Laser Surface Authentication™: Natural Randomness as a Fingerprint for Product Authentication:

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Background

- Most traditional methods for establishing the authenticity of documents, packaging and high value products rely on some manufacturing process which is difficult to reproduce.
- Examples of this include watermarks, holograms, optical recognition systems, bar codes and RFID. However whilst difficult to reproduce, it is by no means impossible to do so.

"IF YOU CAN MAKE IT YOU CAN FAKE IT"

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Breakthrough Technology

- New research by Russell Cowburn (Prof of Physics & Nanotechnology at Imperial College London) has found a way to transform) the microscopic imperfections in the surface of materials into a unique physical identity code. This completely new science follows the discoveries by Prof. Cowburn of the properties of Diffuse Laser Scattering.

- This covert ‘fingerprint’ is intrinsic and based on naturally occurring microscopic randomness and is thus virtually impossible to modify controllably.

- It can be rapidly read using a low-cost portable laser scanner, using a technique called 'Laser Surface Authentication' (LSA), and can be applied retrospectively to existing documents or as a bolt-on to existing manufacturing processes as there are no add-ons required or special production methods needed.

- The ‘fingerprint’ has also been shown to be extremely robust and durable under extreme stress situations when applied to a document such as crumpling, soaking, charring in an oven and covering with inks or abrasing with wire wool.

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Technology Objectives

- Try to identify the equivalent of a fingerprint, iris-scan, or other biometric of a document or packaging, for item-level self tagging.
- Base this biometric on naturally occurring microscopic randomness that cannot be controlled by anybody. ‘Intrinsically read only.’
- Read the random biometric and store it in a database.
- To verify authenticity, re-read the fingerprint and compare it with the database original (‘closed loop authentication’).
- Additionally, the fingerprint can be cross-referenced with other information or data bases.

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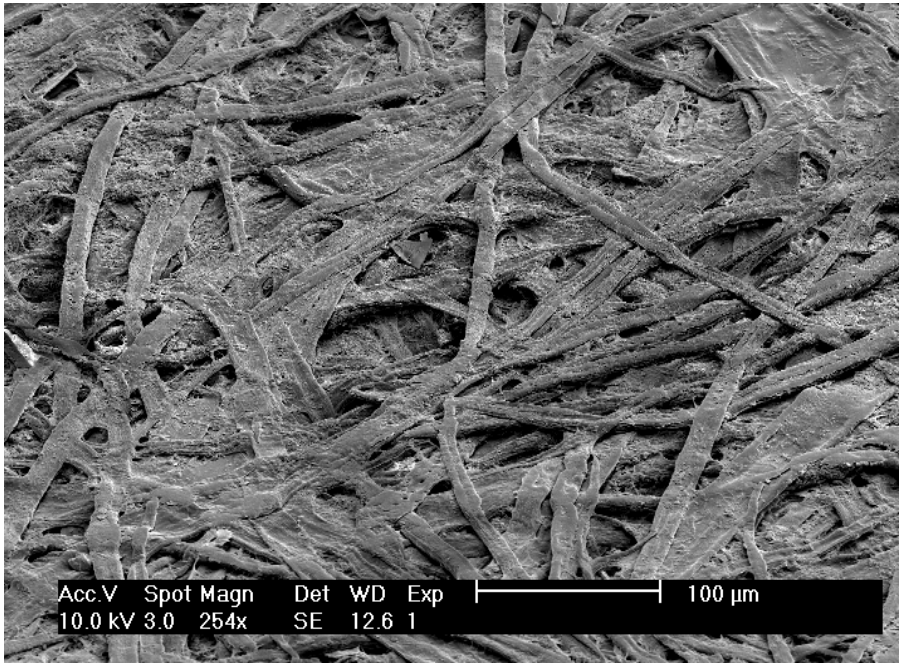
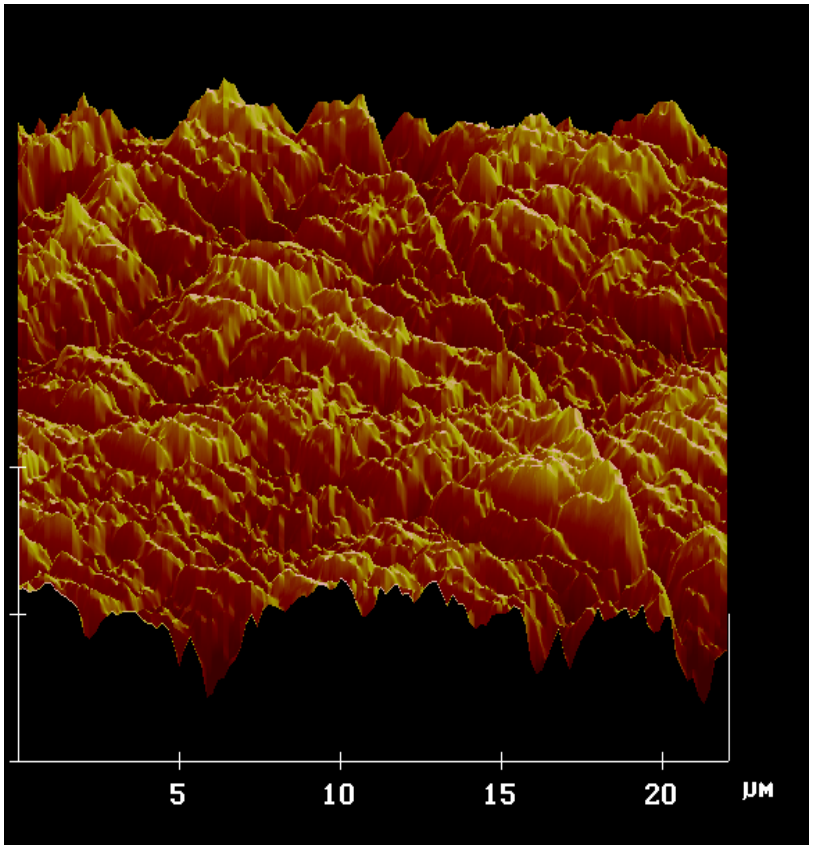
Surface images



A microscopy image of paper

Atomic Force Microscopy of plastic card



100nm

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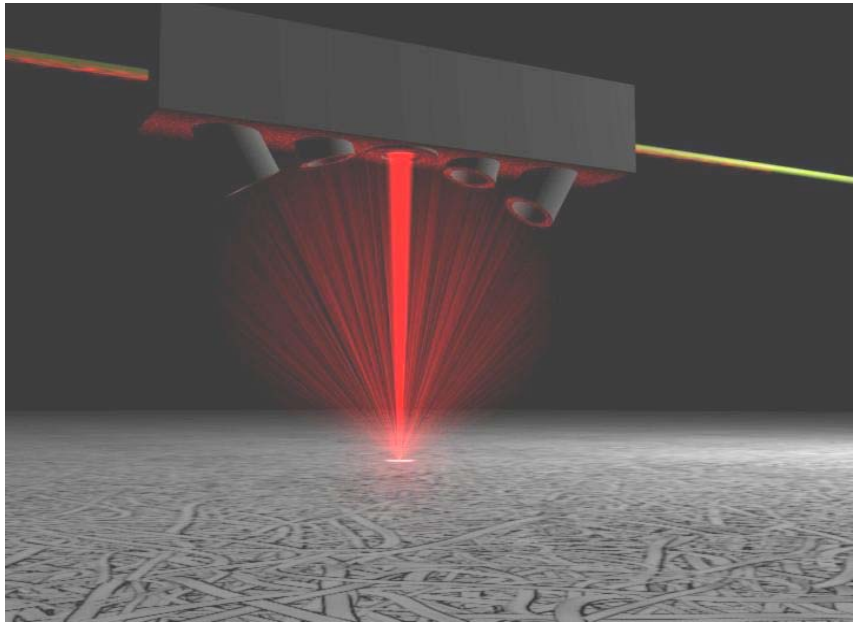
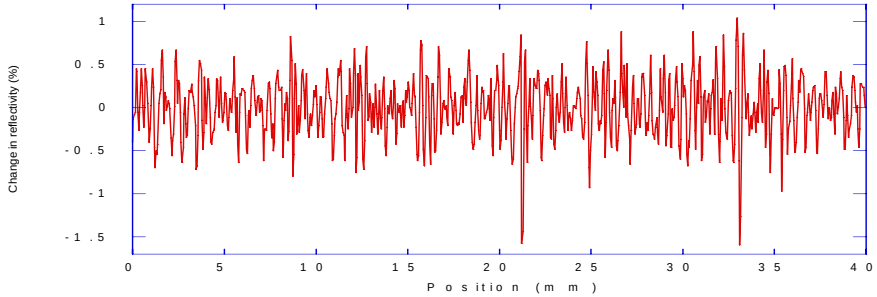
LSA – Covert Authentication



LSA converts the microscopic imperfections in surfaces such as paper & plastic into an equivalent number that is more unique than human biometrics and which can be quickly authenticated <u>(circa 1 second per 100 million readings)</u> using low cost handheld scanners.



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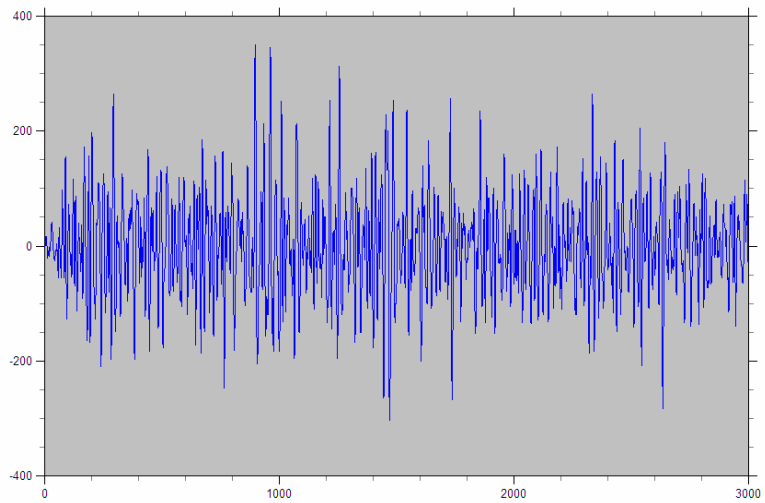
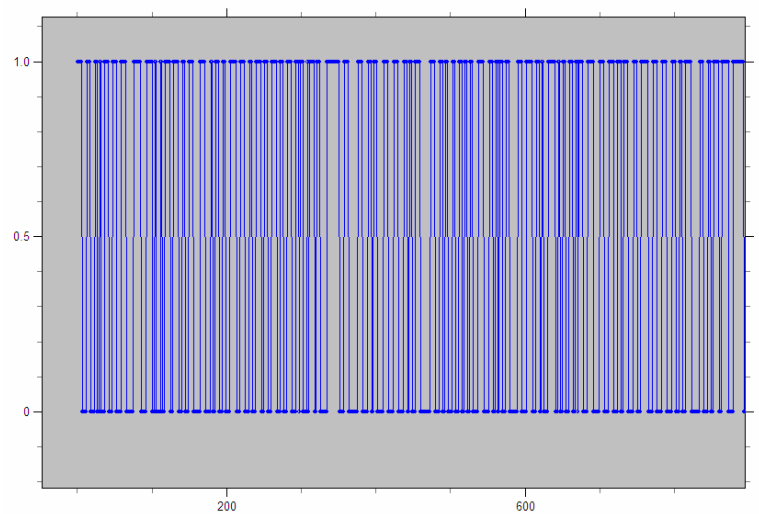
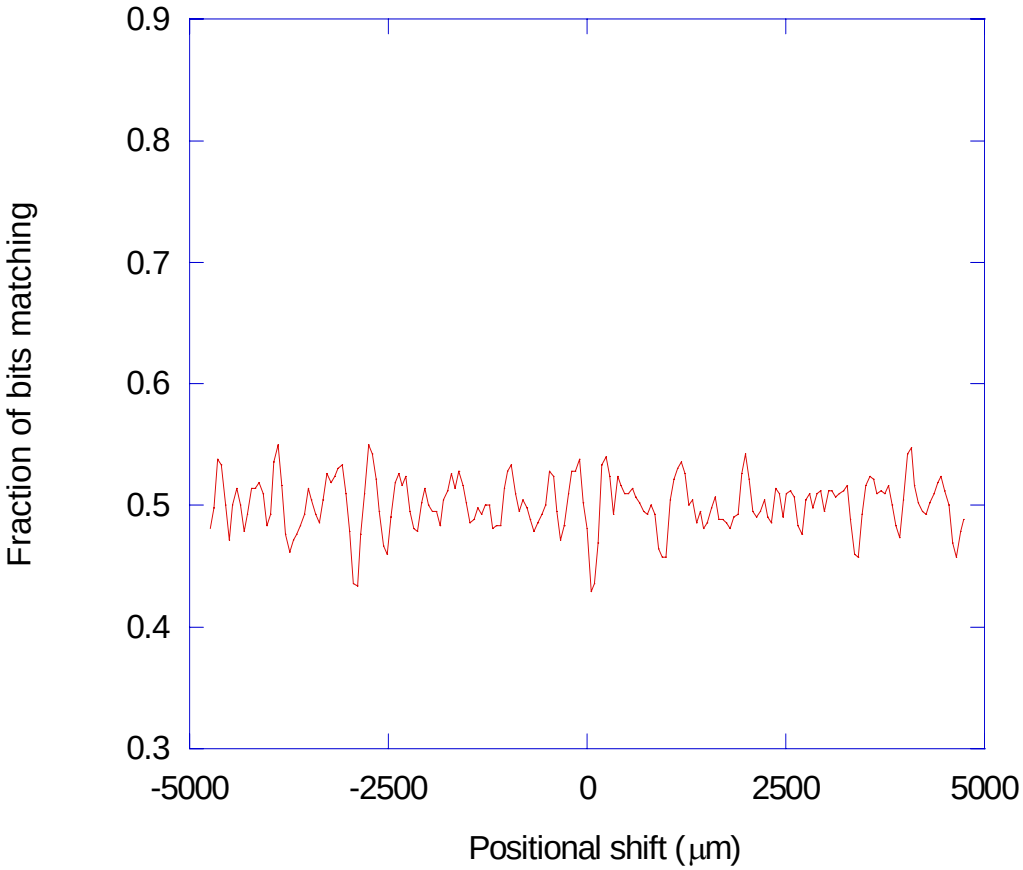
Digitising the fingerprint



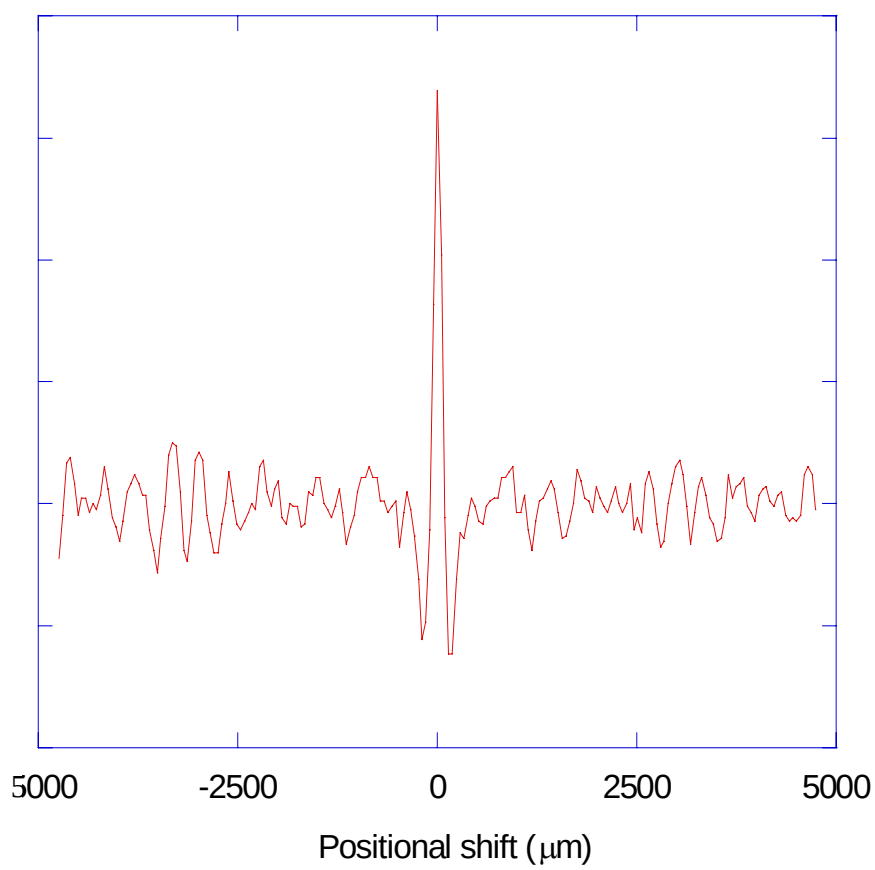


~1000 bits

Cross correlation between 2 scans



Different documents



Same document

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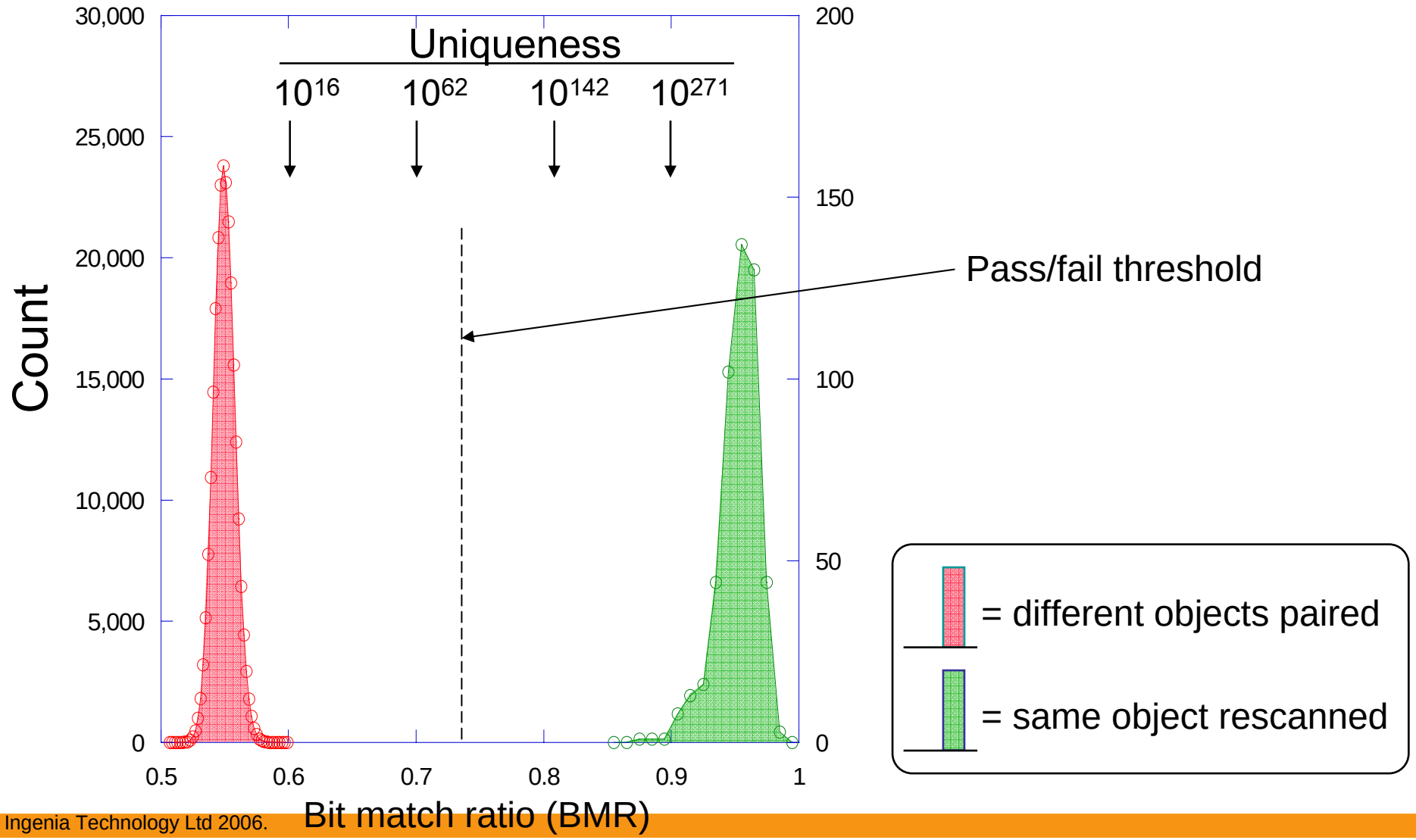
A calibrated Hamming plot



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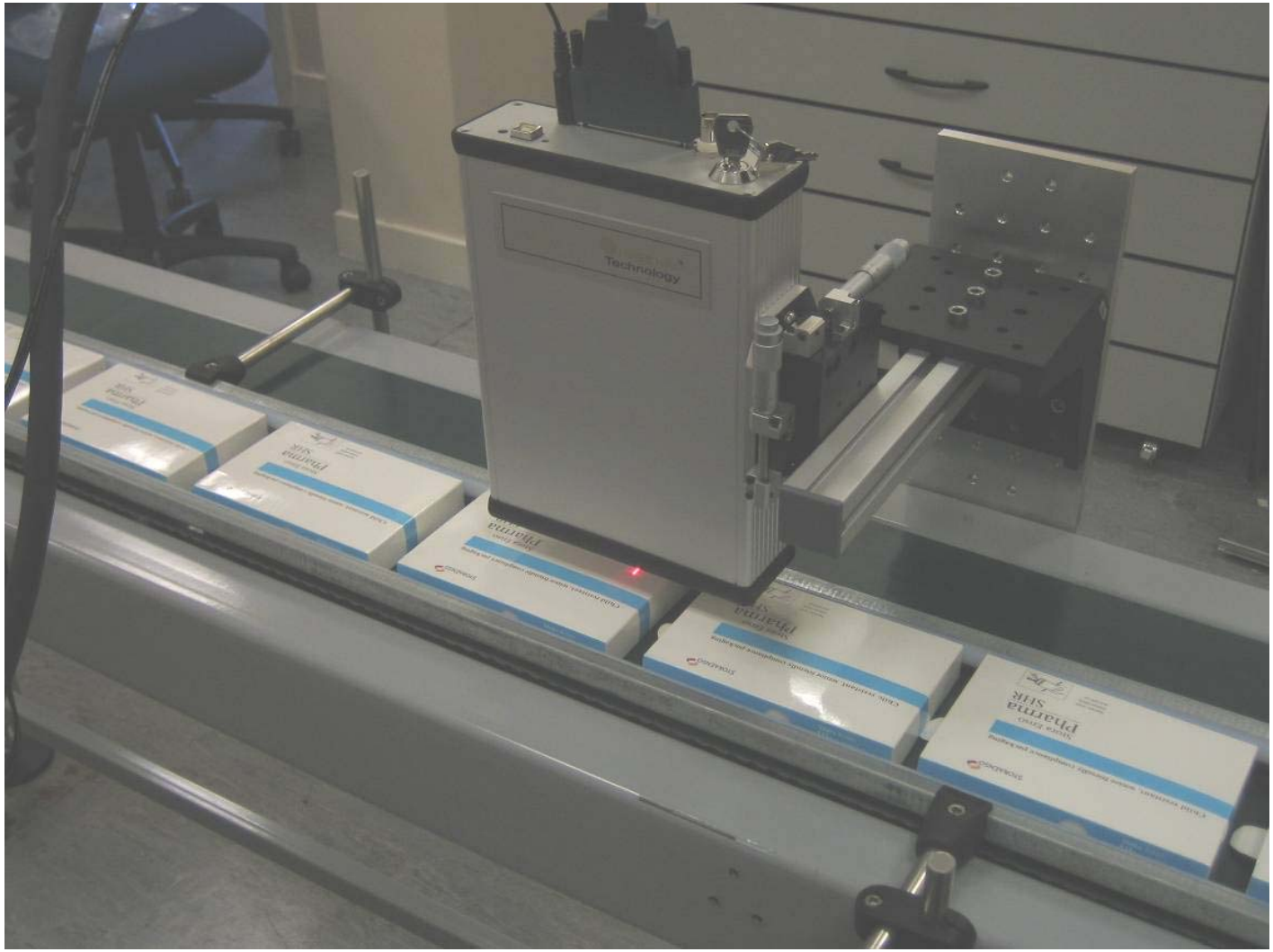
Pharmaceutical line



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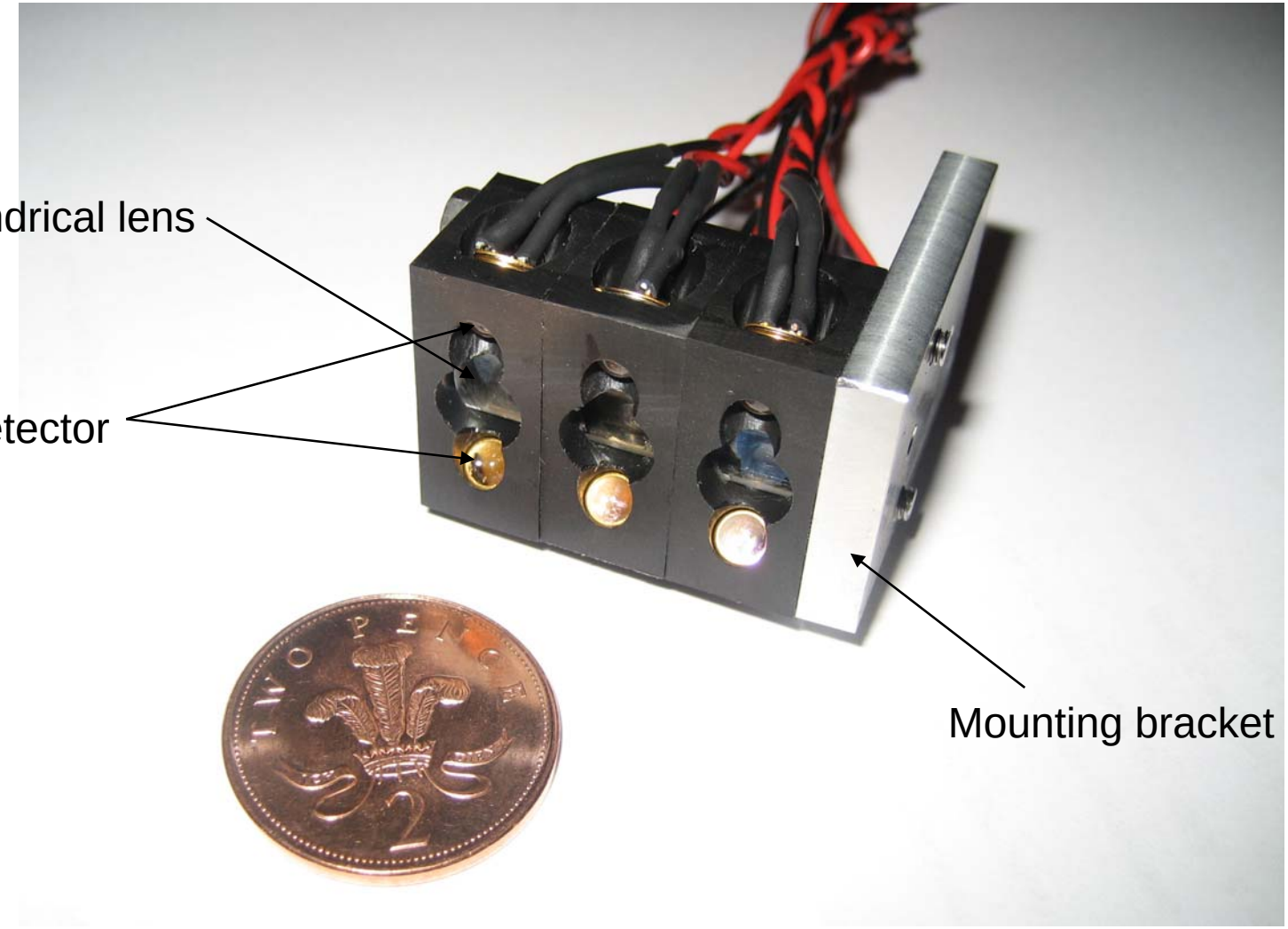
The LSA sensor (Generation 3)



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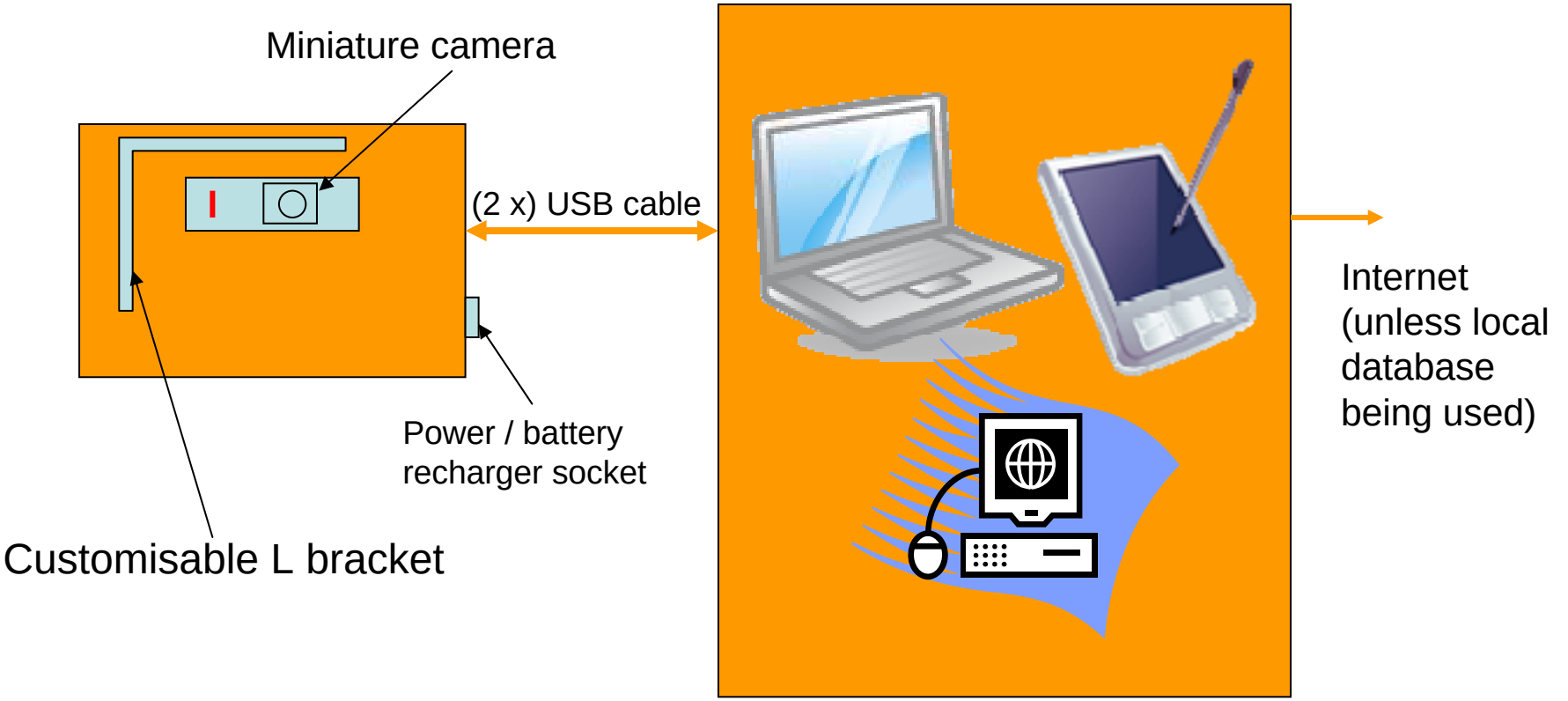
The components of an LSA system: validation



Any of laptop, desktop or PDA
(PDA requires USB host) + LSA software (Windows)

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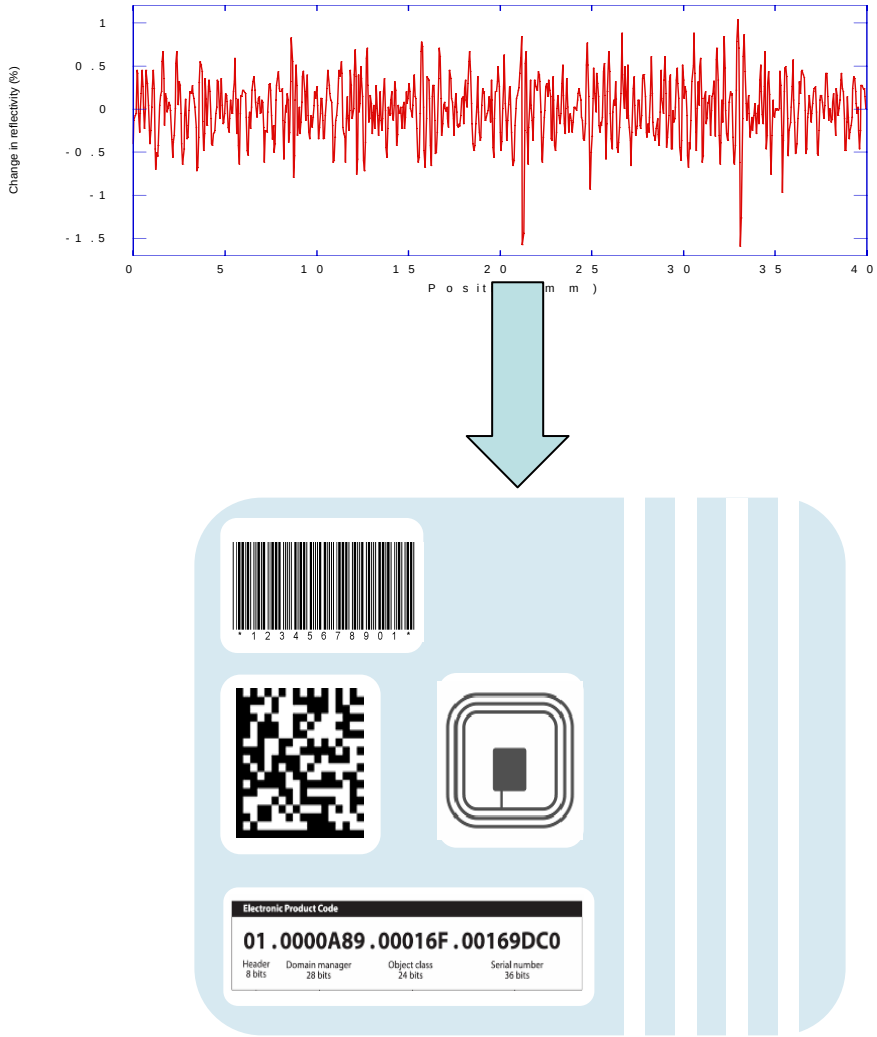
Encrypt LSA in barcode or RFID



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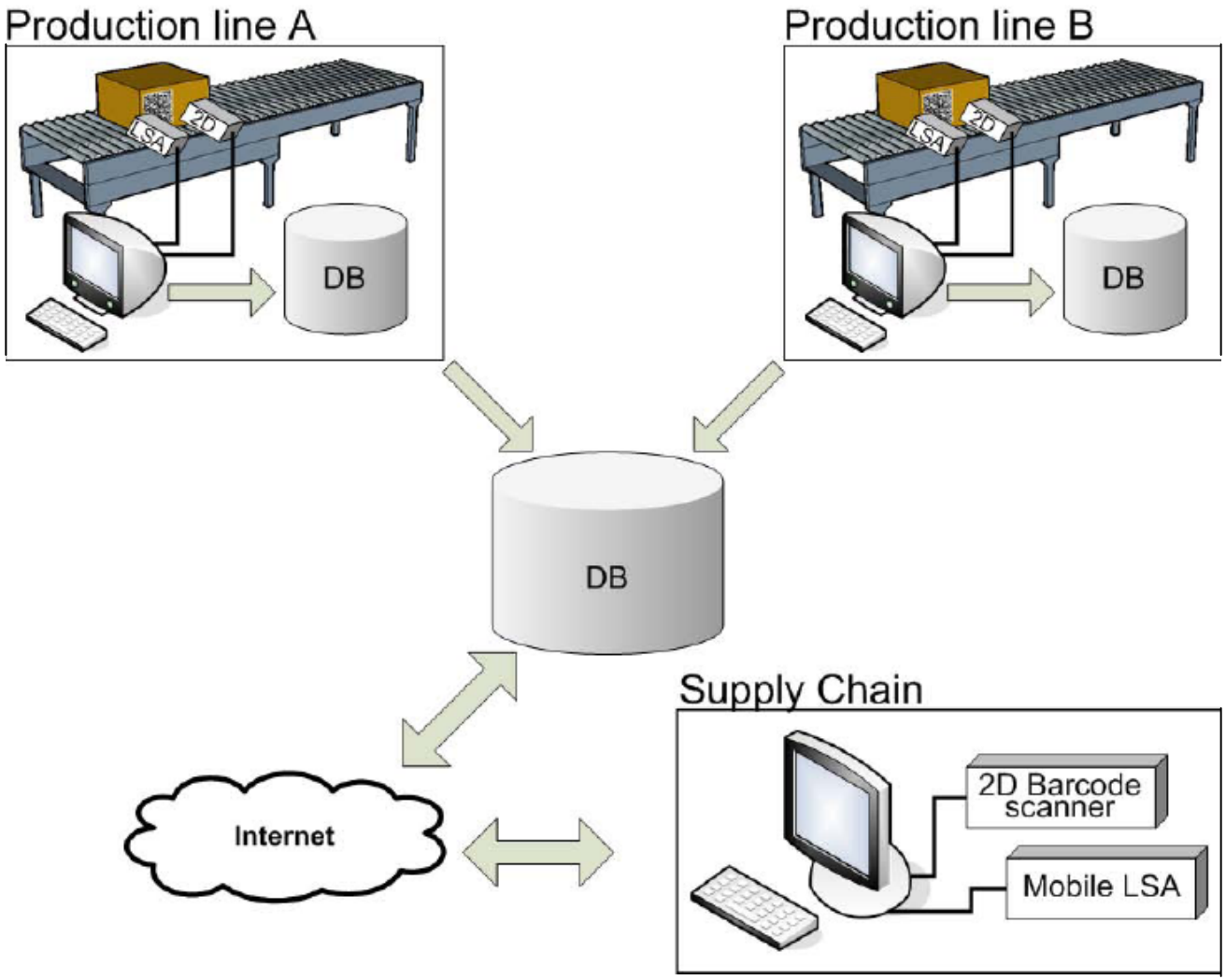
LSA + Datamatrix



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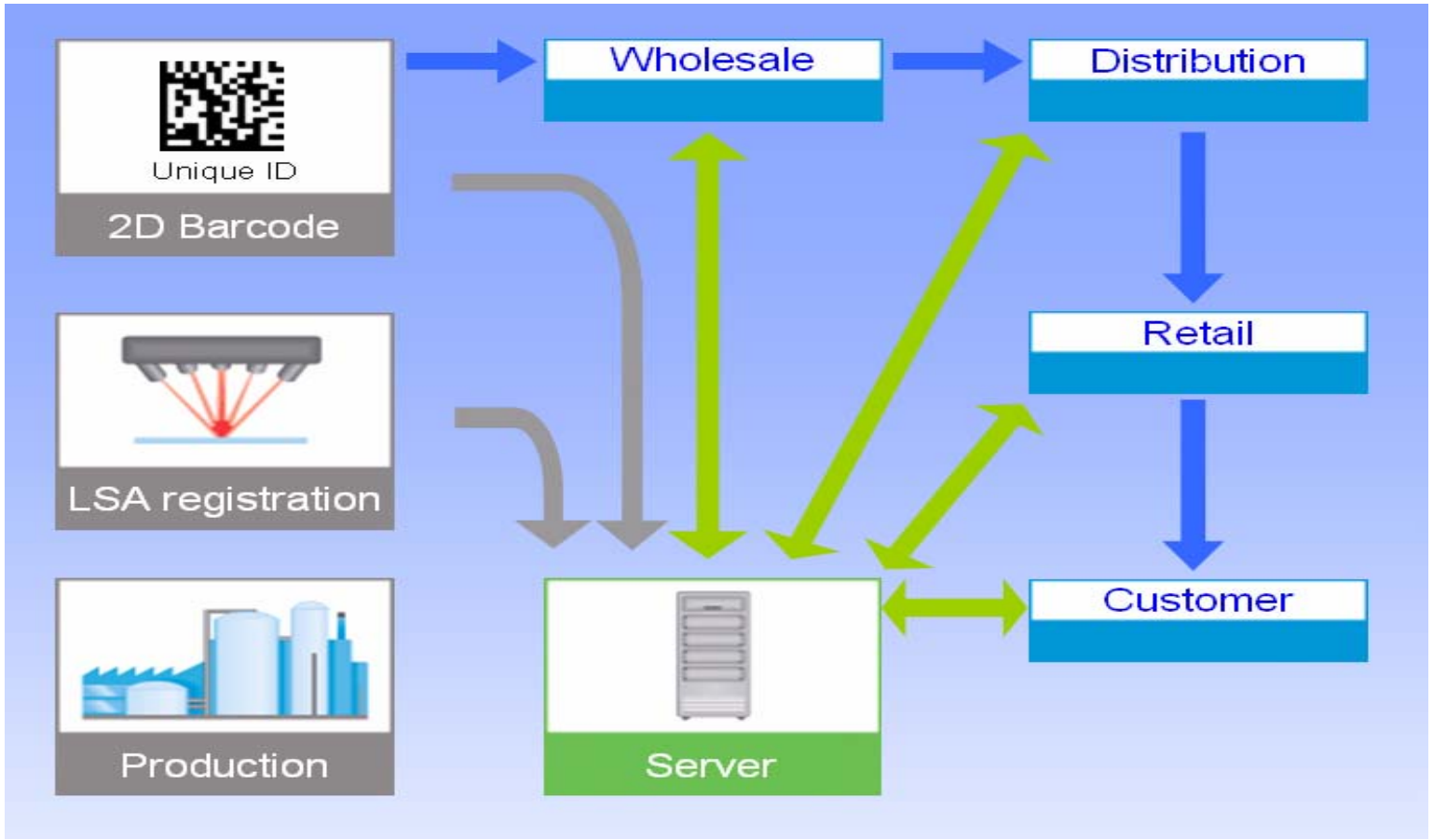
Overt + Covert



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Advantages

- No modification to manufacturing process required.
- Can be applied plastics, papers metals and ceramics
- Extremely high uniqueness: the probability of two naturally occurring codes matching can be as low as 1 in 10 to the power –150
- Robust against wear and tear and intentional or malicious damage.
- Privacy neutral
- The signature can be affixed to packaging/surfaces in encrypted bar code form or RFID
- Fast and effective authentication system
- Scalable solution to meet customer requirements
- Low per-item cost
- Green Technology

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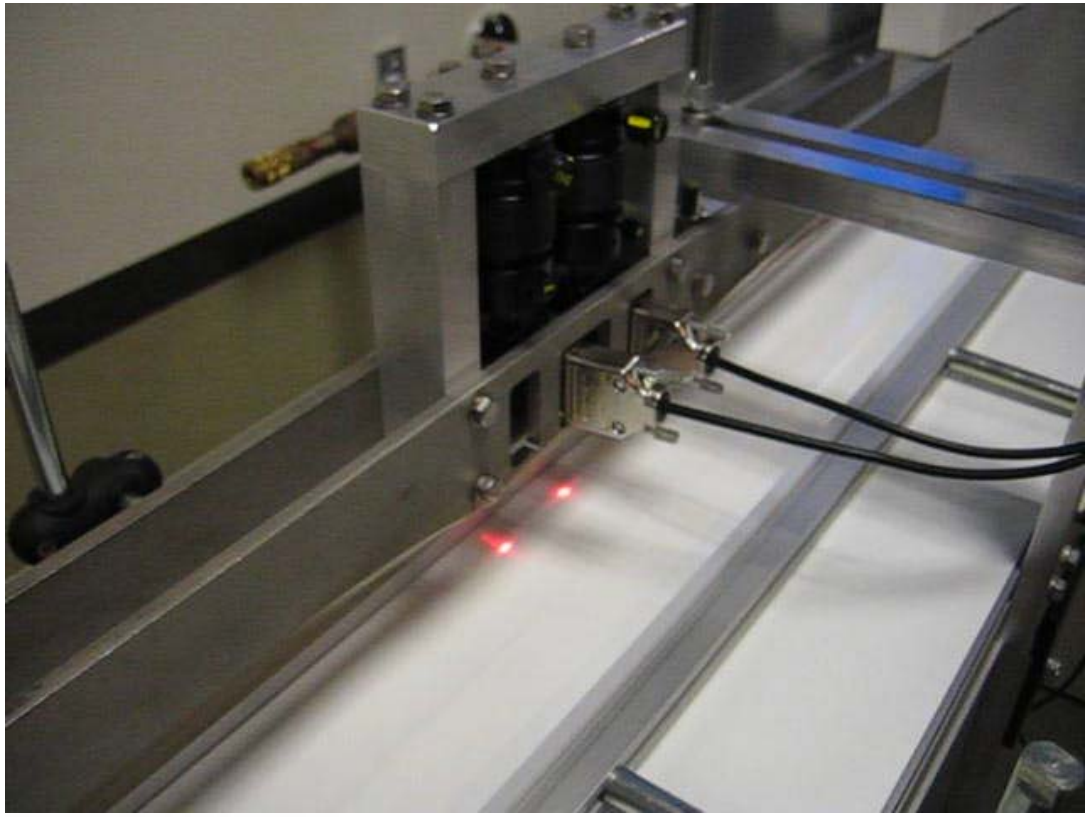
APPLICATIONS



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Pharmaceutical Packaging Line

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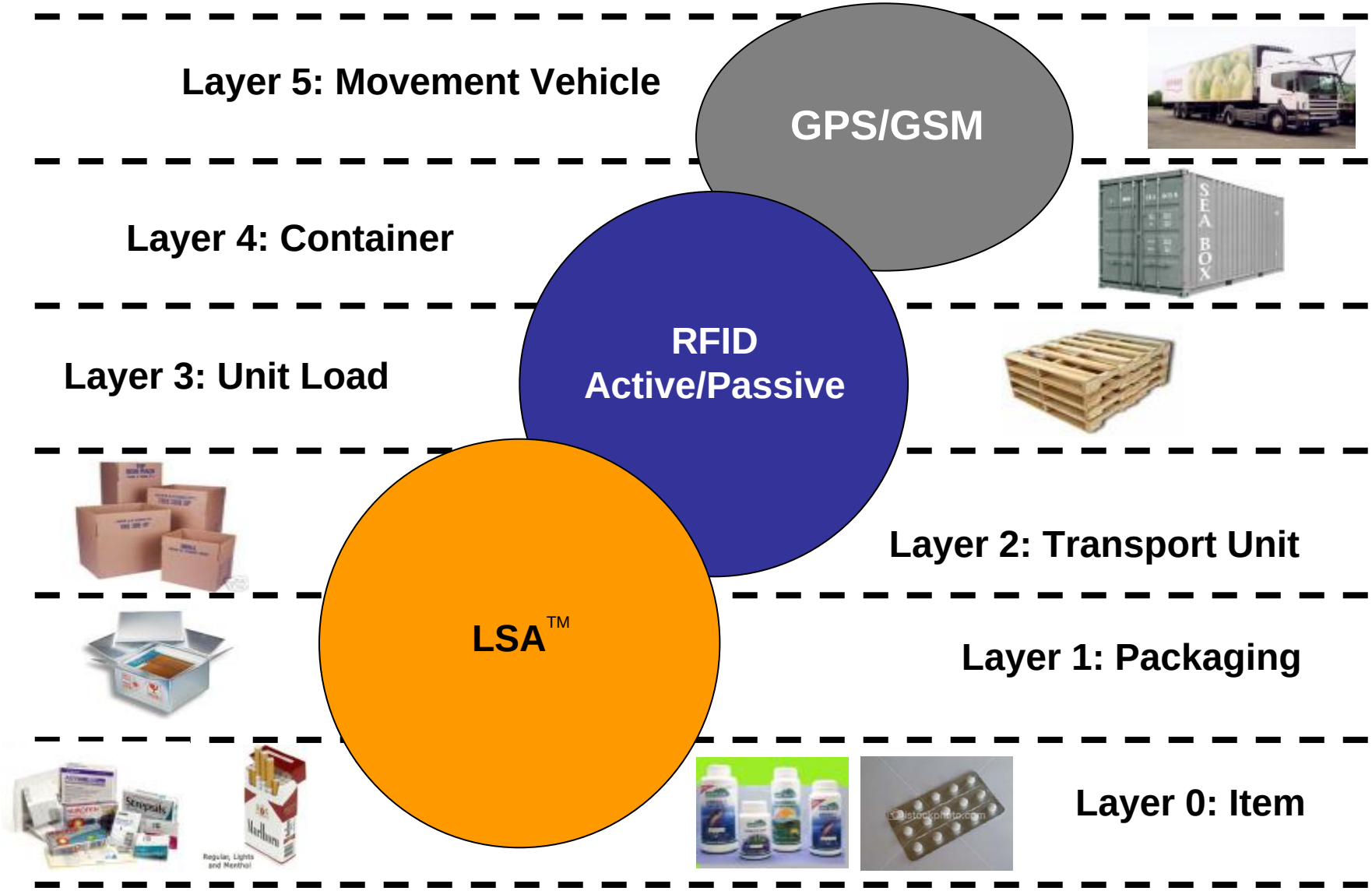
Total Supply Chain Security



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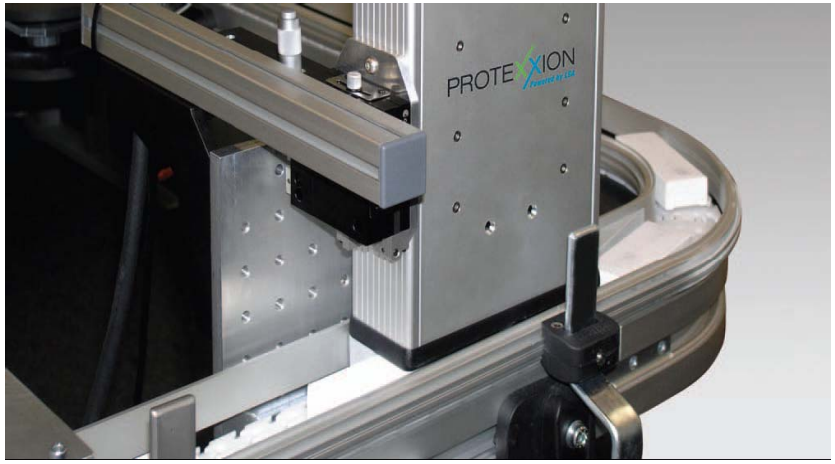
Partnership

- Partnership with Bayer Technology Services GmbH announced 17th Oct 2006
- Subsidiary of Bayer GmbH with €28B sales and 110,000 employees
- Bayer Technology Services GmbH offers fully-integrated solutions along the life cycle of chemical/pharmaceutical plants
- BTS employs more than 2,100 worldwide

- Launch of new product - PROTEXXION Powered by LSA



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Thank You

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