

Laser Surface Authentication LSA™

Security Solution Presentation



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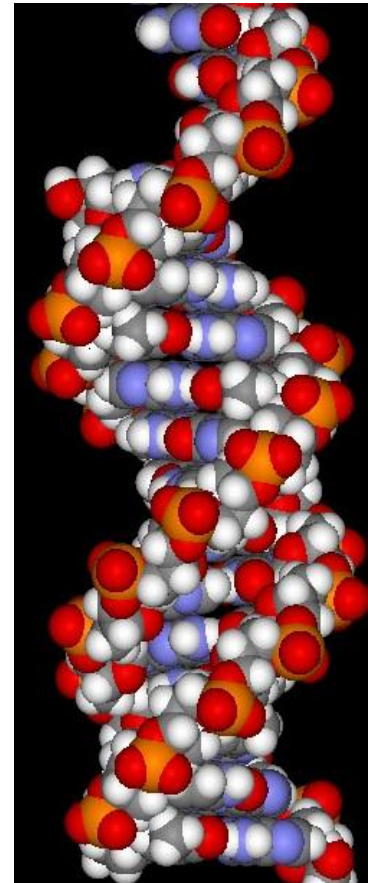
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Ingenia Technology

Ingenia Technology was founded in 2003 following many years of research funding at Durham and Cambridge Universities and more recently at Imperial College, London. This work, under the leadership of Professor Russell Cowburn, inspired the development of the LSATM technology that forms the basis of this security solution. LSATM is protected by numerous worldwide patents.

Ingenia is part of the NewScope Group, a Swiss-based, privately funded business, comprising a number of specialist high-end technology companies. NewScope is a science and innovation driven conglomerate with widely diversified individual technology businesses and activities including design, research, development, manufacturing, marketing, and the supply of innovative products and services.

Ingenia Technology (UK) Limited has its headquarters in London with satellite offices in Vienna and Zurich. The Ingenia team consists of a mix of business and security experts and of specialist engineers and physicists with many years of experience in electronic and product engineering and includes three members of the original research team from Imperial College.



Laser Surface Authentication (LSATM)

Revolutionary Technology for Document and Branded Product Security

Most traditional methods for establishing the authenticity of documents and high value products rely on some manufacturing process which is difficult to reproduce. Examples of such processes include adding watermarks, security printing, colour shifting inks and holograms. However, whilst these are often very difficult to replicate, experience tells us that it is not impossible.

Using a breakthrough, proprietary and patented technology, Laser Surface Authentication (LSATM), launched in August 2005, Ingenia is able to rapidly analyse the surface of any item and read a unique digital serial code. This code, which has been described as being like a fingerprint or DNA sequence for the item, is unique for every document, card and carton and can be used to uniquely and unambiguously identify the

item. The serial code is naturally-occurring and is not added by any manufacturing process.

The technology can be used with most materials including paper, cardboard, plastics, metals, ceramics and textiles. As such LSA™ is ideal for the protecting documents, personal identity, packaging and products against counterfeiting and fraud.

Figures (i) and (ii) below show microscopic scans of the surface of security paper and plastic cards respectively.

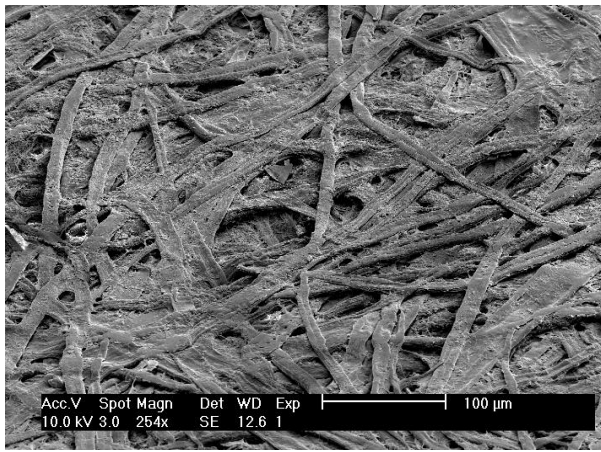


figure (i)

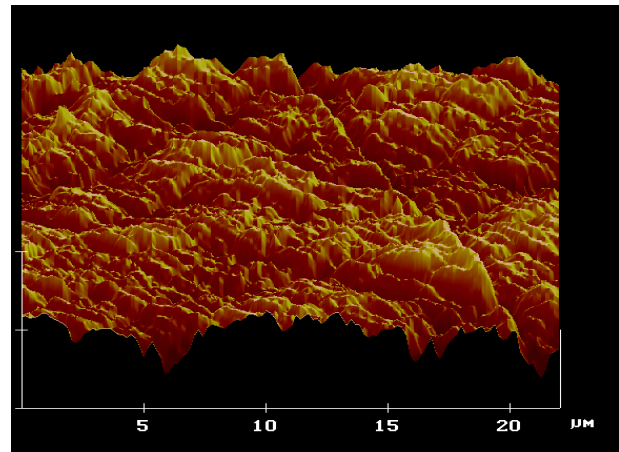


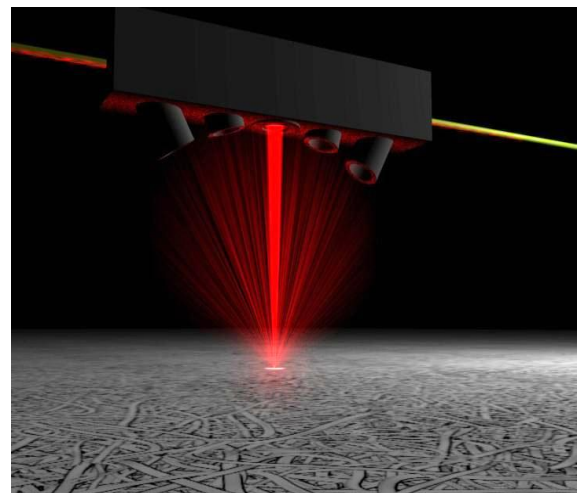
figure (ii)

How it Works

The technology operates by examining the fine structure of different surfaces using a focused laser, and recording the intensity of the reflection in a reproducible format.

The system uses the laser to read the surfaces naturally occurring 'fingerprint'. This information is securely stored on a database.

An item can then be checked and verified by performing a further simple scan which automatically compares this with the existing stored 'fingerprint' data. This can be achieved in seconds using a portable scanner.



The technique has been applied to a variety of materials including paper, plastic, metal and coated paperboard packaging and results in clear recognition between the samples. A typical comparison scan of paper is shown in figure (iii) below.

Recognition continues even after items have been subjected to rough handling, such as submersion in water, scorching, abrasive scrubbing, printing and staining.

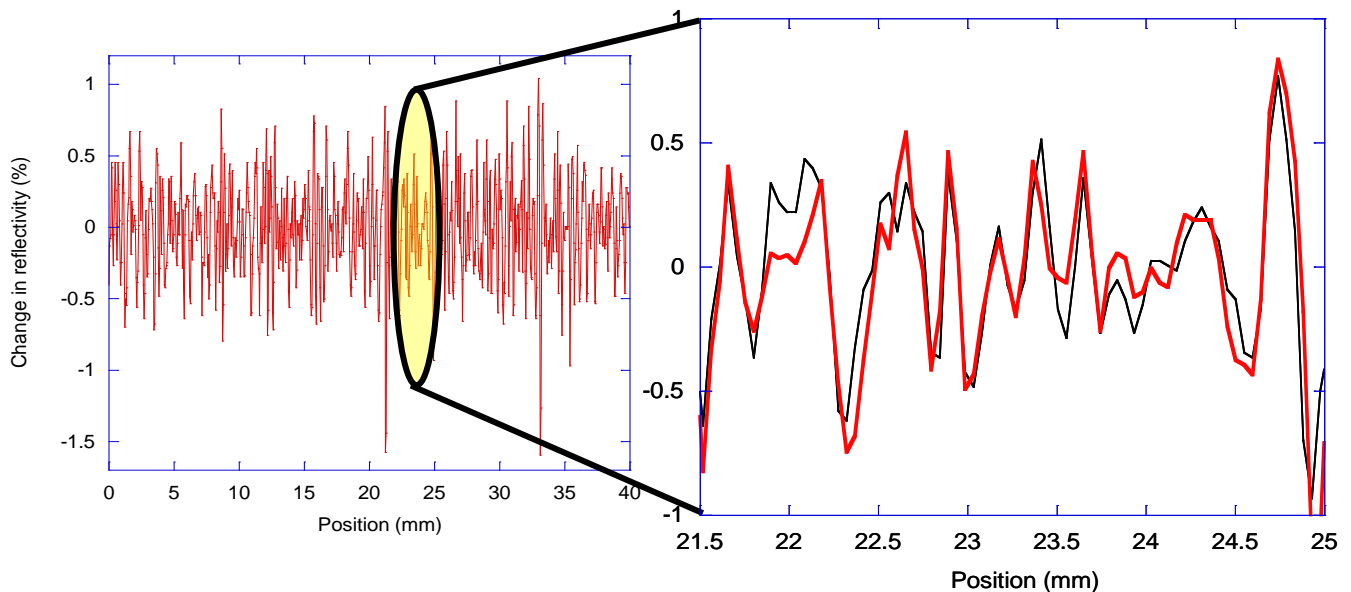


figure (iii)

Technology Advantages

LSA™ is highly secure to the extent that, even as the inventors of the technology, we are unable to replicate it since there is no known manufacturing process for copying surface imperfections at the necessary level of precision.

There is no need to modify the item being protected in any way with tags, chips or inks. It is as if documents and packaging have their own unique DNA.

LSA™ provides a covert and economic solution that is simple-to-integrate into the manufacturing process and is immune to attacks against the security feature itself.

The unique ‘fingerprints’ are naturally occurring and not issued by any third party coding authority, allowing greater security and independence for the user.

Privacy neutral technology - LSA™ authenticates the item without storing personal details of an individual or organisation.

LSA™ can detect not only counterfeit products, but also unauthorised products manufactured on genuine production lines.

LSA™ can 'time-stamp' every scanned item which enables any unauthorised manufacture to be classified as counterfeit.

High speed scanning is possible in a production environment using the latest generation ILS 2100 line scanners that allow scanning at up to 240 m/min, or 10 items per second - see figure (iv).

In-field scanning is possible with the IFS 4000 portable scanner – see figure (v).

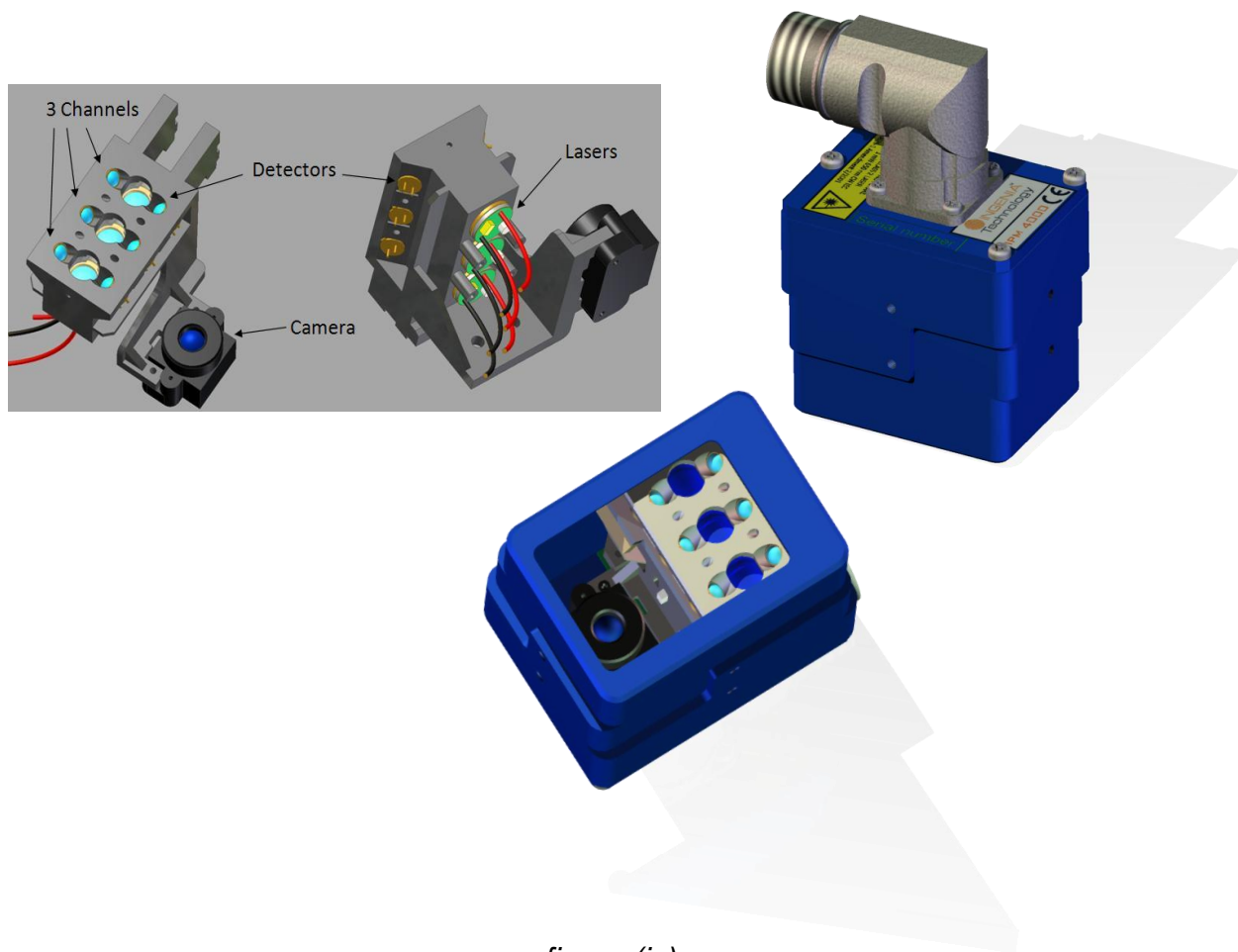


figure (iv)



figure (v)

Technology Benefits

- Low per-item cost with no tags to purchase or become detached.
- No modification to manufacturing process required.
- Can be applied retrospectively to existing documents, cards, packaging or item.
- Extremely high uniqueness: the probability of two naturally-occurring codes matching is typically 10^{30} , but can be as low as 10^{150} .
- No known method to fraudulently copy a code.
- Covert.
- Robust against wear and tear and intentional or malicious damage.
- Privacy neutral.
- The signature can be affixed to documents/surfaces in encrypted bar code form.
- Fast and effective authentication system.
- Scalable solution to meet customers' requirements.

Database Requirements and Solution Architecture

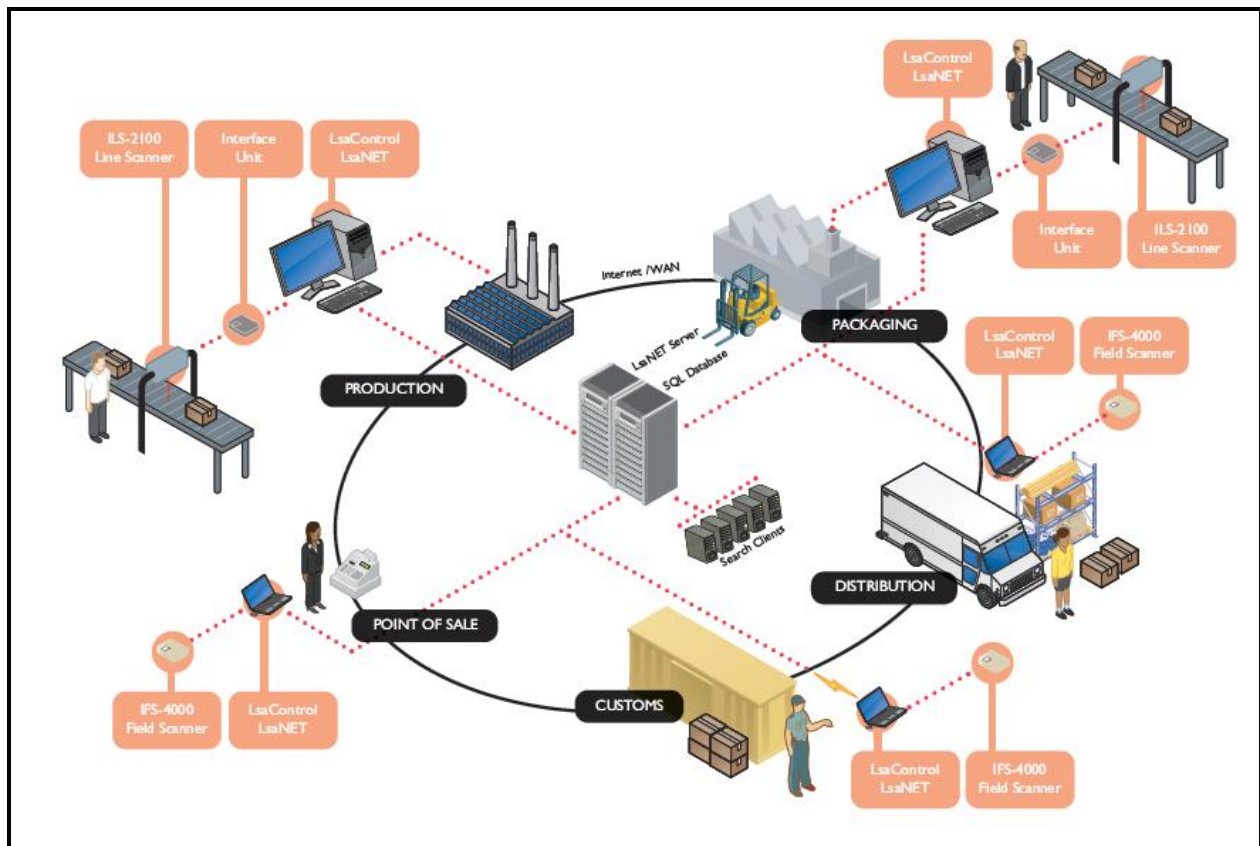
LSANet™ is the software platform developed by Ingenia.

LSANet™ can perform high-speed one-to-many database searches.

LSANet™ provides all the software required to turn a standard database application into a fully functioning secure LSA™ database, capable of capturing LSA™ fingerprints at the point of manufacture, storing them safely and then rapidly searching them in response to a query from an LSA™ field scanner.

LSANet™ allows the fingerprints of 100 billion items to be stored at low cost.

LSANet™ software automatically generates clear evidence reports.



Accurate & Fast Technology

The uniqueness of the LSA™ measurement is often greater than that of DNA with a uniqueness of at least one million trillion. Authentication of an item can take place from almost anywhere in the world by accessing the LSA™ platform.



Solutions

The LSA™ system can be used to validate the authenticity of official documents, passports, visas, evidence certificates, ID cards, packaging and products.

LSA™ can be customised to meet individual requirements.

LSA™ can be also used:

- In the protection of national borders through the authentication of documents and personal identities
- To identify counterfeiting of pharmaceuticals, tobacco products, alcohol and other vulnerable goods.
- To ensure secure supply chain management.
- To help detect currency counterfeiting.
- For authentication of critical parts for the aerospace and automotive industries.
- To reduce 'grey market' issues.
- To prevent revenue fraud.
- Forensic analysis.
- Art and collectable item authentication.
- Document security.



LSA™ can be implemented as a standalone system for product authentication or as part of an integrated solution alongside other complementary technologies such as RFID or biometrics where total supply chain visibility or increased personal security is a customer requirement.

System Integration

As described above, LSA™ has been designed to have the flexibility to be adopted by many market sectors for the authentication and tracing of a wide variety of products. Ingenia has solutions available for most production environments and can also manage the development of bespoke implementations with the ILS2100 proving to be an excellent and robust scan head for high speed applications.

This hardware together with the LSA™ software package enable LSA™ to be implemented at a scale that suits any business requirement, from a compact standalone system to a fully integrated, multi-site installation that enables total supply chain management.

Ingenia can take over the management of as much of this as is deemed appropriate and has a great deal of experience of this type of process and of hosting large databases on remote servers.

Project Evaluation Process

In our experience, every LSA™ application is different and a thorough evaluation is therefore required to ensure that the correct solution is found for each customer. This process usually takes the following route.

- Initial meetings to present Ingenia Technology and LSA™ in more detail and to gain a complete understanding of the customers' requirements. At these meetings a project specification will also be discussed and agreed.
- First engineering evaluation. This usually takes the form of a two to three day visit by two engineers to look over the production equipment and then set-up test scanners to evaluate the exact hardware and software requirements.
- Second engineering visit and supply of hardware for extended trials. This typically involves a three to four day visit by two engineers.

It is expected that following this three step process, enough data would be available to specify a full implementation. It should be remembered however, that customer requirements and solution vary enormously and that these steps can only be used as a guide.

Summary

LSA™ is a revolutionary new technique that allows the natural characteristics of a document or product to be simply and reliably used for item level authentication and tracing. Worldwide patents protect LSA™ and Ingenia has developed a complete system to allow high-speed, on-line scanning of items, and software to manage these codes in a database and then allow retrieval using a robust, portable scanner.

Ingenia has extensive experience of the integration required for LSA™ scanning of products and can manage this process from start-to-finish. Ingenia can supply all the hardware and software specified and has system engineers to support evaluation trials and final system implementation.

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