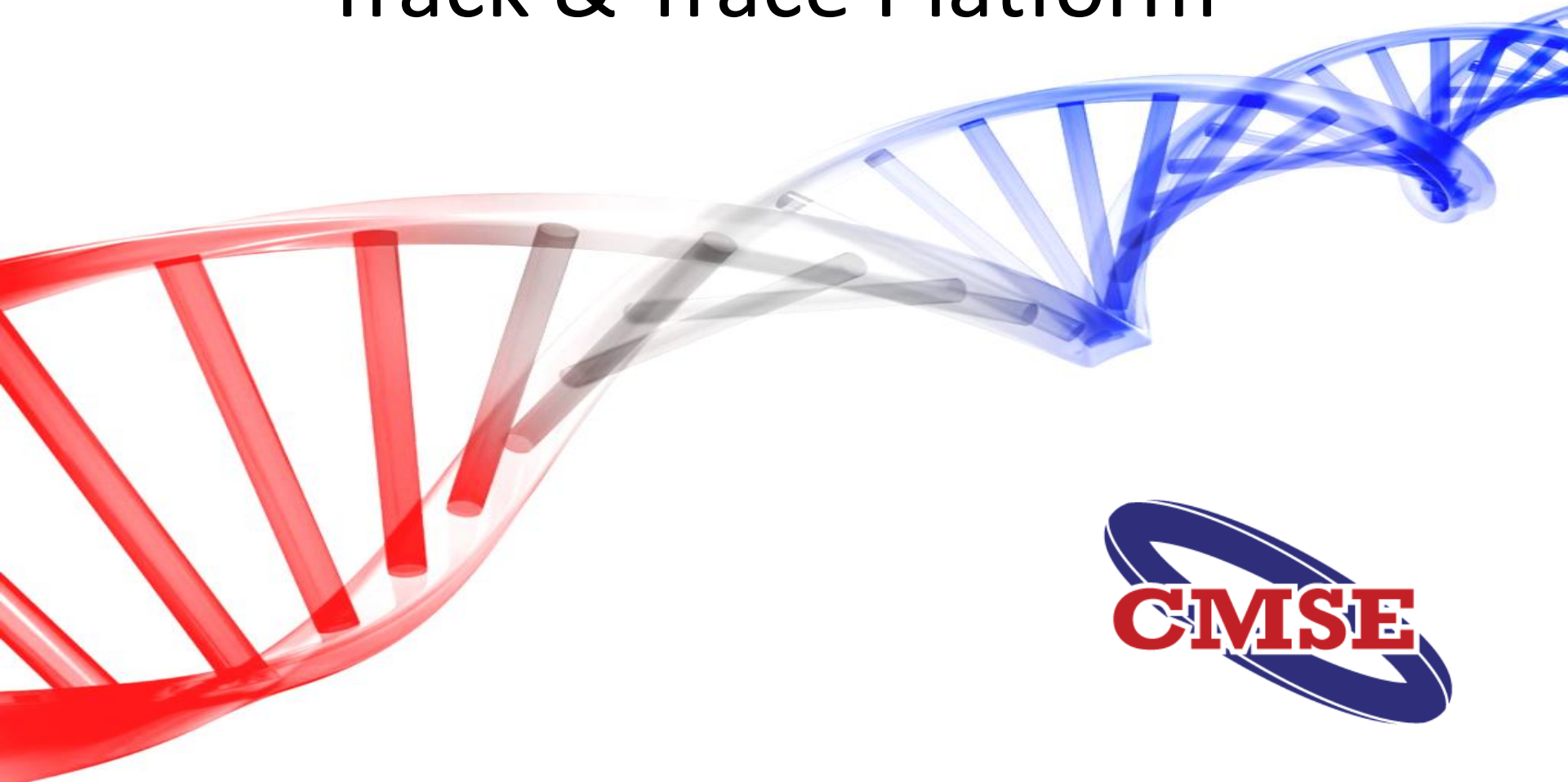
April 13, 2017

Deployed Forensic Cloud-Based Track & Trace Platform



Applied DNA Sciences

- Based in Stony Brook, NY – 30,000 sq ft facility
  - ISO 9001:2008 Certified/Registered
  - ISO/IEC 17025:2005 Accredited
- 44 patents and 83 patent applications
- 62+ employees – 12 PhD's on staff
- Over 100,000 unique DNA codes deployed globally
- Over 750,000 microcircuits DNA-marked and in circulation
- Over 350 commercial customers
  - Current government contractor: 3 DoD Agencies & 3 non-DoD Agencies
- International law enforcement agencies – UK Police & Swedish Police – 100+ convictions totaling 500+ sentence years successfully attributed to SigNature DNA evidence
- 160 million pounds of U.S. cotton DNA-marked since 2014

ADNAS Mission

- **We make life real & safe** by providing botanical DNA-based security and authentication solutions and services that can help protect products, brands, entire supply chains, and intellectual property of companies, governments and consumers from theft, counterfeiting, fraud and diversion.
- **What we do…**
  - Secure global supply chains from provisioning through end-user purchase
  - Protect industries from counterfeits
  - Provide absolute evidence of stolen goods and link criminals to their crimes
  - Supply DNA Services to Biotech and Diagnostic customers

Global Counterfeit Pandemic

	2013	2022 (forecast)
Value of counterfeit and pirated goods.	US $1.90 trillion	US $2.81 trillion
Displacement of legitimate economic activity.	US $980 billion	US $1,244 billion
Wider economic and social costs.	US $1.54 trillion	US $1.87 trillion
Employment losses.	2.6 million	5.4 million

Source: The Economic Impacts Of Counterfeiting And Piracy, A Report prepared for BASCAP and INTA by Frontier Economics

INTA International Trademark Association

http://www.inta.org/Communications/Documents/2017_impact_study.pdf

NIST: Modern Supply Chain Lacks Visibility, Understanding and Control

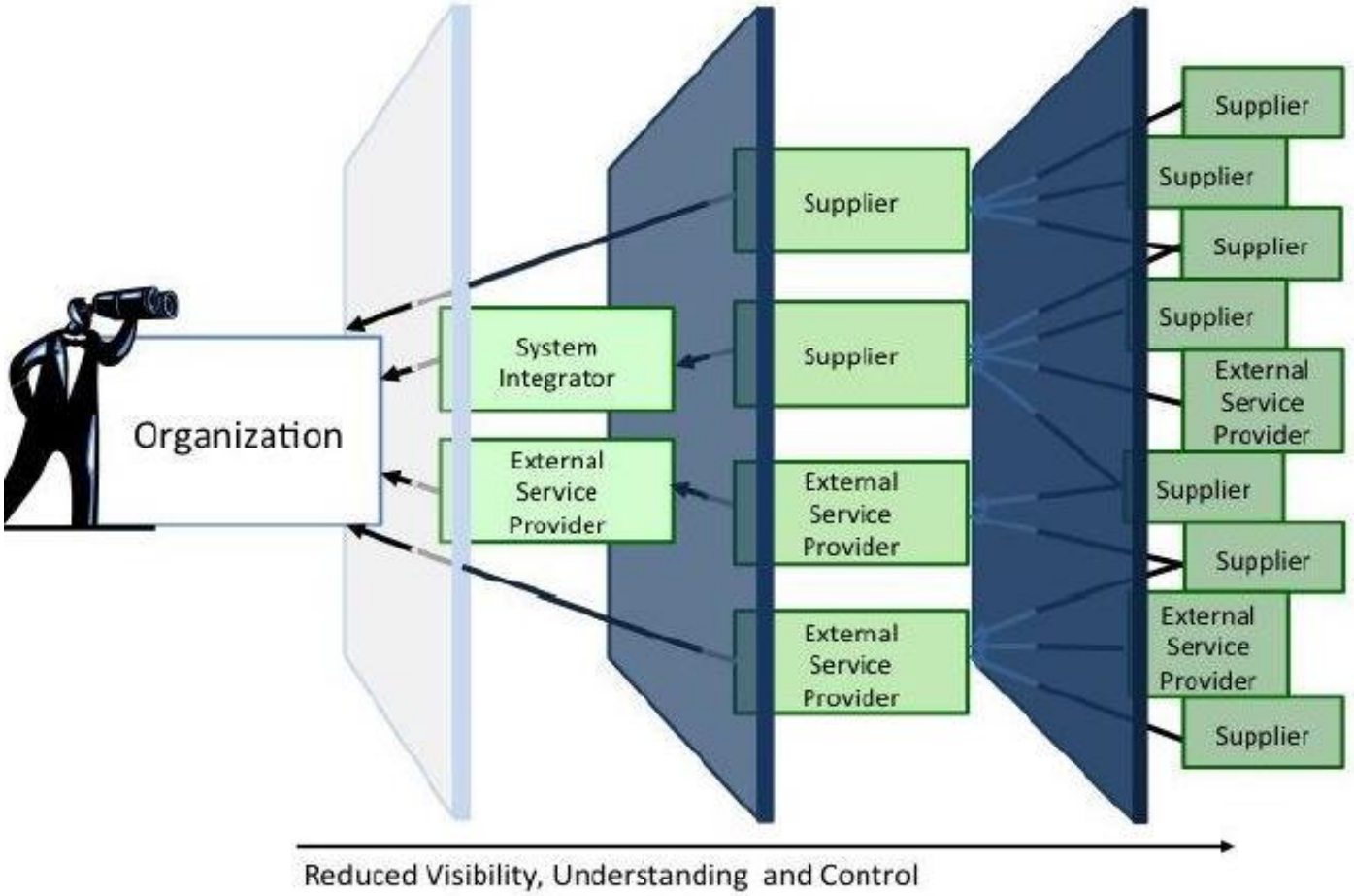


Figure 1-4: An Organization's Visibility, Understanding, and Control of its ICT Supply Chains

NIST Special Publication 800-161: Supply Chain Risk Management Practices for Federal Information Systems and Organizations Page 16

The SigNature® DNA Solution

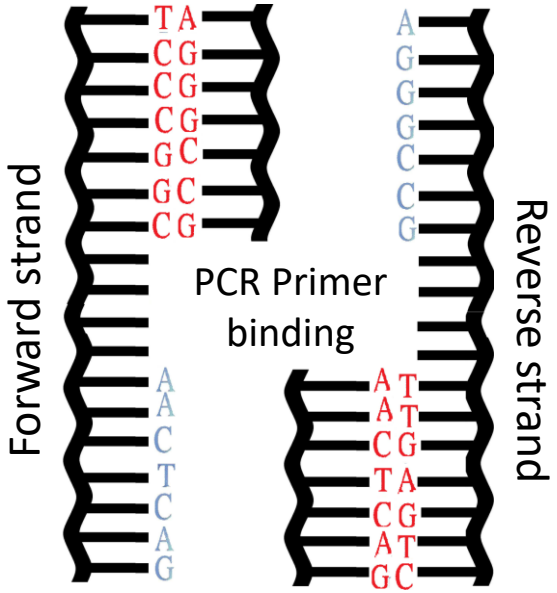
- Precision-engineered, botanical DNA to provide absolute forensic authenticity and traceability within a supply chain integrity program
- Actual Genomic Deoxyribonucleic Acid (DNA)
- Custom marks created for specific vendor/supplier/raw material.
- Versatile – can be combined with most security features to create a unique solution with enhanced functionality.
- Uncopyable (Red Team Challenged by leading International Lab)
- DNA processed using PCR and CE analysis
- Forensically and legally valid in court
- Library of optical rapid reporters accompany DNA

Creating an Uncopyable SigNature DNA Mark

Large Botanical DNA is acquired

DNA is segmented, and encrypted

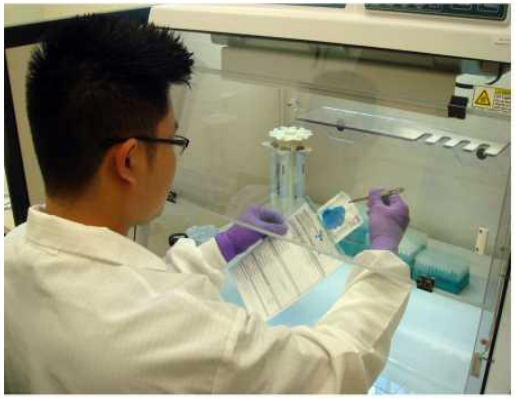
Segments are shuffled and reassembled to form a unique, secure SigNature DNA marker



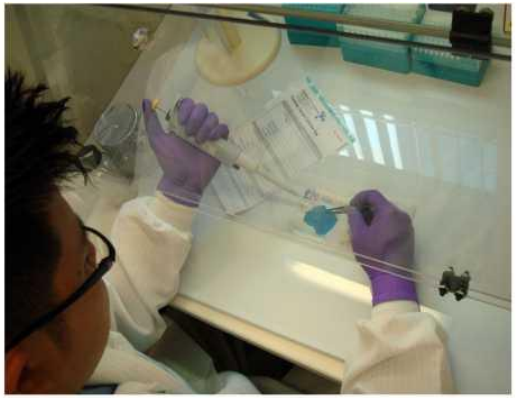
First principles:

- Probability of matching any single nucleotide is 1 in 4
- Probability of matching 2 sequential nucleotides is (1/4)(1/4) = 1/16
- Probability of matching two 15-base primers is $((1/4)^{15})^2 = (1/4)^{30}$ (1 in a quintillion)
- Probabilities radically diminished by multiple marks & decoy DNA

Forensic Lab Authentication Process



Sample is received



Sample preparation

Purified DNA sample into vial

DNA authenticated using PCR machine and CE analysis

Results are absolute and definitive

Slashing UK Cash Crimes

- SigNature® DNA has been used to protect Loomis cash boxes since 2009
- Each box contains a unique DNA sequence, allowing stolen cash to be linked to a specific crime
- Over 110 convictions attributed to SigNature DNA and 541 sentence years
- Loomis has reported a 75% reduction in both cash attacks and cash losses

Protecting Mission Critical Components

- SigNature DNA is used to forensically mark, validate and authenticate parts throughout the US Military supply chain
- Currently used by 3 DoD and 3 non-DoD agencies
- US Defense Logistics Agency has been using SigNature DNA since 2012 to provide part-level traceability; over 750,000 microcircuits have been marked to date

Ensuring Cotton Purity

- Over 160 million pounds of American-grown cotton has been marked with SigNature T DNA
- Backed by the forensic strength of SigNature T DNA, PimaCott® is the world's first verifiable US-grown Pima cotton
- PimaCott® bedding products are sold in big box retailers in the US

DLA Video

https://vimeo.com/182578772

Our Forensic Lab Issues a CoDA (Certificate of DNA Analysis) and is prepared to issue expert witness reports and testify in court as required

appliedDNAsciences

CERTIFICATE OF DNA ANALYSIS

for Marked Components

Issued For	Applied DNA Sciences' Demo				
Marked By	Matt	**Forensic Sample Bag No.**	A00000xxxx	**APDN Job Request No:**	xxxx
Date Marked	3/28/14	**APDN Sample No.**	xxxxx	**Specification:**	xxxx
DNA Vial Code Used	xxxxx-xxx.xx	**Product Name: Description**	Printed Mark: Clear UV DNA Embedded Ink w/ Rapid Reporters		

Component Description					DLA Orders Only			Non-DLA Orders Only		OCM Trace	Test
Part Mfg	Part No.	Date/Lot Codes	Pkg Type	COO	NSN No.	Contract No.	Quantity	Internal No.	Quantity		
Anti-Counterfeit Manufacturing	501911 8-57-01	9410	16 PIN DIP	N/A	5962-01-237-XX95	SPL7M9-17-L-3015	10	N/A	0	Yes	No
Clean Components, Inc	845963-75-12	12@9420, 9@2015	Flat Pack	Thailand	5962-01-136-XX66	SPM9L7-84-X2109	5	N/A	0	No	Yes
Trusted Microcircuits Corp	QXLM-17XX	0024	4 PIN TO-8	Phillipines	5962-05-157-XX75	SPM9L7-84-X2109	0	59128-S4-05-1	5	Yes	No
Legit Manufacturing, Inc	780925 8671M	1229	28 PIN DIP	USA	5962-08-299-XX88	SPL8H-97-D-1111	500	N/A	0	Yes	No
						Quantity Marked:	515	Quantity Marked:	5		

Authentication Results

Test	RESULT
Presence for DNA proprietary markers	Pass / Poor DNA Recovery
Presence of UV / IR Rapid Reporters	Present/ Not Observed

Additional Comments: None

Forensic Analyst: _____ Date: _____

Technical Reviewer: _____ Date: _____

Portal Attributes

- Centralized database allows all trusted stakeholders to easily access key information at any logistic point downstream.

- Stakeholders include: Procurement, Test Labs, Inspectors, end-users/ depots, other Agencies.

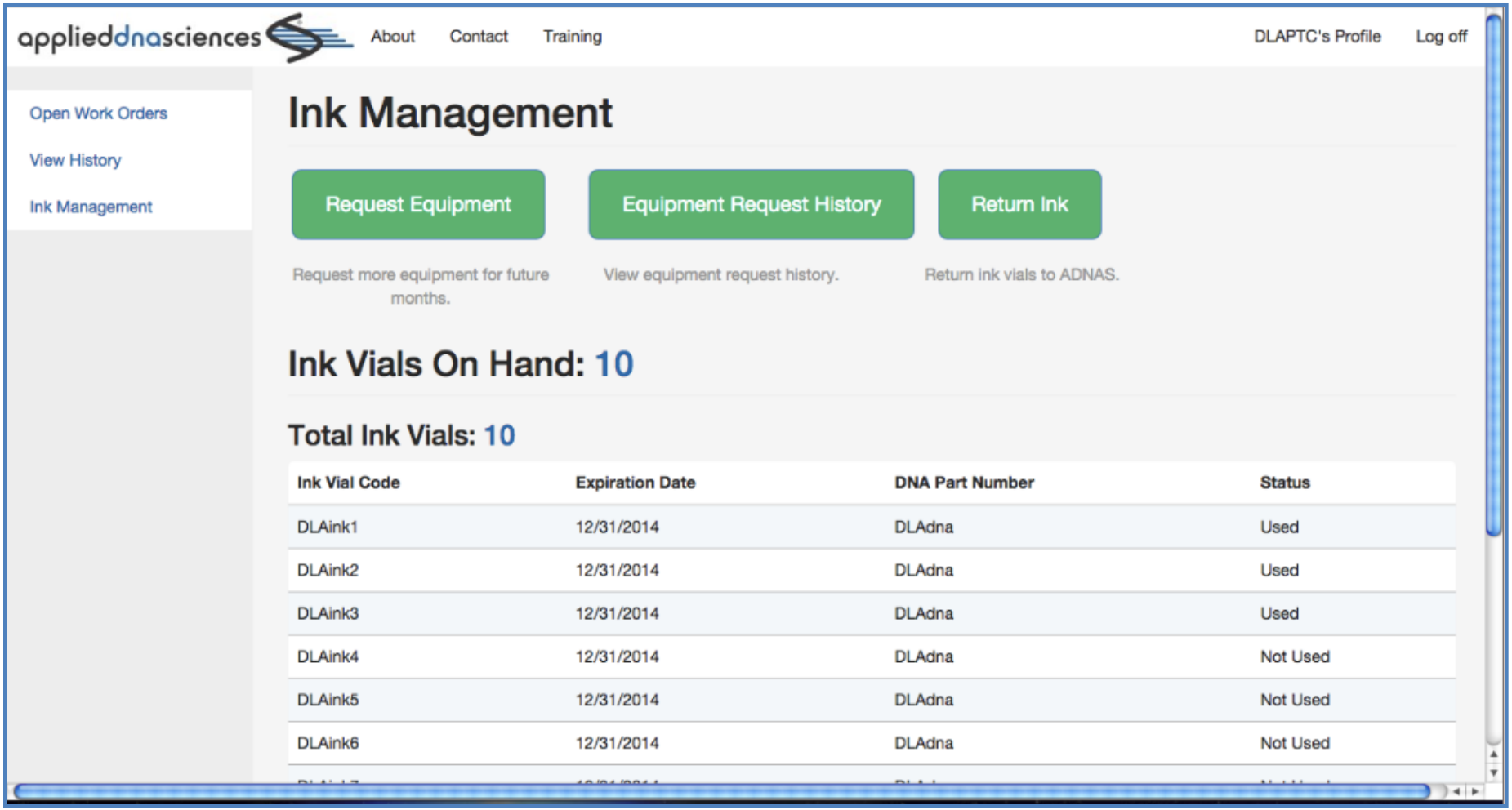
- Information stored indefinitely: traceability documentation, testing reports, hi-res digital photography of components.

- Programs are supported for several decades. An information repository allows for robust procurement, non-redundant testing and other key supply chain value-adds for the future.

- Allows for accurate analysis of key data metrics that empowers efficient procurement/testing and in in-field verification methods.

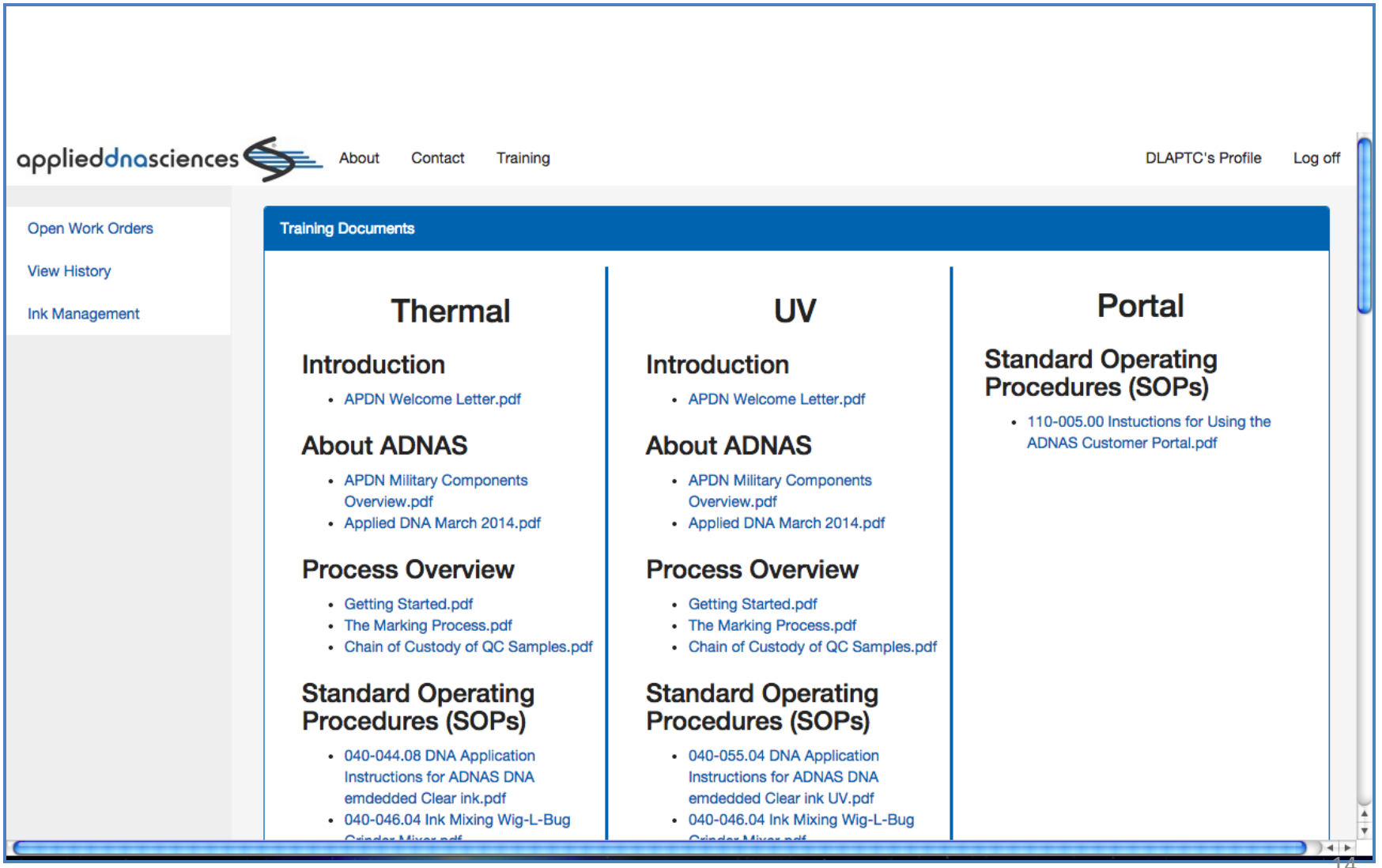
Ink Inventory Management Tool

Tracks DNA Ink Vial Inventory



DNA Training Manuals & SOP Revisions

Latest Revisions Continually Updated



Supply Chain Management
Article Authentication
mCommerce Enhancement

digitalDNA® is a new security tool that utilizes the flexibility of mobile communications, the instant accessibility of secure, cloud-based data, and the absolute certainty of DNA to make item tracking and authentication fast, easy and definitive, while providing the opportunity to create a new and exciting customer interface. *Simulation performed under DoD RIF Contract*

the convergence of digital and bio technologies

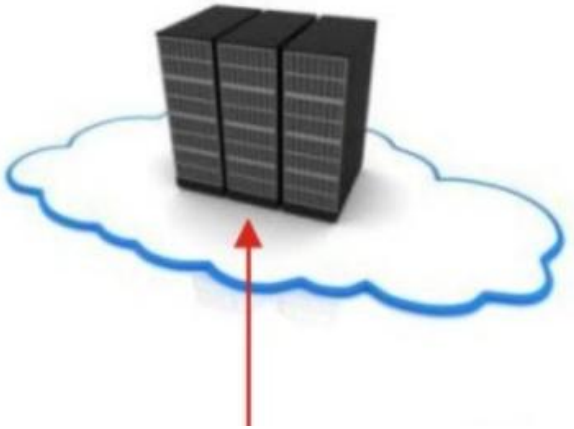
digitalDNA system

Creating the digitalDNA mark

A unique serial code is created for each article, and represented in an easy-to-read QR-style barcode. The barcode is printed using DNA-marked ink, creating the secure digitalDNA mark.

2. The digitalDNA mark is deployed

The unique digitalDNA codes can be used to mark, identify and track virtually any item.



3. Inventoried in the cloud

Each item's unique digitalDNA code is recorded, at its point of origin, on a secure, cloud-based server, affording easy validation/inquiry/input using a smart device.

4. DNA - the core

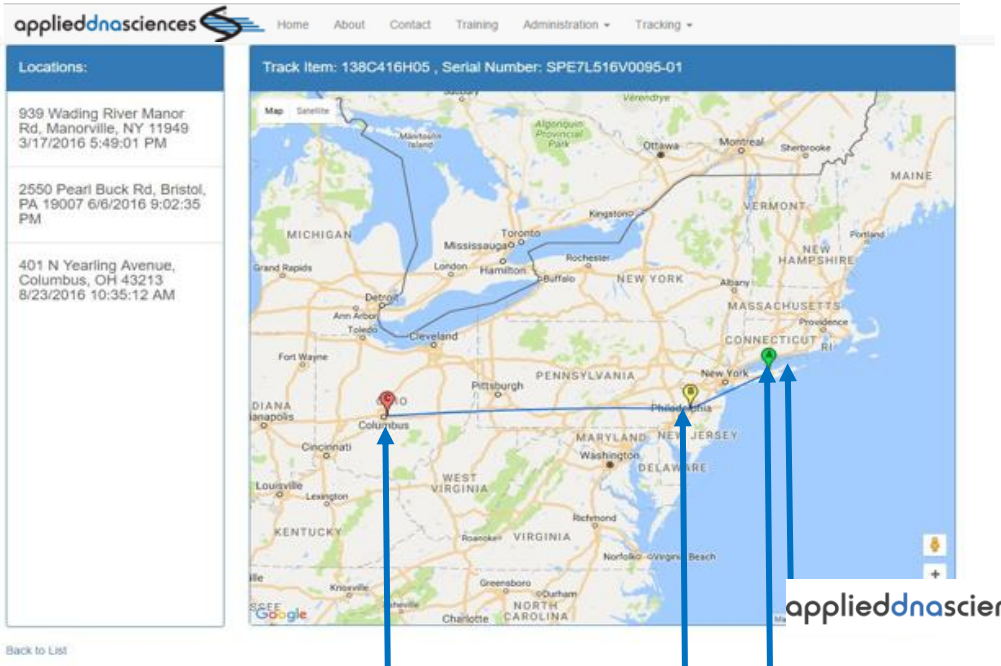
The DNA included in all digitalDNA codes serves as a forensic back stop. Should there ever be a question about the validity of a digitalDNA code, a laboratory-based analysis can be conducted to determine authenticity.

Track and Trace Simulation (Aug 2016)

Mark, Validate, Authenticate, Evidence

Manufacture → Distribution → DLA → Agencies

Chain of Custody, Traceability, Transparency



- ADNAS produce DNA; Ship to SAS
- SAS produce DNA-infused gasket batches; Ship to ActionPak
- ActionPak validate tamper-evident labels; bag-and-tag; Ship to DLA
- DLA receive
- Access to history: authentication, documentation, IUID and non-parts

applieddnasciences

SAS INDUSTRIES

ActionPak

DLA

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Verify authentication and documents

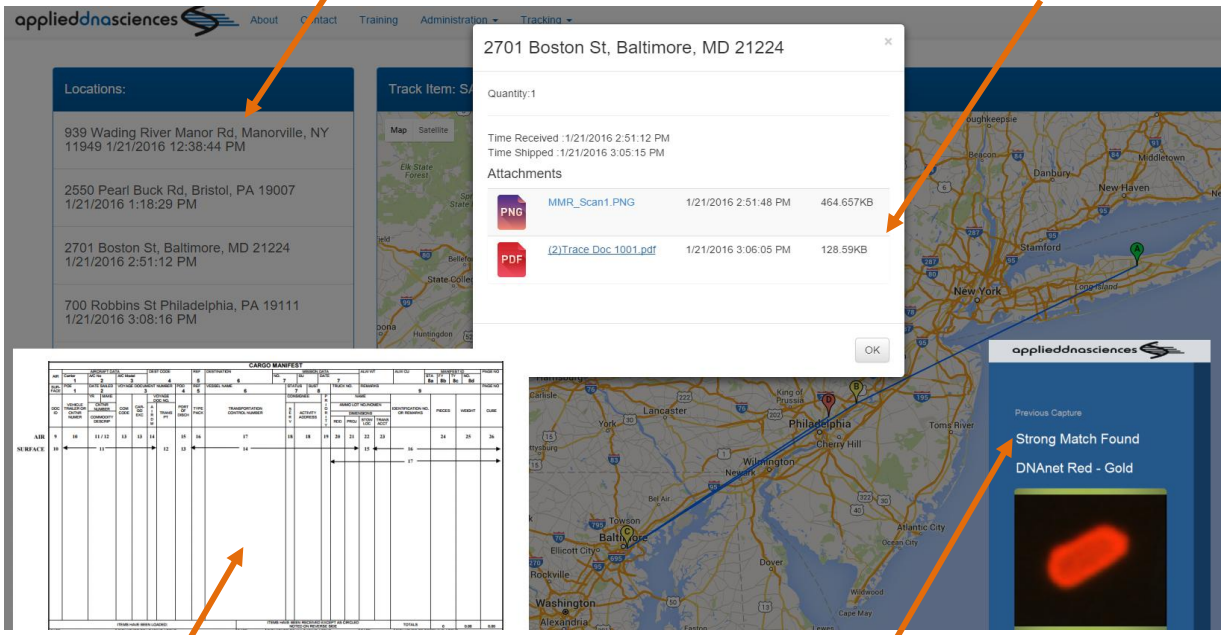
Mark, Validate, Authenticate, Evidence

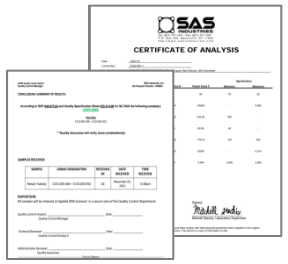
Manufacture → Distribution → DLA → Agencies

Chain of Custody, Traceability, Transparency

Chain of custody,
Geolocation, date/time stamp

Trace and test documents





Shipping documents

Spectral validation

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THANK YOU

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SigNature DNA Qualified Carriers

- Inks
  - UV-Cured (MIL-SPEC)
  - Thermoset (MIL-SPEC)
  - Air dry (Commercial, Industrial)
  - Water-based (Commercial, Industrial)
  - Solvent-based (continous inkjet)
- Varnishes (Actega, Flint)
- Lubricants (Castro Brayco, Ferrocote)
- Poly-olefin thermoplastics (extrusions, drawn fiber, additive manufacturing)
- Chemical suspensions (aerosols/ fog)
- Porous materials (cotton)
- Dye packs (security cash in transit)

Defense Logistics Agency launches DNA marking capability

12/16/2014
By DLA Public Affairs

The Defense Logistics Agency is insourcing its efforts to make it easier to detect and prevent counterfeit microcircuits from entering into its supply chain.

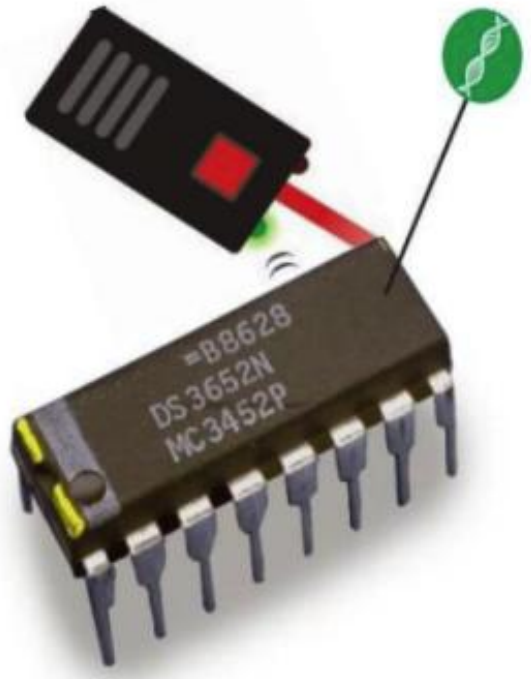
"Adopting this DNA marking capability will enable DLA to intensify its fight against counterfeit parts entering and negatively impacting our supply chain, and ultimately our customers."

Source: http://science.dodlive.mil/2015/01/05/dna-marking-capability/

Protecting the Supply Chain

Why DNA Marking?

- Can't be copied
- Provides authenticity at forensic level
- Doesn't impact functionality of item
- Relatively inexpensive
- Strengthens partnership with DLA's sources of supply
- Enables multiple checks in supply chain



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DLA is Exploring Anti-Counterfeit

Solutions for other High Risk Items

- DLA is exploring DNA marking, along with other technologies as a possible solution to mitigate counterfeits in these high risk items
  - FSC 3110, Bearings (Aviation)
  - FSC 4730, Fittings, Hoses, and Tube (L&M)
  - FSC 5325, Fasteners (Troop Support)
  - FSC 5935, Electrical Connectors (L&M)
  - FSC 5961, Semi-conductor Devices (L&M)