

Laser Surface Authentication™

Natural Randomness as a Fingerprint for
Product Authentication and Tracking

Ingenia Technology

- Established in 2003
- Based in London
- Private venture funded
- Part of the NewScope Group
 - Science and Innovation driven business based in Zurich
- Launched Laser Surface Authentication™ technology in 2005
- LSA invented through long-term funding of research at Imperial College, London
- Global Patents held for LSA technology

Principle of operation

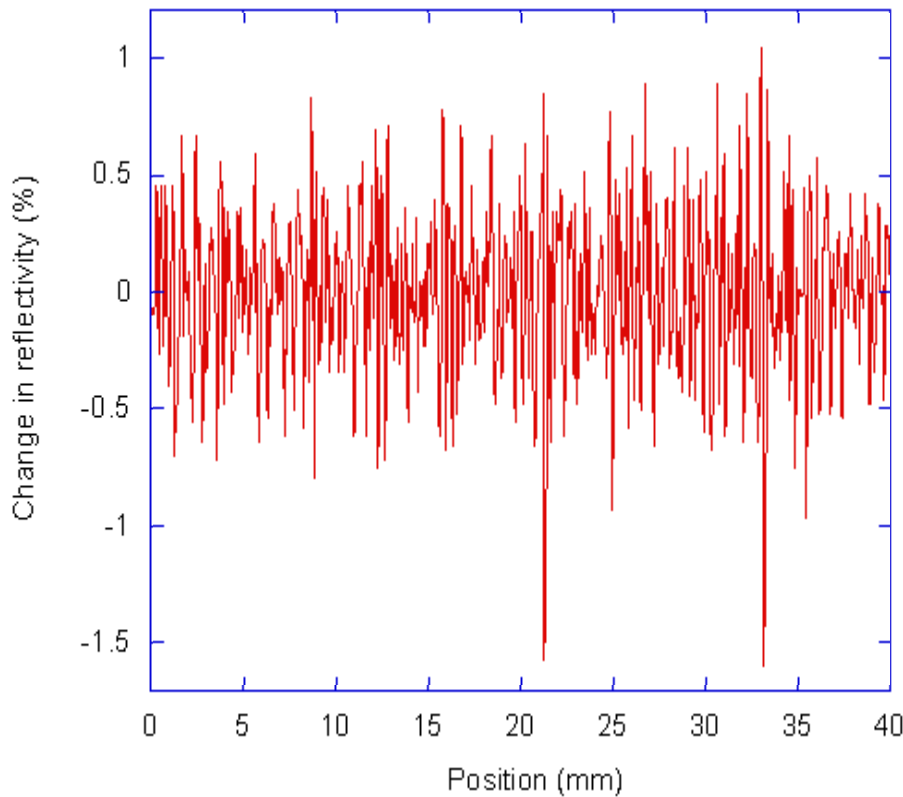
- Identification of the equivalent of a fingerprint, iris-scan, or other biometric for a document or product, for item-level self authentication and tracking
- Base this biometric on naturally occurring microscopic randomness that cannot be controlled by anybody and therefore cannot be copied
- Read the random biometric and store it in a database
- To verify authenticity, re-read the “fingerprint” or signature and compare it with the database original
- Additionally, use this signature to cross-reference other information or databases

Two key questions

1. Do paper and other material surfaces have naturally occurring randomness? **YES**
2. Can we measure them economically and conveniently?

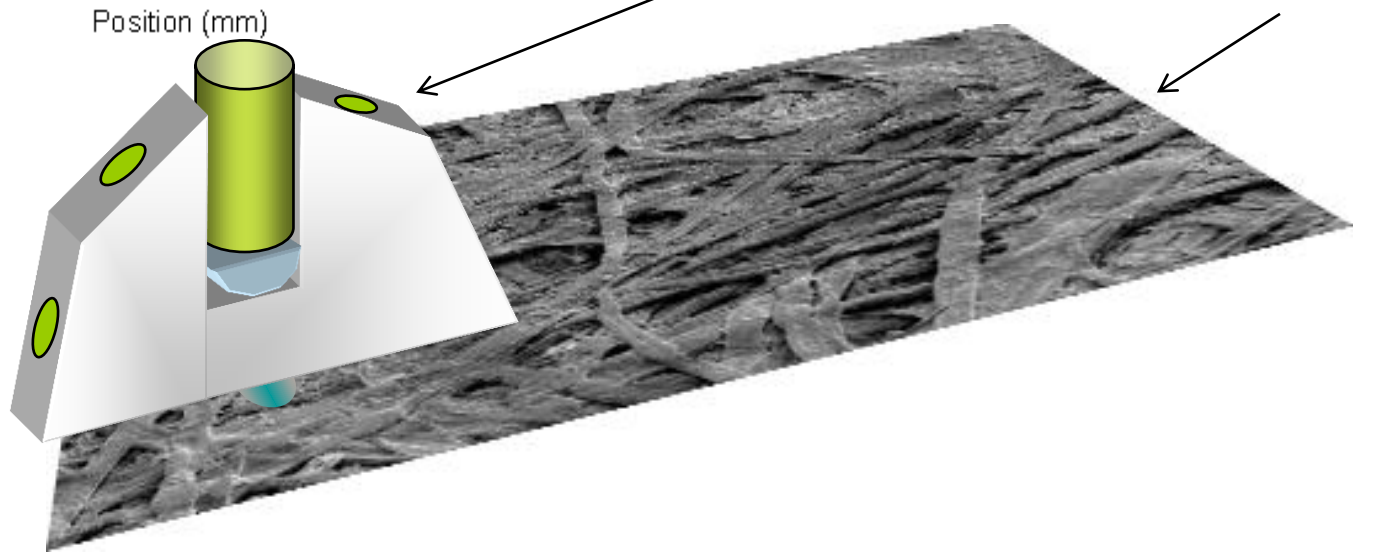
LSA uses laser scattering and allows the 3-dimensional surface topography to be probed with sub-micron resolution

The Basic Design



Scan trace

Scanning head moves across material surface to produce scan trace




Substrate

Scanning speed

- Scanning speed is determined by how quickly the scan head can be made to move with respect to the object
- For low-cost, portable, hand-held scanners, scanning takes ~1 second.
- If the object is already moving (e.g. on a production line), linear speeds of 4 metres per second are possible (100kHz analogue sample rate at 35µm spacing)

Database requirements

- Between 125 and 750 bytes are required to store each signature
- A standard PC could store around 300 million signatures
- Alternatively, the signature can be stored on the document using an encrypted / digitally signed 2D bar code, smart chip etc. 
- Ingenia's proprietary software platform allows a robust, low-cost distributed database to be formed from servers across the world, making conversion of LSA scan into product ID transparent

Applications

- LSA has been tested on:
 - Standard and security papers
 - Plastic cards - identity and credit types
 - Passports
 - Plastic substrates and laminates
 - Printed products
 - Cardboard
 - Matt and gloss cartons

All exhibit a strong LSA signature that can be authenticated

Applications cont.

- High speed online reading of LSA signatures are in progress across several high volume industry sectors
- Read rates and accuracies are proven to be high and to exceed customers requirements
- In-field scanning and laboratory systems are being utilised and have proven to give good retrieval accuracy
- Ingenia is currently hosting database applications for customers on secure servers in London and Zurich

Advantages – security team

- LSA uses the natural surface of virtually any material to produce a unique “fingerprint” or signature for a product
- Nothing is added to a product, so nothing to copy
- Every material surface is unique, so no chance to replicate or fake, even by genuine supplier
- No code to remove to avoid supply-chain monitoring
- Simple, reliable in-field checking for:
 - Product authentication
 - Smuggling
 - Diversion
- Robust coding with in-built redundancy for real world practicality

Advantages – product designer

- LSA uses the natural surface of virtually any material to produce a unique “fingerprint” or signature for a product
- Nothing is added, so no compromise to your product, pack or document design
- There is no need to alter the product or package in anyway, providing excellent design freedom
- No ugly black and white codes needed
- No use of valuable pack or document “real estate”
- Virtually to limitation on material used
- No limitation on colour choice
- No limit to the amount of items being coded

Advantages – operations team

- LSA uses the natural surface of virtually any material to produce a unique “fingerprint” or signature for a product
- Nothing is added to a product, so no need for additional in-line printing of codes
- In-line scanning units can be added to virtually any production process
- Scans possible at up to 240 m/min line speed
- Ingenia can host and manage a full database implementation or link with existing company systems
- Operations and supply-chain data can be integrated with LSA scan data to give a complete “end-to-end” solution

Further information

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