus provides a complete L.A.M.P.S. system including digitising, editing and plotting capabilities.

Digitising speed is up to 15 times faster than manual line following and produces a filtered vector representation of lines in real time to a user specified tolerance. Full interaction at an ergonomically designed work station with very large screen display gives full operator control over features to be captured and their coding. The unique paint-out facility deletes digitised lines from the screen and operator's view thus ensuring complete and accurate digitising whilst removing the possibility of duplication.

Maps or plans for digitising are photo reduced to an A6 size negative at a ratio determined by source document quality and line weight. Large maps are digitised in sections and merged. Calibration to eliminate camera lens distortion and transformation of data to map co-ordinates is standard.

For further details on FASTRAK ask for the separate brochure.

The High Resolution Display and Plotter is the highest resolution commercially available computer controlled display in the world with a large screen (1.0 x 0.7 m) projected image of black lines on an orange background.

A blue refresh image is used for interactive editing using the Laser-Scan Cartographic Editing Software. The unique large screen with very well-defined linework reduces windowing time in editing sessions and is a delight to use compared with all CRT screens.

The Microfiche plotting capability allows very fast, high-accuracy plotting of maps onto A6 (139 x 99 mm) size diazo film with a negative image. This film is daylight handleable and can be viewed or photographically enlarged. Optional high-accuracy software allows for correction of the enlarger lens distortions and full size plots are used for making printing plates in many situations. User-defined line styles, symbols and text fonts are available.

Utilities currently using microfiche for map storage can continue to output digital maps in their chosen format for use as an archive or in their field operations.

The present HRD-1 can be upgraded with a FASTRAK digitiser on site with all HRD-1 facilities retained.



L.I.T.E.S.

MLP-1

Cartographic Software

Laser-Scan's Interactive Editing Station was developed to allow use of the Cartographic Editing Software on standard CRT screens with an optional manual digitising capability. A typical system includes Laser-Scan's proprietary microprocessor-based controller with dual screen display, menu pad and keyboard. Options include colour raster or storage tube displays of various sizes and resolutions and a high-accuracy digitising table.

Storage display versions operate on a single 9.6 k (or 19.2 k) baud serial line to the controlling computer. Colour raster display options require parallel interfaces for very fast access to map data.

For further details on L.I.T.E.S. system ask for the separate brochure.

The Microfilm Laser Plotter writes directly with a laser beam onto 35 mm film producing a very high quality image with a resolution of 10 microns. It can be used on or off line and can use plot files in several common formats.

Microfilm plots can be used as a hard copy archive or for external field use. Existing investment in microfilm viewers and printers is thereby fully exploited while gaining the full advantage of a digital system.

In addition to the MLP-1 plotter, Laser-Scan support all major cartographic output plotters, including Calcomp, Gerber, Ferranti and Kongsberg. Existing plotter installations can be interfaced to the L.A.M.P.S. system for total integration.

For further details on the MLP-1 plotter ask for the facts sheet.

Laser-Scan's cartographic editing software is available on L.I.T.E.S. work stations operating on VAX or PDP 11 computers. It is continually upgraded and is tailored to customer requirements. IFF or customer-defined database files are read into an efficient data structure for graphical editing.

Display representations of lines, symbols and text are defined by Legenda tables allowing for each user's varying map specifications. Edit operations can be carried out on features, parts of features, or groups of features. Interaction is by function button and tracker ball on the HRD-1 or by menu and cursor on the L.I.T.E.S. system. Less frequent commands can be input via the keyboard.

Security is assured by the fast dump facility that the system provides and final output is to a new file with original data maintained. Optional deletion of the original data is a standard feature.

Software is specifically designed for cartographic data manipulation. Customers can edge match stereo models and digitised maps, edit out manual digitising errors and update database files.

The use of Laser-Scan's Cartographic Editing Software covers all scales of conventional mapping. It allows access to, or updating of, non-graphical attributes as well as graphics. Data can be selected in an arbitrary manner for both display and output purposes.

For further details see L.I.T.E.S. brochure and the Cartographic Editor User and Reference Manuals (Spec No 15).





THE QUEEN'S AWARD FOR
TECHNOLOGICAL ACHIEVEMENT 1982

Laser-Scan was founded in 1969 by researchers from the famous Cavendish Laboratory of Cambridge University, England, to produce and market high technology equipment for high energy physics applications.

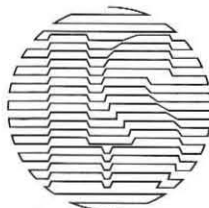
The skills and technology incorporated in the original equipment have been enlarged and exploited in a variety of systems, including film analysers, displays, semi-automatic digitisers and both large format and microfilm plotters. Common to all is the high resolution and speed which stem from the company's basic computer-controlled laser deflection technology, and the skilful harnessing of advanced techniques in optics, mechanics, electronics and computer science to meet complex requirements.

These products have found markets worldwide with many high energy physics groups, computer graphics users, research and design departments and cartographic production organisations. The expanding requirements of products and markets have meant a progressive building up of internal and external services at Laser-Scan. These services enable the company to undertake research and development contracts of either an open or a classified nature. Laser-Scan also operate a plotter and digitiser bureau service at very competitive rates.

The company is based in a modern factory on the Cambridge Science Park which houses design, engineering and manufacturing, research and development, sales and service, software systems and administration.

Most of the staff are professionally and academically qualified. A broad range of disciplines and experience within Laser-Scan means that the company is extremely competent at systems analysis and problem solving. It is well supported by modern in-house computer systems, specialised test and inspection equipment, experimental and production workshop areas and photographic and optical laboratories.

Laser-Scan's close connections with Cambridge University ensure the availability of considerable resources and expertise on a consultative basis. The combination of these assets gives Laser-Scan a unique advantage in the high technology of its product and market area.



LaserScan

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