

Crisis Quality Brand Management
Product Surety, Security, Protection & Safety
Electronics: A Global Challenge in Reliability and Authentication

Peter Gabriele

ARmark™ Authentication Technologies, LLC

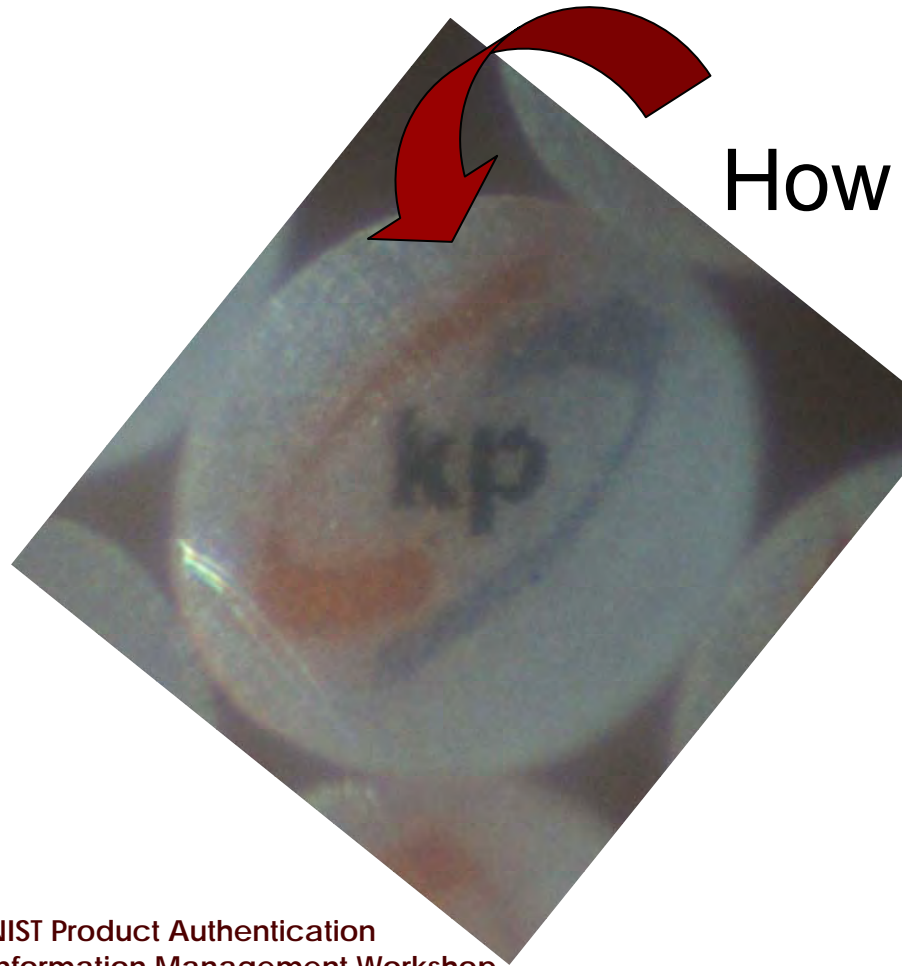
NIST Product Authentication
Information Management Workshop
February 17-18, 2009

ARmark™ Authentication Technologies, LLC.



NIST Product Authentication
Information Management Workshop
February 17-18, 2009

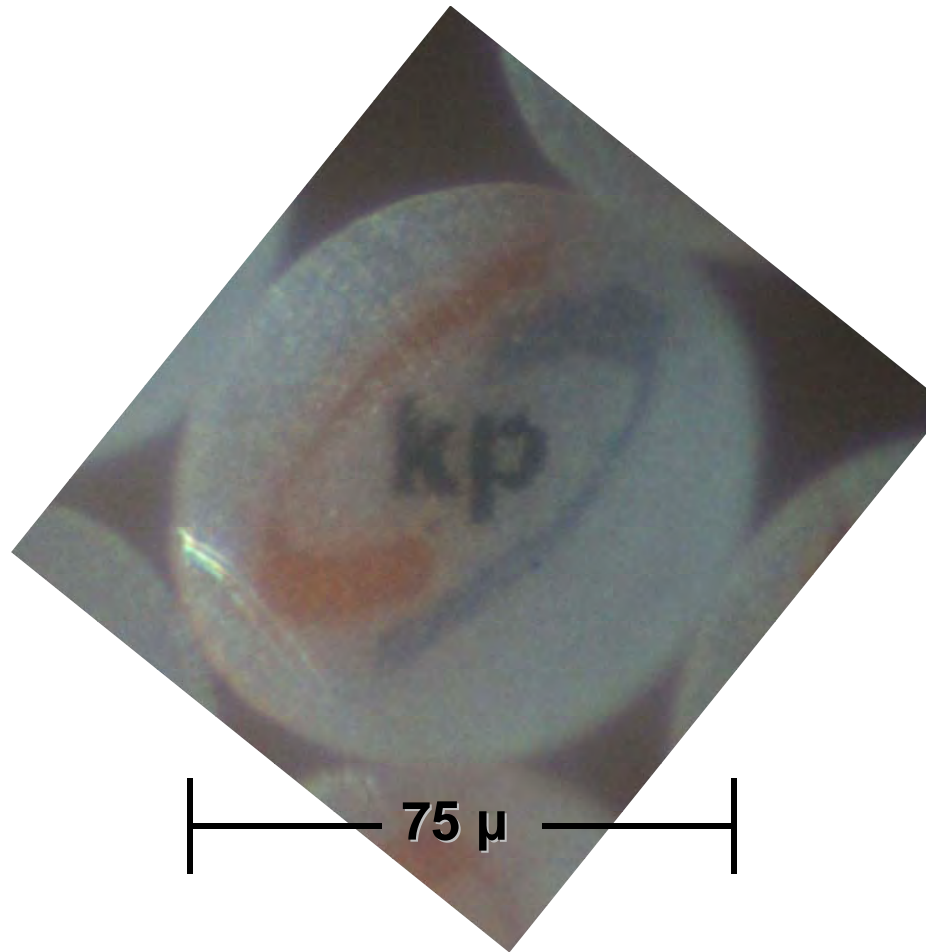
Microtag/Taggant/®mark/



How big?



Microtag/Taggant/®mark/



Millionaire's Microtag

- Consider all the information in this coin:
 - Brand (U.S. Currency)
 - Time
 - Language & Communication
 - Association and Trademark
 - Culture & Economic Value
 - Religion, Politics & Government
 - Style
 - Heritage
 - Location
 - Virtue
 - Exchange Value
 - Supply chain information integration

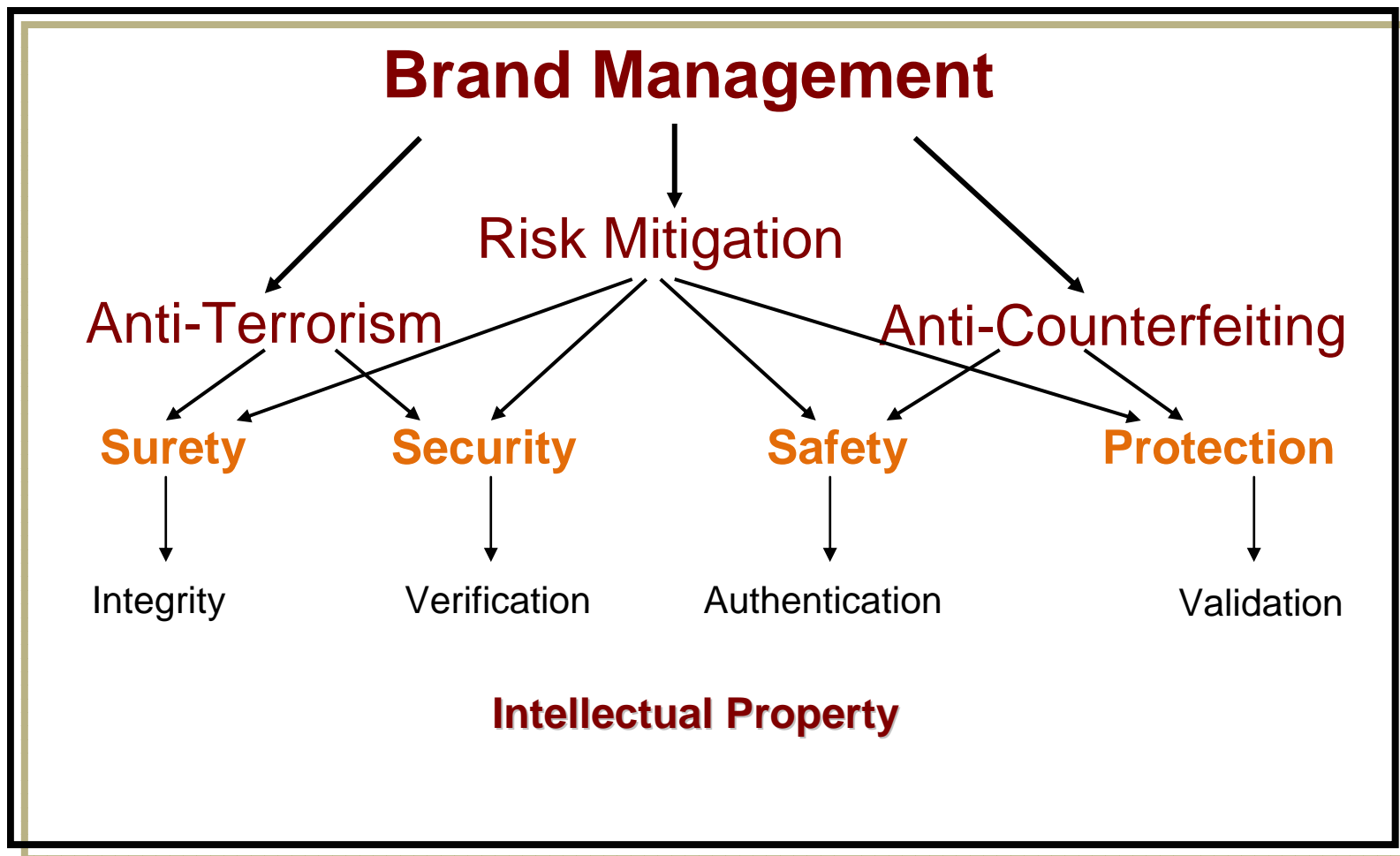


The Facts

- Counterfeiting costs U.S. businesses **\$200 billion to \$250 billion** annually.
- One of every 10 tech products sold is counterfeit, leading to an estimate of a direct loss **over \$100 billion a year**. A \$2 fake part leads to losses of \$20 if detected at the manufacturing board level. It costs \$200 if detected in the market.
- Since 1982, the global trade in illegitimate goods has increased from \$5.5 billion to approximately \$600 billion annually in 2004 and **\$1.3 trillion** in 2006.
- Approximately 5% - 7% of **world trade** is in counterfeit goods.
- 5.2 million counterfeit foodstuffs, drinks, and alcohol seized by the EU
- 8% -10% of globally Rx Medicines are Counterfeit (**\$72B**) PDMA
(Indian Pharmaceutical Market is **\$8.5 Billion** 20% + API potential)
- U.S. companies suffered **\$9 billion** in trade losses due to international copyright piracy.
- Since 1980, **80% of terrorist activity** has been directed at private industry.
- 25% of companies have experienced a disaster in the last 5 years.

The Economic Consequences

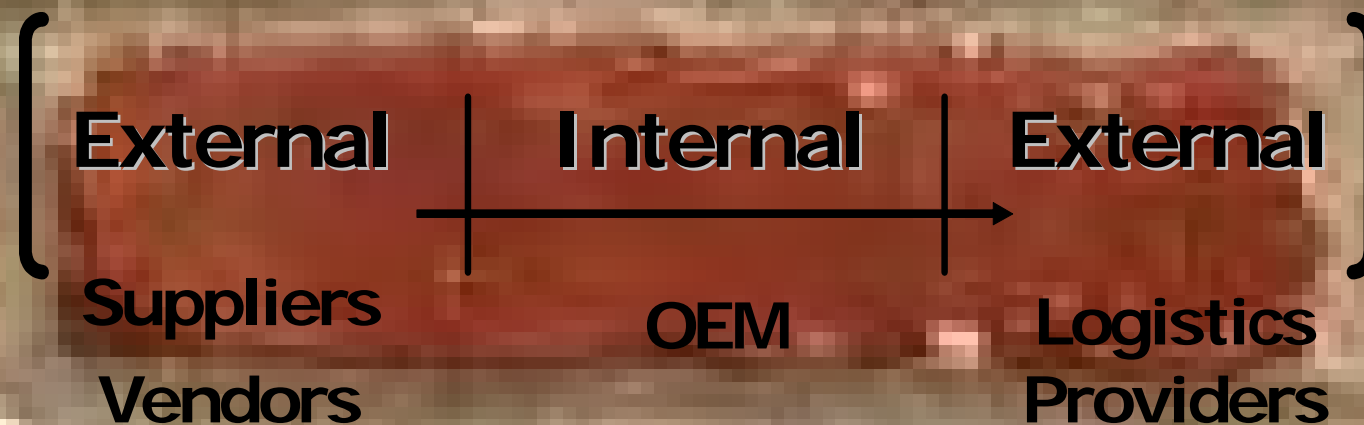
- Economic and social impact on consumers
- *Direct financial loss*
- *Danger to human safety*
- Diminished or destroyed brand image
- Warranty and service claims
- *Liabilities*
- Lost tax revenue to government
- Downward price pressure
- Loss of confidence in identity documents and financial instruments



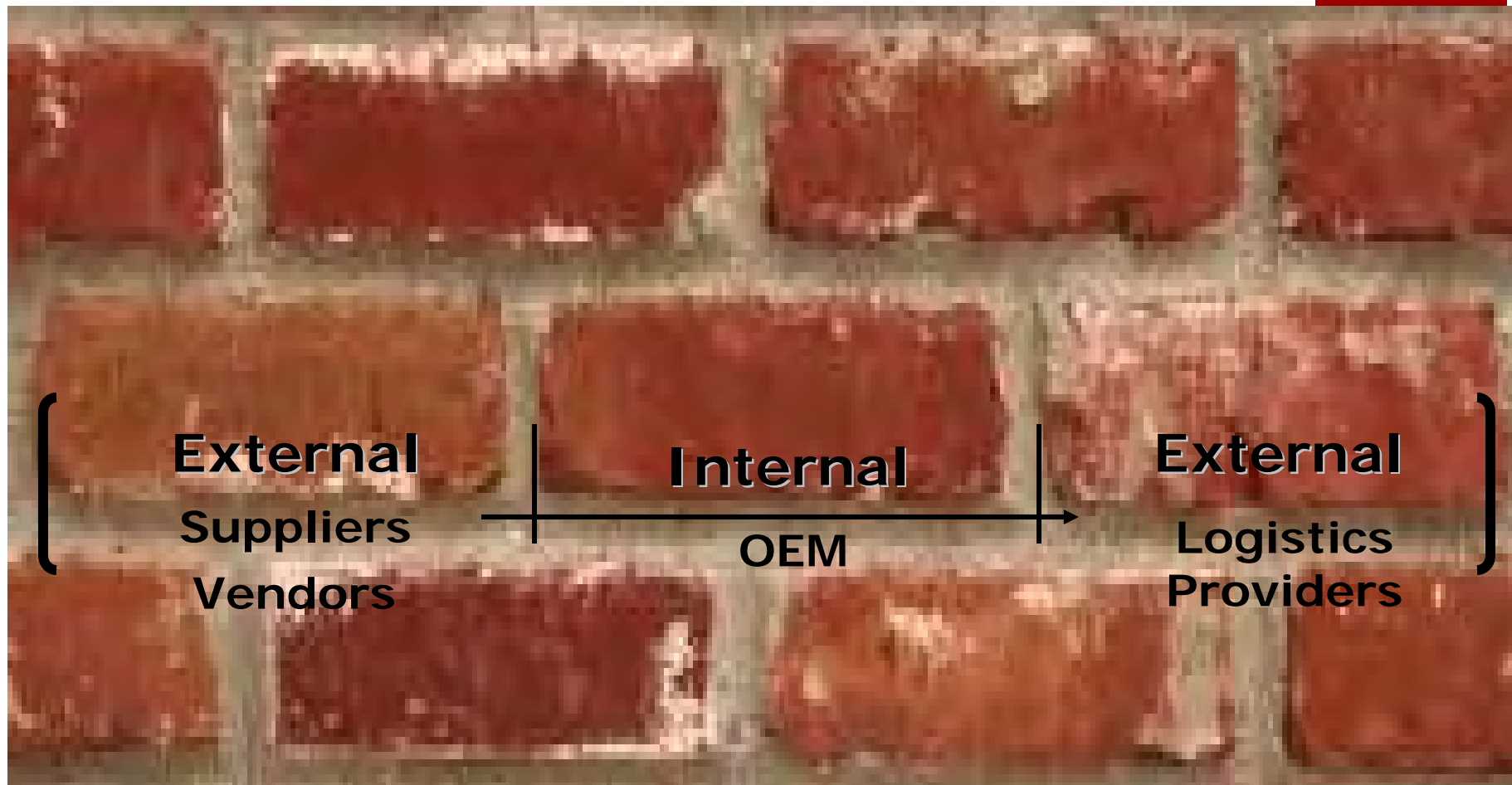
Supply Chain Challenges in a Thiev World

Mass-Serialization
Track & Trace
Authentication
Intellectual Property Management
Brand Authentication
Anti-Counterfeiting
Brand Reliability
Brand Reliability
Gray market

The Basic Supply Chain Unit (Vertical)



The Basic Supply Chain Unit (Horizontal)



Mass Serialization



NIST Product Authentication
Information Management Workshop
February 17-18, 2009

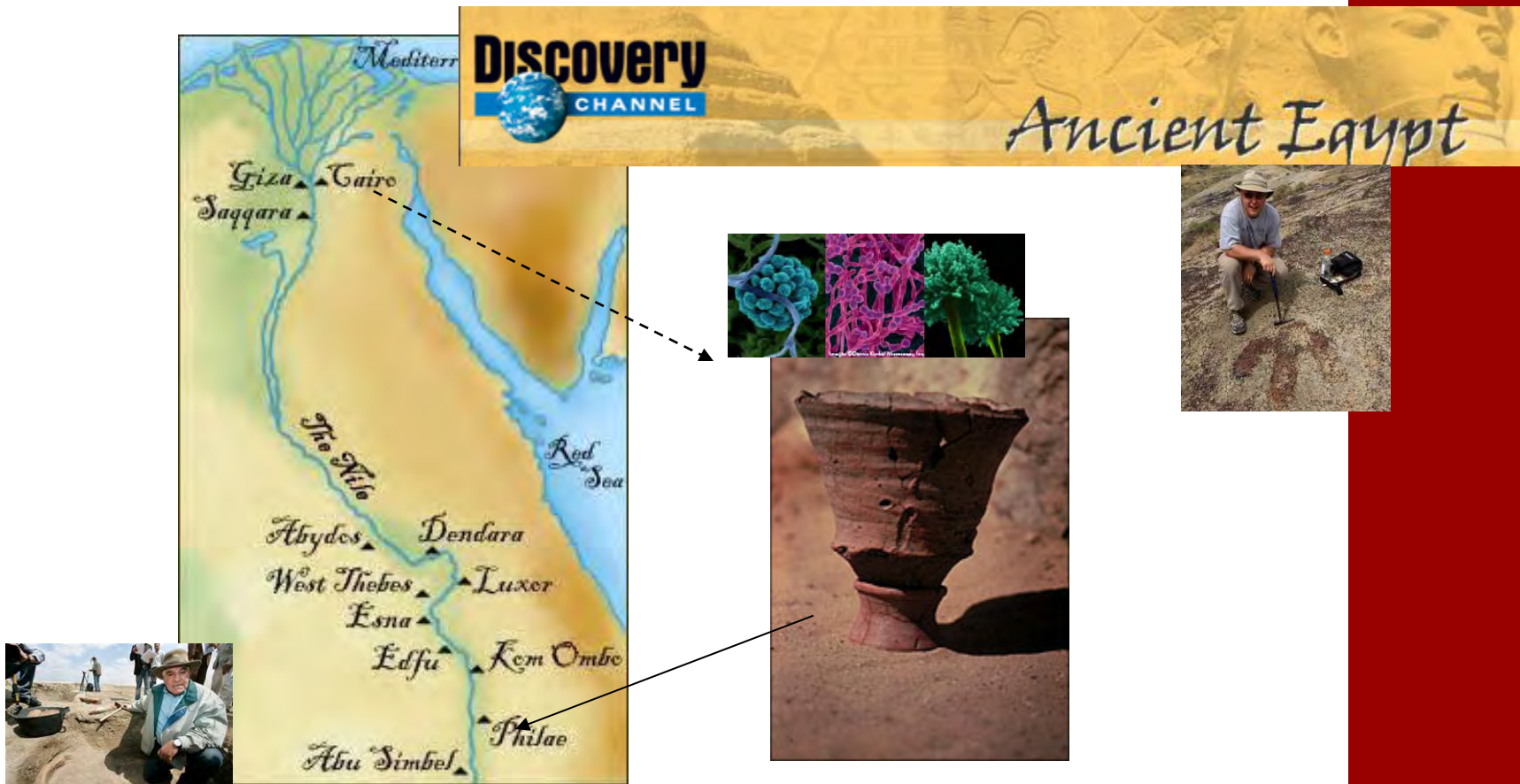
Track and Trace



NIST Product Authentication
Information Management Workshop
February 17-18, 2009

ARmark™ Authentication Technologies, LLC.

What's Authentication?



NIST Product Authentication
Information Management Workshop
February 17-18, 2009

Brand/Supply Chain Vulnerabilities

- Manufacturers-Logistics Providers-Retailers
 - Driving Forces
 - Globalization
 - Competitive landscape
 - M & A
 - Regulatory requirements
 - Customer expectation
 - Product failure rate
 - Product variety
 - Energy cost
 - Port Congestion
 - Disasters
 - Terrorism



Brand Management is Brand Authentication

Brand Authentication is Brand Management

Brand Authentication is Brand Management

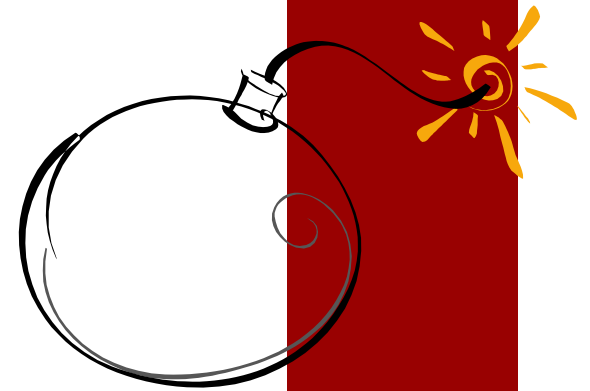
Brand Management is Brand Authentication

Brand Management is Brand Authentication

Brand Authentication is Brand Management

Brand Management

- It's about controlling product image and avoiding compromise
 - Diversion of products (Gray Market)
 - Counterfeiting
 - Organized retail theft
 - Warranty and return fraud
 - Illegal factory over-runs
 - Re-labeling, re-dating
 - Parts harvesting, re-manufacturing
 - Terrorism
 - *Ignorance and neglect*



Brand Management Will

- Let you know the product is *indisputably* yours!
- Assure product reliability
- Be a Deterrent
- Reduce liability and sustain profitability
- Share holder assurance and confidence
- Guarantees quality, ethics, and moral obligation to customer
Sarbanes-Oxley
- Inspire consumer confidence
- Challenge your competition

Defining Authentication in a Crisis

- Elements of Crisis Mitigation
 - Private Industry
 - To indisputably eliminate your product and company from liability i.e. manage brand security
 - Support investigative strategy
 - Government & Regulatory
 - To have the ability to quickly trace back to the origin of electronic items in a crisis
 - Provide critical product identity for search and seizure or intervention mitigation

When Do You Authenticate?

- When your product has a reservation price value
- When there is emotional value to your product
- When the liability of a single issue can crush your immediate earnings



Clues to a Brand/Supply Chain Problem

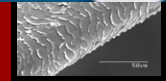
- Drop in raw-material orders
 - “Where’d all the packaging go?”
- Increased orders for proprietary components
 - Export/import ratios: “It’s going where?”
- Increased gray market activity
 - “This shouldn’t be here! Or there!”
- Increase in service returns
 - “Got back more than we made.”
- Large volume of discounted products available
 - “Wow, that’s a great deal!”

Common Layers of Security Technologies

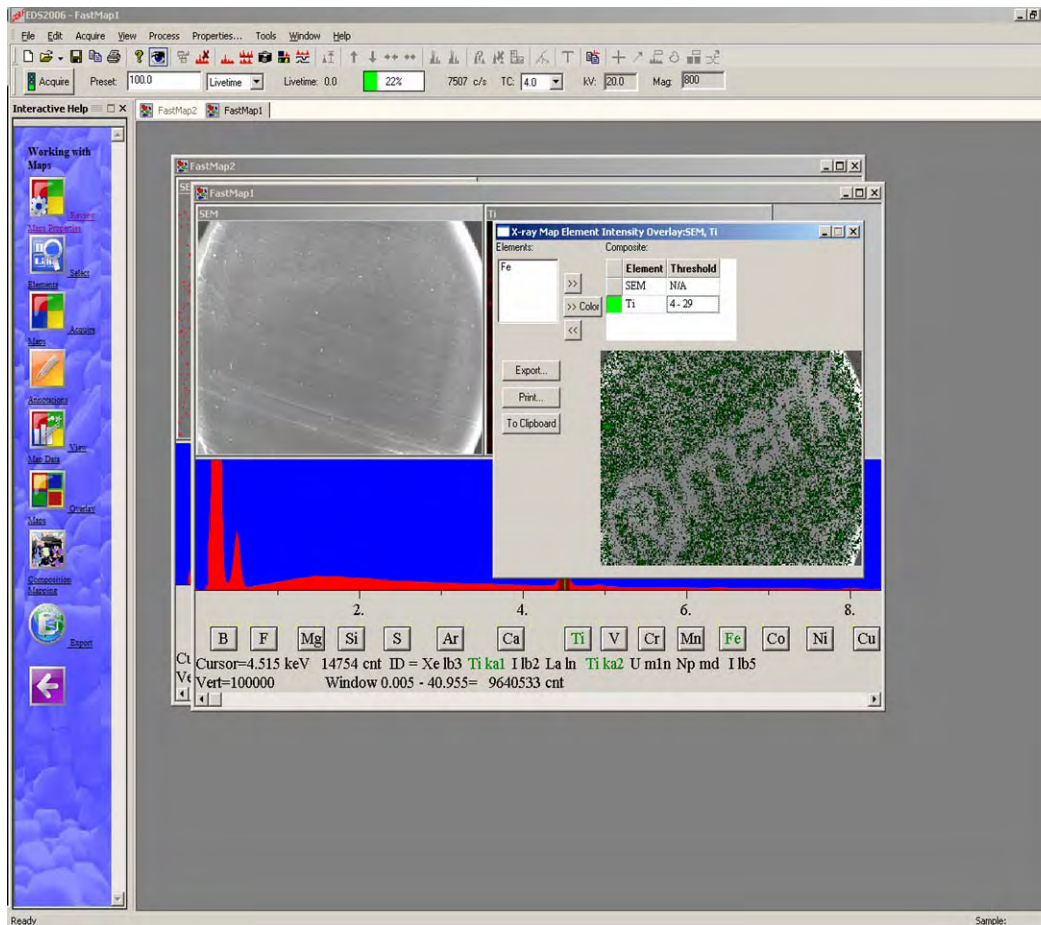
	TECHNOLOGY	THREAT ADDRESSED
Overt	Holograms, OVD's, intaglio ink, copy prevention	Counterfeiting
Covert	UV/IR, taggants, microtext, packaging design features	Counterfeiting
Coding (Track & Trace)	Encrypted Bar Codes & RFID	Diversion, Gray Market
Forensic (Court admissible, evidentiary)	Synthetic DNA, elements, nano-particles	Counterfeiting, Diversion, Gray Market

Covert Markers a.k.a. Covert Micro Tags (CMT)

- High definition micro disc-like structures in the diameter *size range of 90 to 150 μ by 10 to 20 μ thick.*
- Information centric indicia including for example:
 - Alpha-numeric text,
 - Hieratic,
 - Geometric symbol
 - Composition
- The only authentication technology that is composed of food grade materials that allows *in situ* use
 - **Its edible!**



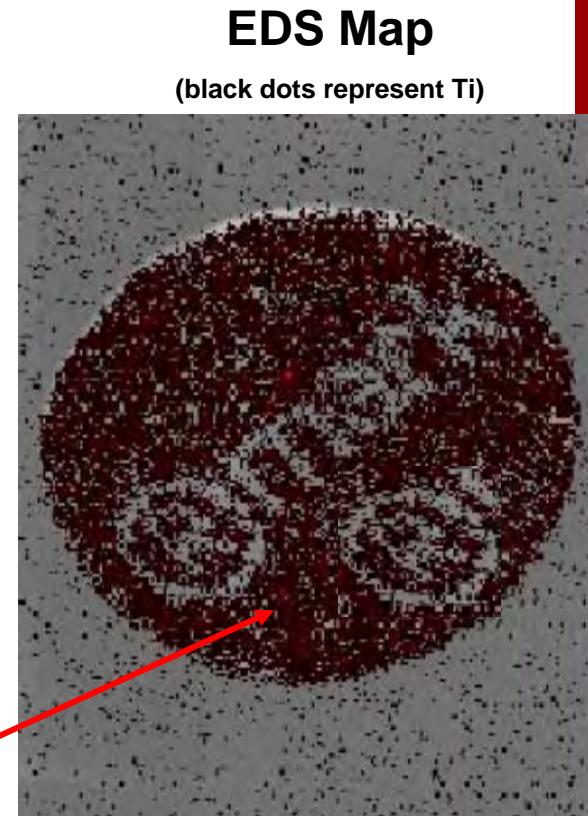
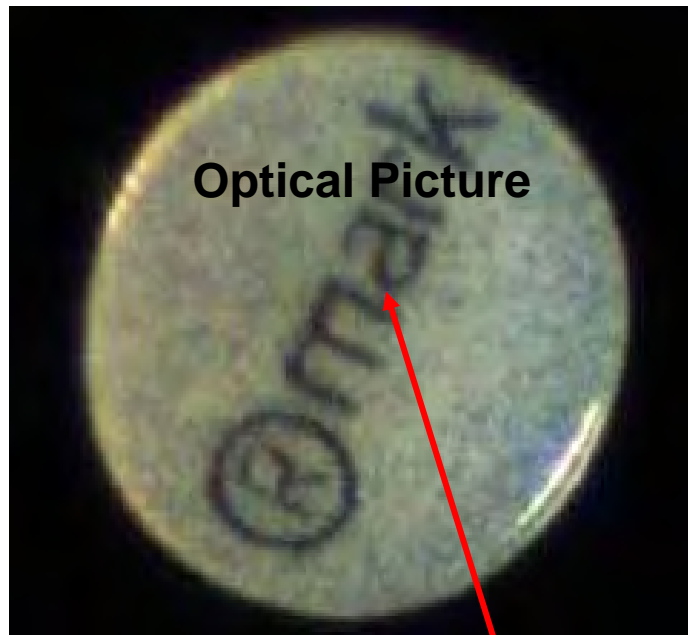
Example of EDS Map for Elemental Authentication



Titanium is present where a green dot appears on the map


NIST Product Authentication
Information Management Workshop
February 17-18, 2009

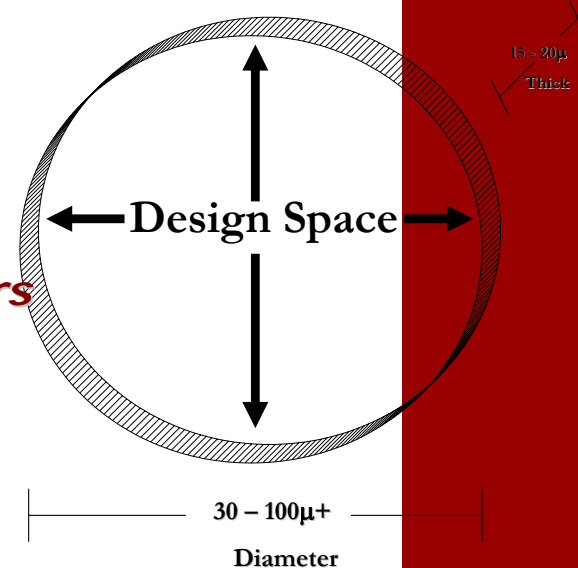
ARmark Internal Authentication



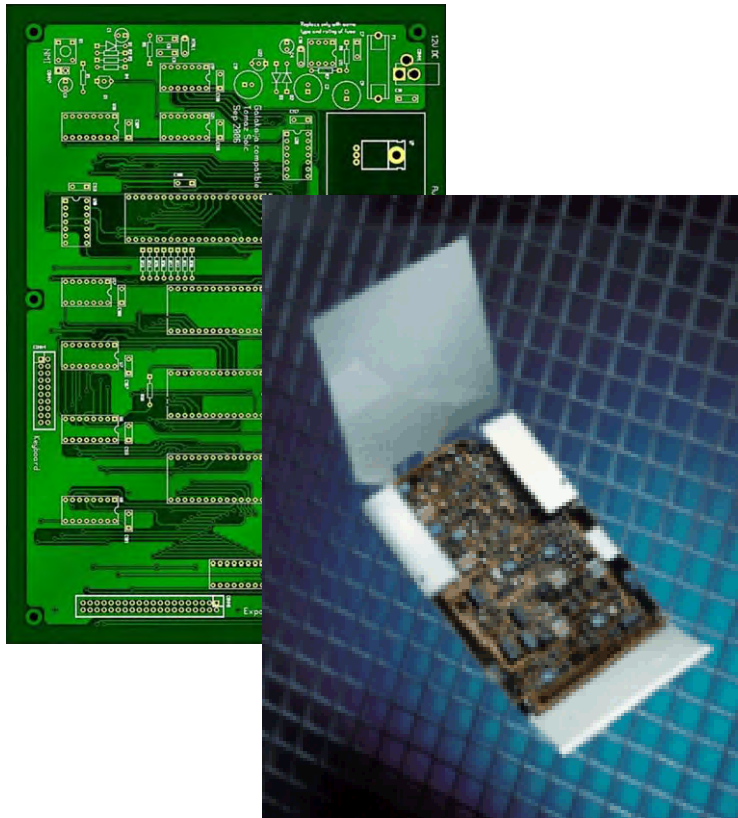
® symbol is made up of BaSO_4 white
(invisible in TiO_2 white sea)

Design as a Code: Multivariate Information

- **Color**
 - *Color and spectral selection*
 - *Photophysical and Photochemical response*
- 
 - *Geometric symbols & hieratic*
 - *Spatial relationships*
 - *Topography*
- **Text**
 - *Novel alpha-numeric identifiers*
 - *Coding & Encryption*
- **Composition**
 - *Physiochemical content*
 - *Chemotrophic technology*

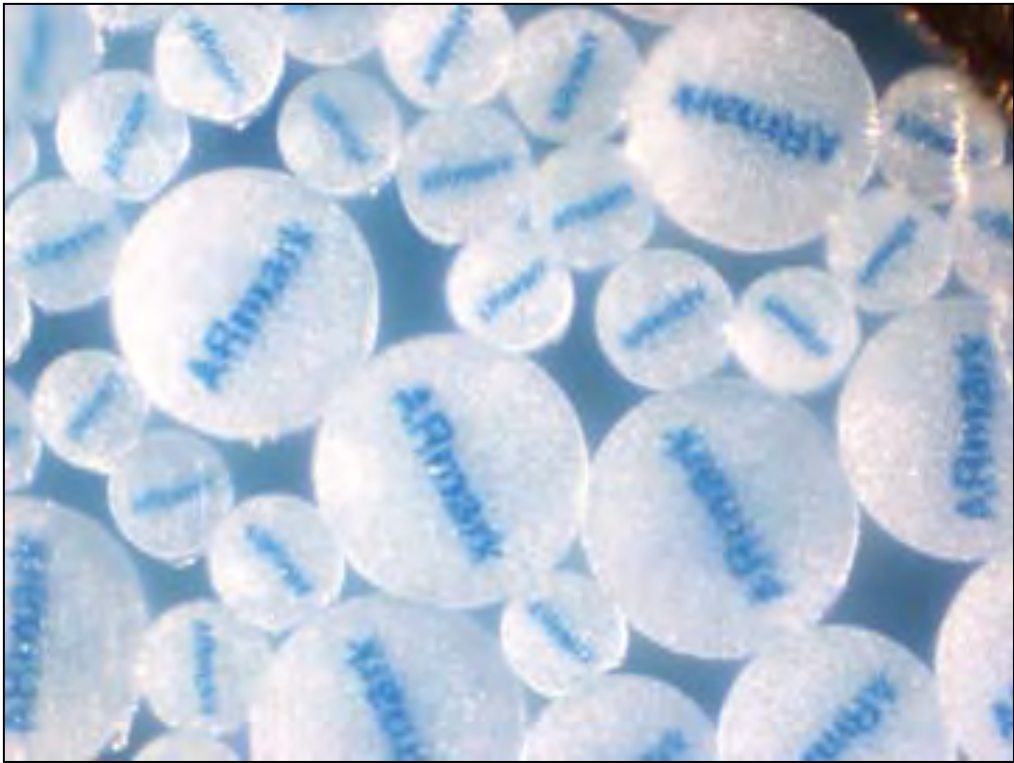


Thermal & UV Masks

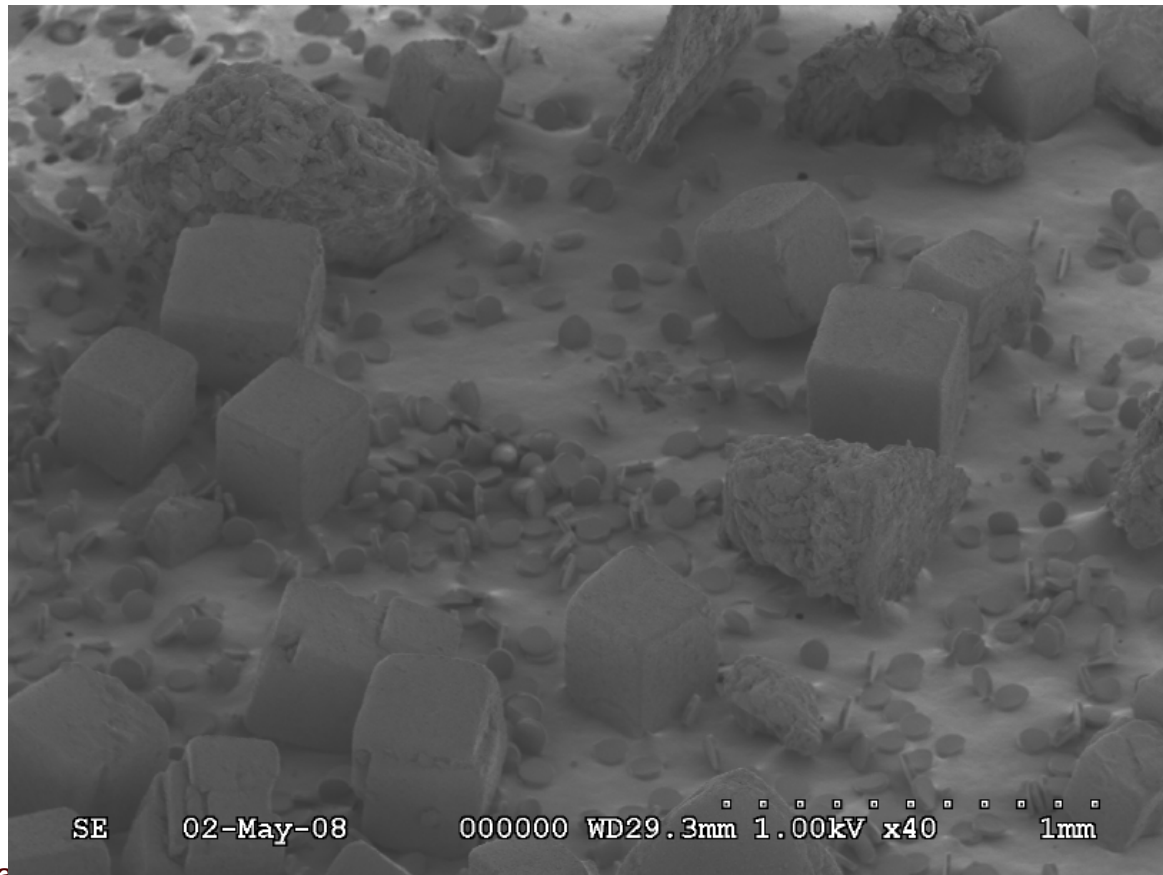


NIST Product Authentication
Information Management Workshop
February 17-18, 2009

Multiple Sizes

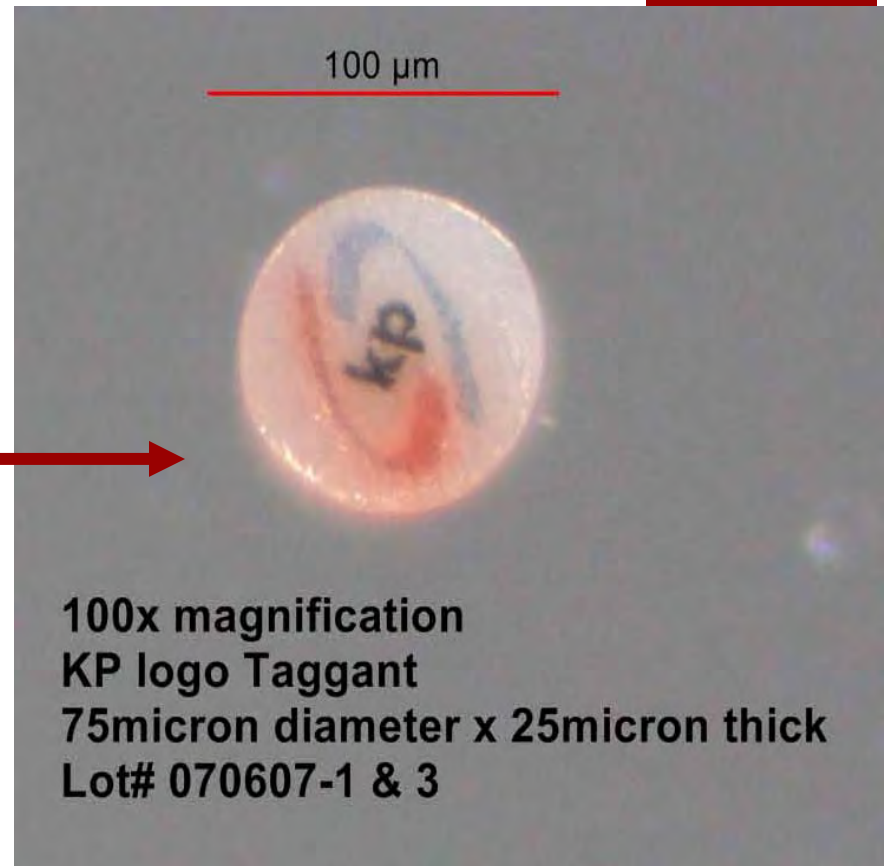


Salt and Pepper



NIST Product Authentication
Information Management Workshop
February 17-18, 2009

klöckner pentaplast



100x magnification
KP logo Taggant
75micron diameter x 25micron thick
Lot# 070607-1 & 3

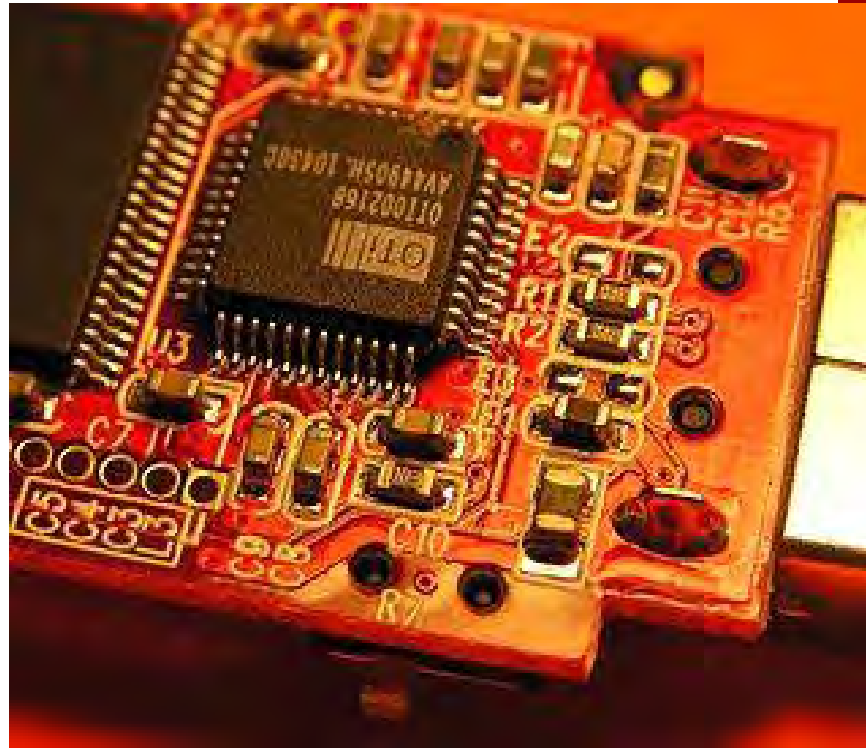
Custom Security Label Adhesives



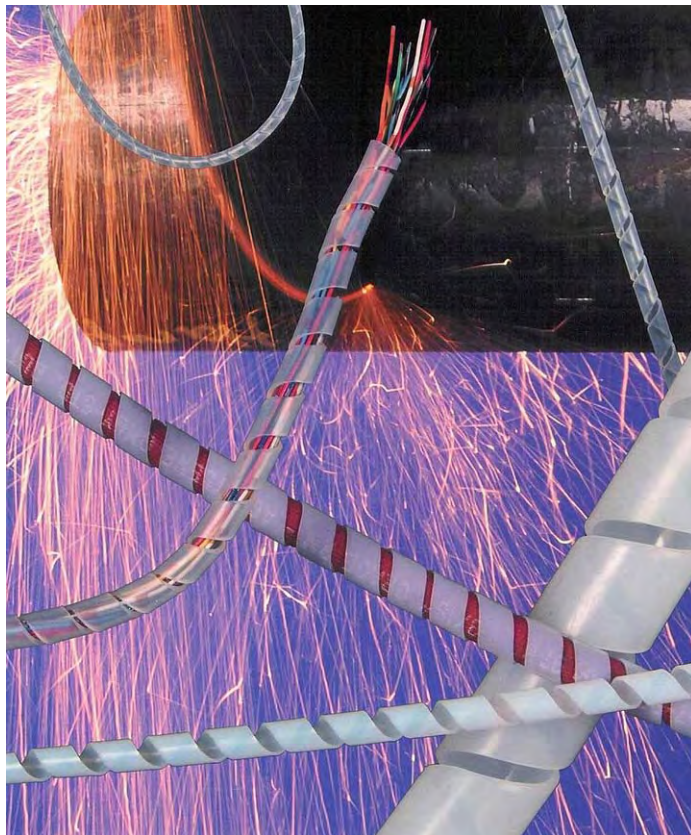
NIST Product Authentication
Information Management Workshop
February 17-18, 2009

Surface Mount Device Components

- Plastics
- Laminates
- Ceramics
- Solder
- Inks
- Conformal Coatings

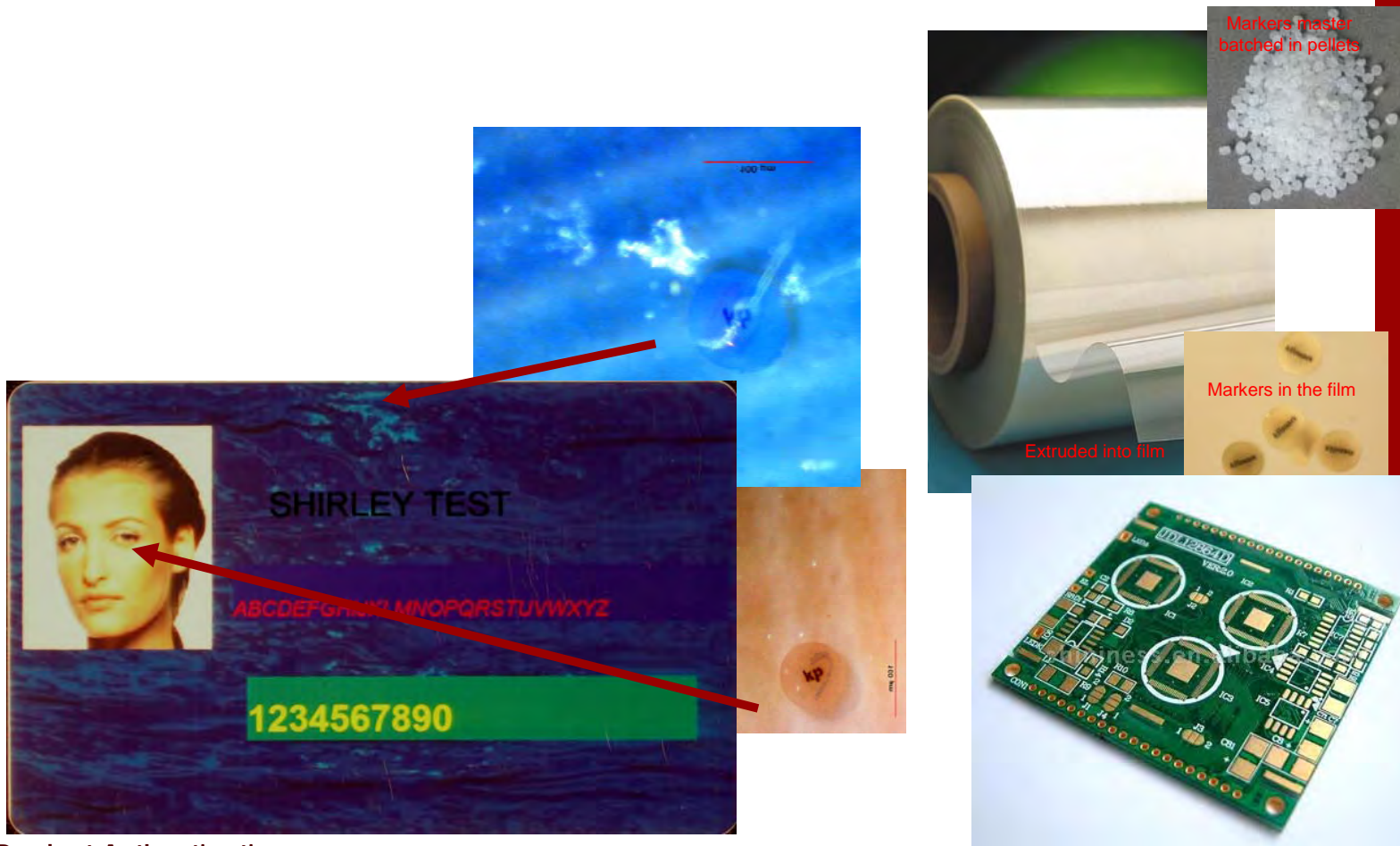


Cable Wrap



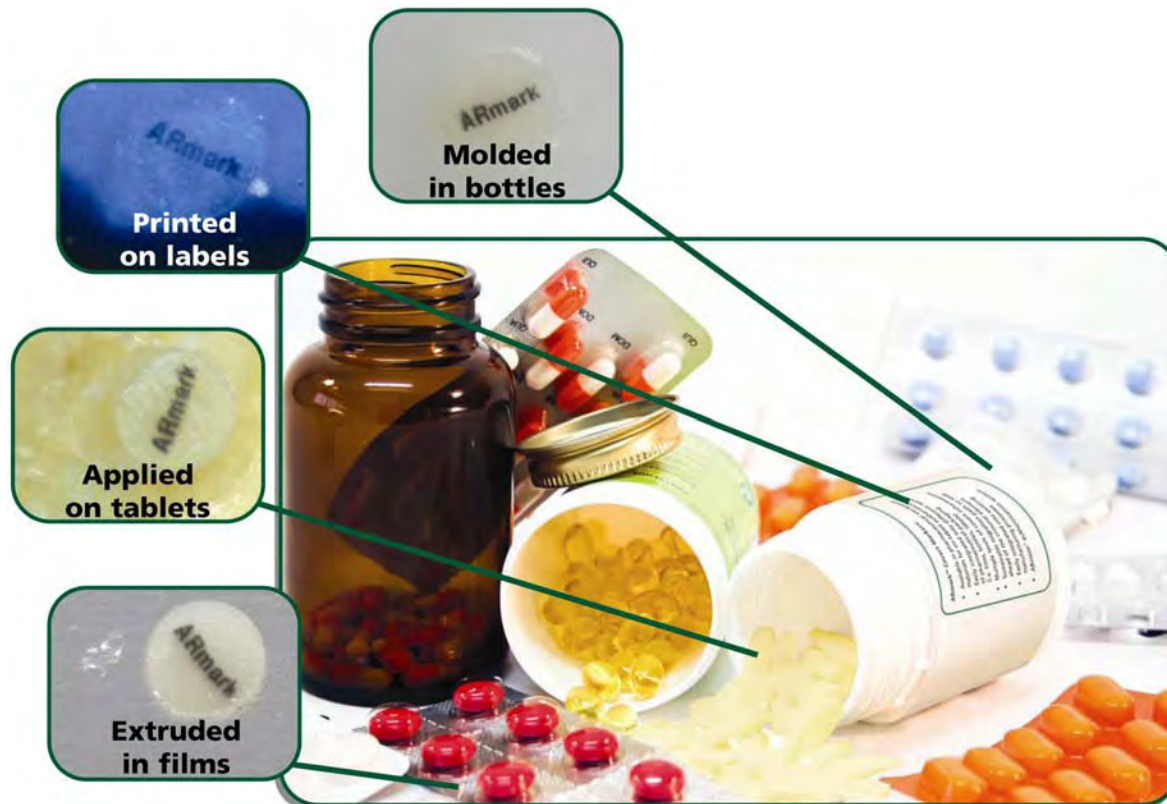
NIST Product Authentication
Information Management Workshop
February 17-18, 2009

Laminates and Packaging

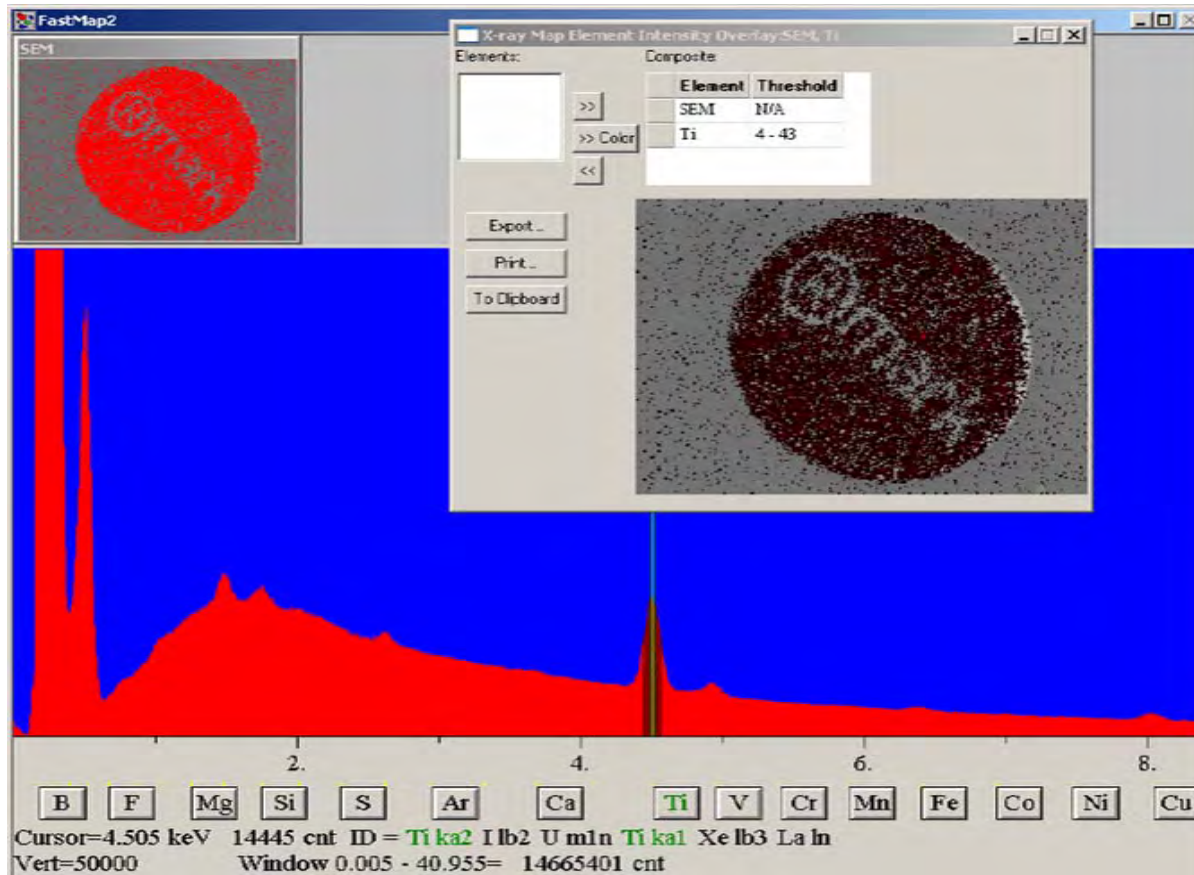


NIST Product Authentication
Information Management Workshop
February 17-18, 2009

Packaging Applications



Energy Dispersive Lacing Images



**Materials of
Construction**

**Embedded
Chemistry**

**Smart
Visualization**

**Chemotactic
Response**

Customized Feature & Construction Design



Feature Relationship

**Feature Count
& Geometry**

Distribution

**Feature
Morphology**

**Multi-
Component
Chemistry**

System Specific Application Design & Detection

Application & Handling

- Air/Airless Spray
- Dip
- Curtain
- Electrostatic
- Mill & Mix
- Screen
- Flexo
- Cast
- Aerosol
- Flood
- Knife over roll
- Gravure
- Molded
- Extruded
- Laminated

INTEROPERABILITY

Main Entry: **in-ter-op-er-a-bil-i-ty**

Pronunciation: "in-t&r-"ä-p(&-)r&-'bi-l&-tE

Function: *noun*

: ability of a system (as a weapons system) to work with or use the parts or equipment of another system

- **in-ter-op-er-a-ble** /-'ä-p(&-)r&-b&l/ *adjective*

ARvision™

- Laptop/Cellular Capable
- Database integrated
- Portable Field Readable
- Frequency or Wavelength Specific Detection
 - UV-VIS-NIR options
- Magnification 140 -300X
- Custom optics
 - 1.3 Mega-pixel CMOS imaging sensor
- Custom matched materials of construction and reader detection



Summarize

- Questions:
 - Business Questions
 - William Stratton
 - ARmark Authentication Technologies LLC
 - 159 Industrial Dr., Glen Rock PA 17327
 - 717-227-3254
 - bstratton@arglobal.com
 - Technical Questions
 - Peter Gabriele
 - pgabriele@rmark.org
 - 717-227-5922