



Better Tamper-Indicating Seals

*Anti-Evidence Seals:
Fundamentally a better way to do tamper detection.*

Tamper-Indicating Seals

The Vulnerability Assessment Team (VAT) at Argonne National Laboratory has devised and demonstrated easy defeats for hundreds of different tamper-indicating seals, including those used for high-level security applications and nuclear safeguards. As a result of this work, the VAT believes much better seals are possible, and has developed over 20 new kinds. Some have received U.S. patents.

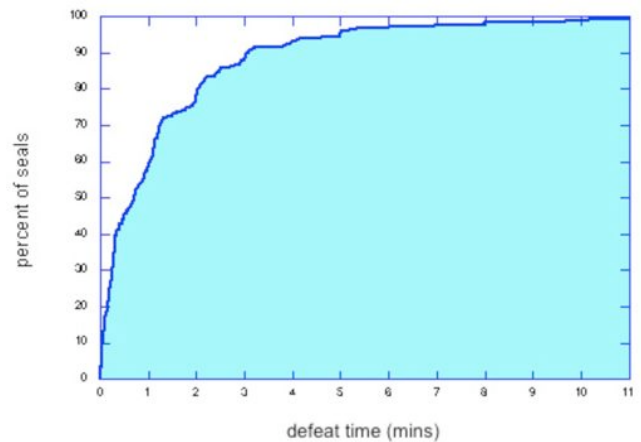
The Anti-Evidence Approach

Most of these new seals are based on the VAT's "anti-evidence" approach to tamper detection. In a conventional seal, the fact that the seal has been opened must be stored in or on the seal until such time as it can be inspected. But it is usually easy for an adversary to replace the original seal with a counterfeit, or else hide or erase this 'alarm condition' in the original seal.

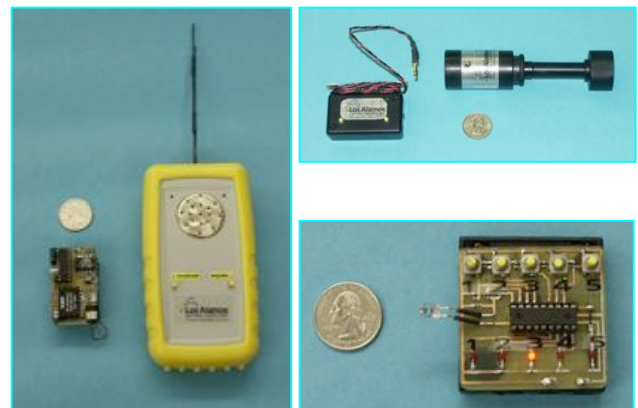
With an anti-evidence seal, in contrast, we store secret information (typically a byte) in or on the seal indicating that tampering has not yet occurred. When tampering is detected, this information gets instantly erased. As a result, counterfeiting is of no value to an adversary if he doesn't know what information to put in or on the seal.

Advantages

Advantages of the anti-evidence approach include better security, as well as simplicity & low cost, volumetric intrusion detection, no need for a hasp, and "anti-gundecking" features.



Percentage of 244 different conventional 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.



Various VAT anti-evidence seal prototypes

VAT Resources & Capabilities

- Top Secret security clearances
- Access to 2 SCIFs + a new SCIF under construction
- 18+ years of experience with vulnerability assessments and tamper detection
- 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

VAT Awards

The Argonne Vulnerability Assessment Team has won numerous awards. A partial list includes:

- * 10 U.S. patents
- * 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

About Argonne National Laboratory

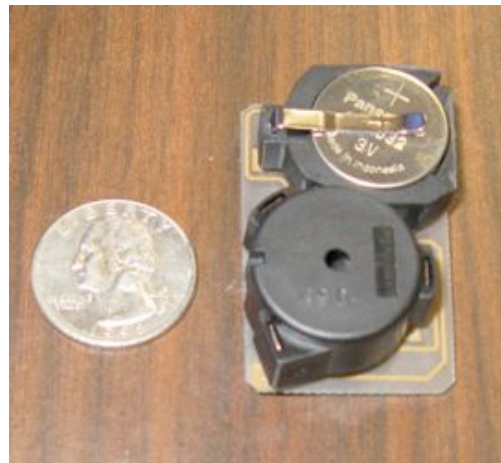
Argonne National Laboratory, the nation's first national laboratory, is one of the U.S. Department of Energy's largest national laboratories for science and engineering research. Argonne has approximately 3,000 employees, including 1,000 scientists and engineers, three-quarters of whom hold doctoral 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.

Argonne is managed by UChicago, LLC, for the U.S. Department of Energy.



Time Trap: an anti-evidence tag & seal.



Prototype Chirping Tag & Seal