



JUST TWENTY YEARS after its founding, in 1969, by a group of researchers from the famous Cavendish Laboratory at Cambridge University, Laser-Scan has achieved the position of a world-leader (and world beater) in data-capture, terrain analysis and GIS with a range of products which are second to none.

Early days

From its very beginning, Laser-Scan took the industry by the scruff of its neck and shook it with the development of advanced data capture products based on laser technology. From these developments came mass digitising on a scale never previously achievable – typically, ten times faster than manual digitising.

Laser-Scan used this wealth of knowledge and built on it to establish close working links with commercial customers and established institutions. As a result, the passing years saw steady – and at times spectacular – advances in the fields of digital mapping and GIS. The result has been the emergence of Laser-Scan as a company that not only provides digital mapping and GIS systems, but which can also take customers' specific requirements and problems and provide the SOLUTIONS to them as well.

Laser-Scan is now positioned to make an even greater impact on its markets, following last year's merger with the Imtec Group plc. With this strong backing Laser-Scan is already making an impact in terms of customer benefits and service as well as in future development strategy.

Laser-Scan's headquarters, the Cambridge Science Park.

Today's markets

Typical examples of where Laser-Scan solutions have proved to be winners are in mapping agencies, environmental agencies, central and local government, the armed services, utilities and emergency services.

Laser-Scan is increasingly a market-led company. Not for them the old British problem of having an apparently good product and then going out to look for a market niche where it might sell!

Expert analysis of market trends and the relating of these to specific customer requirements, has led Laser-Scan to produce products for which there is a known market need.

Concurrent with this approach has been the ability to move swiftly and effectively into areas where the competition has either been lacking in terms of solutions, or slow to appreciate market requirements.

Not content with this, however, Laser-Scan not only continues striving to address the vital issues affecting today's application areas, but is also carefully planning future developments in order to enhance its solutions to tomorrow's problems.

Capturing the world

It was in the area of Data Capture that Laser-Scan first made an impact 20 years ago. It is still an area in which the company is unsurpassed. The techniques used have

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evolved to an extent where they are very much 'state of the art' – of vital necessity to keep pace with the ever-increasing geographical database population demand.

The importance of advanced data capture techniques is not always appreciated until customers are faced by realistic cost breakdowns. Then, and only then, do they come to understand that at least 75% of the cost of commissioning a complete Geographical Information System can be set against the conversion of data held in paper map form.

Despite the amount of work already done by Laser-Scan for its own customers, or by customers themselves, only a small percentage of maps have been converted to digital format. Of those that have, most have been laboriously hand-digitised and these have suffered the inevitable problems of quality assurance and operator motivation.

Typically, Laser-Scan has been market-led to develop products to address these problems, using scanned map data and intelligent algorithms to reduce dramatically the time and cost of data capture.



VTRAK system at Summerside Associates, St Neots, Cambridgeshire.

One particularly dramatic software breakthrough is VTRAK – a combination of interactive and automatic feature extraction which is rapidly being recognised as the only really effective way of capturing complex graphics without extensive pre- and post-capture editing.

With VTRAK, data is easily layered and attribute coded, making it suitable for topographics, thematic and utility maps. Most importantly, however, quality and consistency are consistent with the highest national standards used by NJUG and the Ordnance Survey.

Map data capture is now big business. Central and local government, utilities, environmental agencies and emergency services are all increasingly striving to improve their efficiency and performance. With VTRAK, Laser-Scan has implemented pragmatic and cost-effective algorithms and techniques on a standard workstation accepting input from a variety of scanners. While systems often take a global approach to scan data, VTRAK applies image processing recognition and other techniques in a selective approach.

It is not just the technical excellence of products in isolation which is the key to success, however, but also their refinement for effective commercial utilisation, as well as their ability to generate benefits for users whether in terms of profit, quality or other measures of efficiency. This has been the real reason for Laser-Scan's recent successes, which is well illustrated by organisations such as Taywood Data Graphics and Summerside Associates, both of whom bought systems on their benefits.

To quote Philip Platt, Planning Specialist with Taywood Data Graphics:

The results obtained by a combination of auto- and semi-auto facilities are of a higher quality than have been seen by full automation and are much faster than manual digitising alone. Moreover in the cases that have been attempted, the product and cost has been acceptable to the end user and this by any standard is the result for which we all strive.

Taywood's experience over six months using VTRAK has proved that the software has had a beneficial effect on the work TDG had carried out by other means (large scale mapping) and has also allowed the company to tackle other work for which traditional methods would not have been cost-effective or appropriate.

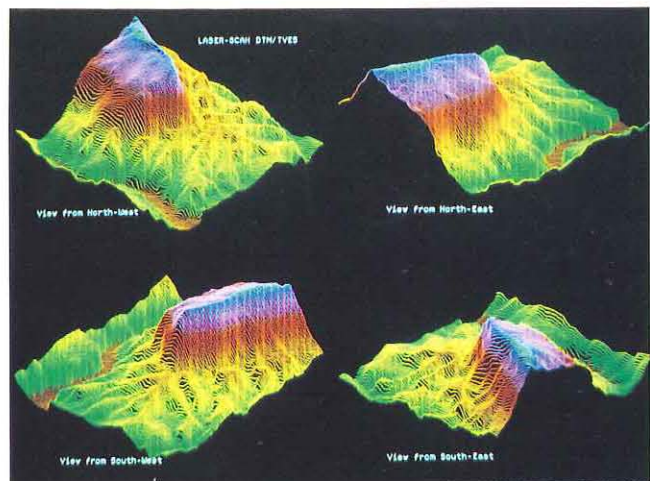
Terrain Analysis

Given the company's record for innovation, it was almost inevitable that Laser-Scan would become involved in terrain analysis at an early stage.

Originally, the processing of vector map data began with the production of paper maps as the final objective. Increasingly, however, map data began to be used for analytical purposes, including using Digital Terrain Models generated from digital contour data. The growth of Geographical Information Systems pushed DTMs into the background for a brief period in the mid-1980s. The reasons for this were because the primary applications of GIS became concerned with linking vector data to relational databases for applications such as land parcel information systems and public utilities' records systems.

Stored in a raster format, DTM data is easily manipulated. The processing utilities for operations on terrain data within the Laser-Scan system include features such as Slope and Aspect Generation; Shaded Overlays; Intervisibility; and 3-D perspective views and solid modelling.

In a sense, progress has come full circle with DTM processing and manipulation is now perceived as an



Laser-Scan Terrain Analysis and Visualisation.

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integral part of a GIS. Typically, Laser-Scan has achieved the integration of all GIS functions – that is data capture, conversion, maintenance, manipulation and output – within the one system.

Now, in an increasingly environmentally-conscious world, Terrain Analysis and Digital Terrain Modelling are coming into their own. In conjunction with other information such as vector data, satellite imagery and attribute data, they are being used for an increasingly wide range of applications involving environmental impact analysis and communications planning.

Environmental Impact Analysis

This has only recently become a crucial 'player' in the development 'game' if, indeed, development and re-development can ever really be called a game. With the increasing influence that everything environmental is now exerting on our lives, the development of EIA has gone ahead at a great rate. What is particularly interesting is how it is not all concerned with the visual influence of a new development on the existing landscape, but also with predictions as to its effect on existing environmental systems and structures.

Terrain Databases and associated software have a major role to play in both applications and here, as elsewhere, Laser-Scan's system is now being used by a number of organisations to assess the impact on the landscape of developments such as opencast mining, afforestation, transmission line construction and large scale industrial construction.

Landscape architect Ed Sharkey of Anthony Walker & Partners, leading landscape architects and planning consultants, and one of Laser-Scan's many customers, says:

Anthony Walker and Partners chose Laser-Scan because their mapping expertise and the breadth of coverage of their DTM software has a flexibility that best met our company's needs at an affordable cost.

EIA is not concerned with simply whether a building is going to look right or wrong in its chosen setting, or whether it is going to please or aggravate those living nearby. Many factors need to be taken into account such as the whole construction phase (site, plant, disruption and noise), the impact of associated transport, the removal of existing landscape features and the possible addition of new ones. In afforestation, for example, the short and long term visual effects need to be assessed in terms of growing time and growth patterns of the trees in question.

Laser-Scan systems are being used to aid the interactive design and location of developments, and as part

of developers' representations at public enquiries. In this context, the three main applications involved are inter-visibility, 3-D visualisation and volumetric calculation. For all these, Laser-Scan's techniques have proved to have considerable advantages over the traditional manual methods of volume and line of sight calculations, involving the analysis of contours on paper maps, or the use of an artist and photomontage techniques.

Communications planning

This has become something of a priority in our modern high-speed world where radio, television, cellular and mobile radio telephones are all jostling for space on the crowded airwaves.

A principal use, by Laser-Scan customers such as Philips Radio Communications, is the prediction of field signal strength. This is estimated by analysing the signal path loss from transmitter to receiver. Signal strength data is used for the planning of communications networks, rapid optimisation of radio links, siting of transmitters and the prediction of areas subject to co-channel interference.

While terrain elevation information can be derived from the DTM, this is insufficient since both height and density of natural and man-made surface features can influence considerably signal strength. Surface features are referred to as 'clutter' and are often more important than the terrain in determining signal strength loss.

Using the Laser-Scan system, the signal strength or coverage data may be presented in combination with the grid DTM and clutter data or with vector map data. This allows the information to be presented as a 3-D view. Because of its flexibility, the system also allows for features that are important to a particular application (such as roads for mobile in-car communication, or urban boundaries for television transmission) to be overlaid on the coverage grid. Alternatively, it is possible to contour the coverage grid to produce a vector contour map showing signal strength.

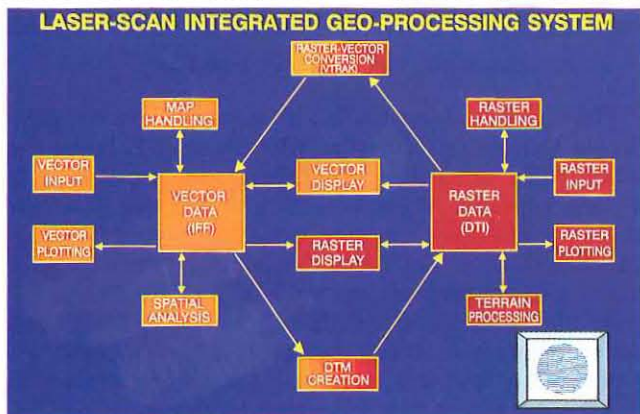
David Kinch-James, Propagation Group Support Manager with Philips, echoes the words of many different Laser-Scan customers when he says: 'We use Laser-Scan software because its flexibility and accuracy gives us the edge to stay ahead in our competitive market place.'

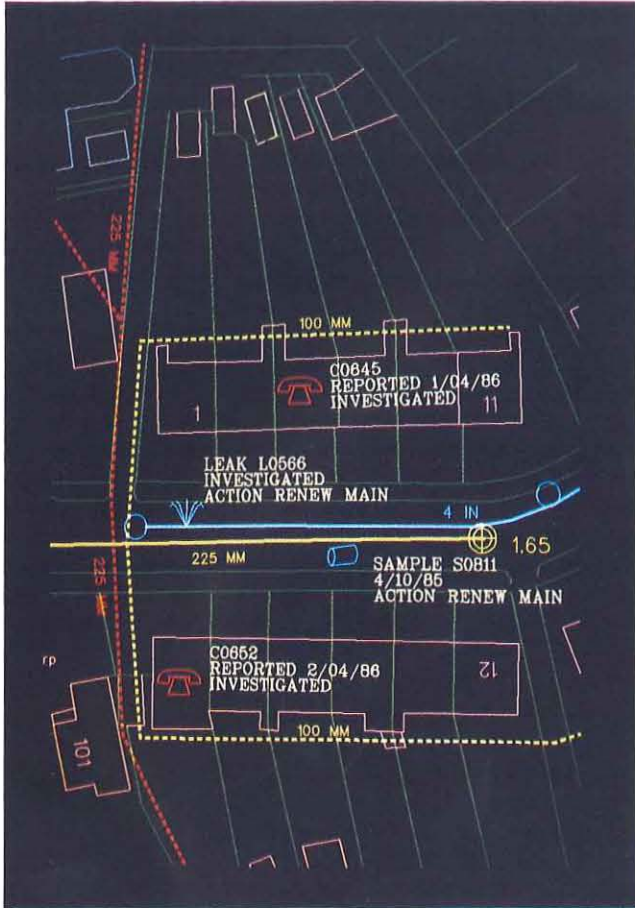
Geographical Information Systems

The developing field of Geographical Information Systems has characteristically been enthusiastically embraced by Laser-Scan and introduced into three important growth markets, providing systems for Public (or soon to be privatised) Utilities, Local Authorities and Environmental Agencies.

Laser-Scan is the sole UK distributor of INFORMAP, a georelational database software toolkit, optimised for the large corporate mapping user. INFORMAP avoids the overheads of greedy storage and the difficulties of developing mapping solutions via a general purpose graphics product.

Among its users are utilities such as British Gas, who have selected INFORMAP for their National Digital Records System, which is to be installed in all Regions. This is the largest and most significant sale of its type in this country. Other major users of INFORMAP are Anglian Water, Bristol Waterworks Company and Wessex Water.





Utility Asset System.

Wessex Water was, in fact, Laser-Scan's first GIS customer back in 1985. Since purchasing INFORMAP Wessex have completed the conversion of their entire inventory of water supply assets into the system and the database has started to supply paybacks.

According to David Beal, Wessex Water's Head of Information Systems:

The GIS system has a tremendous input to the Asset Management Plan, providing executives with accurate and instant management information so that policy and strategy can be effective. Also, direct access to plant information means that we can reduce downtime and improve our service to the customer.

Local Authorities need only look as far as Laser-Scan for their own software package designed to meet all their mapping and GIS needs. Appropriately called METROPOLIS, Laser-Scan have designed a system which allows each user to store and retrieve specific asset/event information against a common map base.

Furthermore, METROPOLIS gives authorities a comprehensive range of manipulative facilities unrivalled by any other product. These include, for example, a continuous digital map which is scale-free; random access via a gazetteer so that the user can window-in on a particular street name or district; multi-user access in real time; the manipulation of the alphanumeric attributes of a map feature to make analysis and reporting possible and a distributed database.

In addition, department specialists can access application-specific procedures under menu control such as street furniture inventory; accident statistics; drainage records and social service studies amongst many others.

Laser-Scan's view of the future

Laser-Scan specialists have published widely on how digital mapping and GIS technology may be expected to develop over the next ten years. Key words for the future include 'Integration', 'Distributed Databases' and 'Standards'. Integration of all forms of geographical data has long been a goal for some Laser-Scan users (e.g. the military). Data may arrive in map form, as aerial or satellite images, as terrain models or as geo-referenced data in corporate database.

Mike Jackson, Laser-Scan's managing director, who was Chairman of a European Working Group on Integrated GIS which first introduced the IGIS acronym, believes that:

Laser-Scan's attention to future needs is the low level design of products. Its anticipation of the need for greater integration places it in a powerful position to maintain its lead as customers catch up with the more powerful capabilities already available to defence agencies.

In database development, Laser-Scan looks to continue its policy of giving the customer choice and, therefore, maintains independence from any single proprietary database. This enables the company to offer an integrated product to any modern relational database management system that supports the standard SQL query language.

In fact, adherence to International Standards is a strong theme for the future, and Laser-Scan's Robin Fairbairns has represented the UK on behalf of the Department of Trade & Industry for a long time, as a spokesman at International Standards Organisation (ISO) graphics meetings.



Laser-Scan's training and consultancy.

The future does not just lie with more and more sophisticated technology. Laser-Scan's GIS already offers the functionality needed by the commercial user. What is equally important is product tailoring the user interface and its efficiency in a production environment. What Laser-Scan users have found is whether they are in a major Government organisation, a multinational company (such as BP, Philips or Racal) or a newly established data conversion or survey organisation, Laser-Scan offers a return on their investment which helps its users to become leaders of their respective industries.