

Countering Tampering & Counterfeiting

*The Argonne Vulnerability Assessment Team:
Internationally recognized expertise in tags, seals, anti-counterfeiting,
cargo security, nuclear safeguards, & physical tamper/intrusion detection.*

Vulnerability Assessments

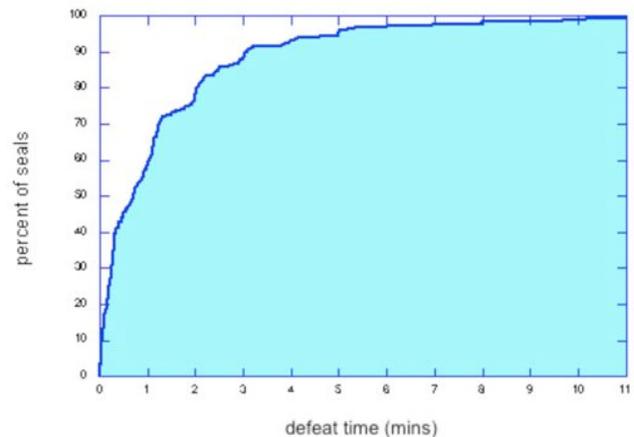
The Vulnerability Assessment Team (VAT) at Argonne National Laboratory (formally at Los Alamos from 1992-2007) has conducted vulnerability assessments on hundreds of different physical security devices, systems, and programs. This includes locks, tags, seals, RFIDs, GPS, microprocessor systems, contact memory buttons, electronic voting machines, and biometrics and other access control devices. The VAT has demonstrated how all these can be easily defeated using widely available tools, materials, and supplies, but has also devised and demonstrated simple and practical countermeasures.

In addition, the VAT has provided security consulting, training, R&D, reverse engineering, specialty field tools, and novel security devices/strategies for more than 40 different companies, NGOs, and government organizations, including DoD, DOE/NNSA, DHS, U.S. Department of State, the International Atomic Energy Agency (IAEA), Euratom, and the intelligence community.

Tamper-Indicating Seals

The VAT has devised and demonstrated successful attacks and countermeasures for hundreds of different tamper-indicating seals. As a result of this work, the VAT has developed improved training, seal use protocols, and novel kinds of seals. These new seals are based on the VAT's "anti-evidence" approach to tamper detection. Advantages include better security, simplicity & low cost, volumetric intrusion detection, no need for a hasp, and "anti-gundecking" features.

Some of these new seals are: the Talking Truck Cargo Seal, Tempered Glass Seal, Time Trap, Tie-Dye Seal, Chirping Seal, DTMF Watch Seal, Skunk Seal, MagTag, Magic Slate Seal, and the Triboluminescence Seal.



Percentage of 244 different seals that can be spoofed (defeated) in less than a given amount of time by 1 person, working alone, using only low-tech tools, methods, and supplies. These 244 seals include high-tech seals and those used for nuclear safeguards.

Novel Anti-Counterfeiting Approaches

The VAT has proposed and developed a number of new techniques for countering product (and other kinds) of counterfeiting, including:

Virtual Numeric Tokens [RG Johnston, "An Anti-Counterfeiting Strategy Using Numeric Tokens", International Journal of Pharmaceutical Medicine 19, 163-171 (2005)]

Time Trap (authenticity & tamper detection with one device)

Wine Anti-Tampering and Anti-Counterfeiting Device

VAT Resources & Capabilities

- Top Secret security clearances
- Access to 2 SCIFs + a new SCIF under construction
- 18+ years of experience with vulnerability assessments
- One-of-a-kind Vulnerability Assessment Laboratory
- 1200 square feet of classified VTR laboratory space
- 2000 square feet of other office & laboratory space
- Unique VAT microprocessor rapid prototyping shop
- Experience with the successful completion of \$25 million of classified & unclassified projects since 1992
- Access to multidisciplinary, world-class science & engineering expertise at all the DOE national laboratories



The Time Trap anti-evidence tag & seal.

VAT Awards & Recognition

The Argonne Vulnerability Assessment Team has won numerous awards and received widespread recognition. A partial list includes:

- * 10 U.S. patents
- * Interviewed by the Wall Street Journal (front page), NPR, CSO, RFID Journal, Homeland Security Alert, IOMA Security Director's Report, Mechanical Engineering, Business Travel Executive, Pharma Manufacturing, etc.
- * BECCA Honorary CCO Award for contributions to homeland security, 2009
- * LANL Fellows Prize for Outstanding Research, 2004
- * LANL Achievement Awards, 2007, 2004, 1999 & 1995
- * Distinguished Performance Award from the CIA, 2002
- * "Excellence in Performance Measure" Award, American Society for Industrial Security, 2002
- * LANL Distinguished Performance Awards, 2001 & 1996
- * Excellence in Technology Transfer Awards, 1997 & 1992
- * R&D 100 National Awards, 1992 & 1994
- * "Best of What's New Award", Popular Science, 1992



A new cap invented by the VAT can detect counterfeit or tampered wine. By plugging the cap into a computer through a USB cable, a wine buyer or auctioneer can check if the wine inside is genuine and undisturbed.

Sample Publications

RG Johnston, EC Michaud, and JS Warner, "The Security of Urine Drug Testing", *Journal of Drug Issues*, (in press).

RG Johnston, "Layered Security: Self-Defense or Self-Delusion?", *Security Management* (in press).

EG Bitzer, PY Chen, and RG Johnston, "Security in Organizations: Expanding the Frontiers of Industrial/Organizational Psychology", *International Review of Industrial and Organizational Psychology* 24, 131-150 (2009).

RG Johnston, "Tamper-Indicating Seals", *American Scientist* 94, 515-523 (2006).

RG Johnston, "New Research on Tamper-Indicating Seals", *International Utilities Revenue Protection Association News*, 16, 17-18 (2006).

RG Johnston and JS Warner, "The Dr. Who Conundrum: Why Placing Too Much Faith in Technology Leads to Failure", *Security Management* 49, 112-121 (2005).

RG Johnston, "The 'Anti-Evidence' Approach to Tamper-Detection", *Packaging, Transport, Storage & Security of Radioactive Material* 16(2), 135-143 (2005).

JS Warner and RG Johnston, "A Simple Demonstration that the Global Positioning System (GPS) is Vulnerable to Spoofing", *The Journal of Security Administration* 25, 19-28 (2002).

Sample Invited Talks

"Security Against Theft, Tampering, and Counterfeiting", General Assembly of the Pharmaceutical Security Institute, Mclean, VA, October 28, 2009.

(Keynote Address) "The Importance of Not Being Earnest", SecureWorld Expo, San Francisco, CA, September 19-20, 2007.

"Pharmaceutical Security & Authenticity", Pharmaceutical Supply Chain Integrity Conference, Baltimore, MD, April 25-27, 2007.

"Vulnerabilities & Limitations of RFID and Contact Memory Devices", IAEA Technical Meeting on Sealing Systems and Containment Verification Methods, Vienna, Austria, February 12-16, 2007.

"Countermeasures to Wishful Thinking", ASIS International Middle East Security Conference, Manama, Bahrain, December 4-6, 2006.

Vulnerability Assessments on Tamper-Indicating Seals", Joint US-Russia TID Working Group, Moscow, Russia, September 13-14, 2006.

"Research on Improving Cargo Security", 5th North American Cargo Security Forum, Washington, D.C., September 6-7, 2006.



About Argonne National Laboratory

Argonne National Laboratory, the nation's first national laboratory, is one of the U.S. Department of Energy's largest national laboratories for science and engineering research. Argonne has approximately 3,000 employees, including 1,000 scientists and engineers, three-quarters of whom hold doctoral degrees. Argonne's annual operating budget exceeds \$630 million. Since 1990, Argonne has worked with more than 600 companies, federal agencies, and other organizations.

Currently, 16% of Argonne's budget is for intelligence, defense, and homeland security projects (up from 6% before September 11, 2001). The long-term goal is to significantly increase this percentage.

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