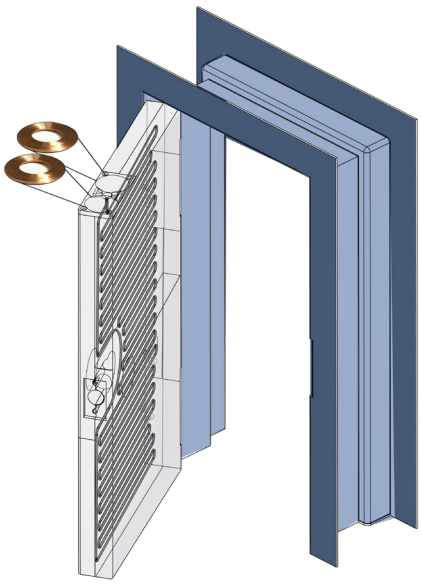
INDUCTIVE CIRCUIT SENSOR
FOR INTRUSION DETECTION

US Patent 11,074,795
SD# 15050
Technology Readiness Level: 5
Proof of concept testing has been performed and a small-scale prototype has been developed

Sandia's intrusion detection system uses inductive power transfer to reliably sense whether a barrier has been opened, closed, or breached relative to a stationary surface.

Over the last forty years, balanced magnetic switching (BMS) has become the standard form of intrusion detection for secure sites throughout the United States. BMS systems rely on permanent magnets which can detect if a door has been opened or closed but not when it has been breached or penetrated. High security sites require enhanced forms of intrusion detection to supplement BMS systems. Alternative systems such as video analytics or passive infrared sensors perform best in static ambient conditions, which are difficult to maintain and frequently result in nuisance alarms.

By combining techniques in inductive power transfer and automated tailored wire placement, Sandia researchers have developed a superior form of intrusion detection that can reliably detect whether a barrier has been opened, closed, or breached relative to a stationary surface. This sensor system uses inductive power transfer to create a circuit between two power coils. A highly configurable, modular stitched sensor panel or wire path is placed in series with the coils and embedded within the barrier to create a continuity sensor. When the two coils are placed over each other with their central axis aligned, a current is generated in the receiving coil. If the surfaces are separated or if the stitched sensor is disrupted, an intrusion is detected and will trigger the system alarm.



Sandia's inductive circuit sensor for superior intrusion detection is shown above on a miniatiurized door. It features two inductive power coils and an embedded wire path.

Due to its modular design, sensors can be placed in custom configurations within large or varied surface areas. This new approach can provide a more sophisticated form of intrusion detection for high-value assets in secure settings of all kinds.

Technical Benefits

- Reliably detects open, close, and breach of barrier
- Highly configurable, highly accurate sensor placement
- Low-cost solution
- May be customized for unique security barrier types and settings, ranging from large to small surface areas
- Potential to add diagnostics for characterizing intrusion type and anti-spoofing

Industries & Applications

- Intrusion detection for diverse articles
- Asset protection
- Security and defense
- Infrastructure
- Shipping and logistics

ip.sandia.gov
ip@sandia.gov

Sandia National Laboratories is a multi-mission laboratory managed and operated by National Technology and Engineering Solutions of Sandia, LLC., a wholly owned subsidiary of Honeywell International, Inc., for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-NA0003525.