PathSensors Building Protection

PathSensors will design a custom system tailored to your building and detection requirements.

- Used by US gov’t for 8+ years
- Sensitive detection platform
- Rapid results (2 minutes)
- Biodetection expertise
- Onsite evaluations available
STEP 1: Evaluate (Risk Profile)

A strong communications channel will be established to understand your requirements. PathSensors will work with you to establish the system requirements and specifications.

This phase consists of listening to your concerns...

- What are the pathogens of concern?
- Is there a desired sensitivity level?
- Is focus on point detection or building-wide detection?
- Preference for triggered versus continuous sampling?

- What is the timeline?
- Tradeoffs of manual versus automated systems
- Local test results or networked to a remote monitoring station?

As part of the evaluation process, PathSensors will send a team of experienced engineers to evaluate the site. This provides a wealth of information that often cannot be communicated via text or voice alone.

At the conclusion of the evaluation phase, PathSensors and the client will have a clear understanding of the system requirements.
STEP 2: Design

With the requirements established in STEP 1, PathSensors’ team of experts will design a custom solution tailored to the needs of the site.

Utilizing a team of experts in HVAC, air monitoring, and biothreat detection technologies, PathSensors will design a system composed of:

• **Air Flow Analysis & Sampling Options**
  • The building’s total air volume will be calculated, along with sensitivity requirements, to determine how many detection instruments will be needed as well as optimal locations.

• **Trigger Instruments**
  • These continuous sampling devices detect the presence of biological agents. In these scenarios, trigger devices provide real-time monitoring.

• **Detection Instruments**
  • The core of the system, the PathSensors BioFlash-E instrument, provides the rapid identification of environmental pathogens. These instruments identify up to 16 different pathogens, with high sensitivity, within 120 seconds.

• **Traceable Results**
  • Test results may be sent to a single on-site location, or in more complex implementations, multiple device results can be monitored either on- or off-site via secure encrypted networks.

At the conclusion of the evaluation phase, PathSensors and the client will have a detailed understanding of the system to be installed.
**STEP 3: Implement**

With the system design from STEP 2, PathSensors will work with you to schedule the on-site installation of the biodetection system.

PathSensors provides implementation flexibility. After the system design is set, we deliver and install the system.

**Strategic Air Monitoring Options:**
- **Centralized**
  - Pull air samples from central location
  - Test devices located in central location
- **Distributed**
  - Point-based sampling, strategic location choices
  - Each location has separate test device and logistics

**Operational Automation**
- System automation is flexible. Ranging from simple operator initiated testing through fully autonomous testing for 7 days without human intervention options are available, depending on the client requirements.

At the conclusion of the implementation phase, the custom biodetection system will be fully operational.
STEP 4: Service & Support

PathSensors’ work continues through the lifetime of the system. From repairs and upgrades to general system support and questions, PathSensors is available to meet our clients needs.

All PathSensors systems come with a 1 year parts and labor warranty. Extended warranty and service contracts are available to keep your system running in top condition for years.

System Validation:

- PathSensors’ CANARY™ technology has been validated at DoD’s Edgewood Chemical and Biological Center, Pacific Northwest National Labs, and Battel Memorial Labs (reports available on request).
- On-site verification testing and “Red Team” testing are available through the use of simulants or pre-configured consumables

At PathSensors, our service and support are our highest priorities.

Technology History

- CANARY™ was originally developed by MIT-Lincoln Labs
- Technology is in use by Department of Defense for 8+ years
- BioFlash instruments in mail screening
- CANARY™ biodetection is deployed at U.S. ports of entry for USDA mandated pathogen detection
BioFlash Implementations for Buildings

**Point Testing**
*Sampling of air in highly sensitive locations.*

**Networked Testing**
*Sampling of air through the building’s HVAC system.*

**Triggered Testing**
*Particle detectors continuously monitor the space. When particle levels rise, or proteinaceous materials are observed, an identification test for that respective air space is initiated.*
PathSensors Building Protection
Client Questionnaire

There is no one-size-fits all solution to building security for CBRNE protection. PathSensors BioFlash instrumentation can provide a central pillar for biothreat detection, but numerous other factors should be taken into consideration when designing a complete building protection solution. The following questionnaire is a starting point to assess the specific customer requirements.

• What is the approximate total air volume of the building? (square feet, average ceiling height)
• Is the space composed of well-defined rooms or large open areas?
  • Size and distribution of the rooms in the structure, and if the rooms are ‘open’ allowing airflow between spaces or if they are closed door space
  • How many ‘air chambers’ exist in the structure.
• What biological pathogens are of interest?
  • PathSensors standard detection suite encompasses Ba, Rn, Ft, Yp, Bot, and Op.
• Are there specific sensitivity level requirements?
  • Longer collection times and/or more devices provide for increasingly lower levels of detection
• How important is automatic operation?
  • Varying from manual consumables change to fully automated testing (and remote test data reporting).
• Primary interest in point detection (points of entry/exit) or building-wide?
  • Point detection can be implemented with strategically placed detection equipment with minimal impact on building infrastructure.
  • Trigger based testing may involve ductwork, electrical considerations, and communication networking.
• Implementation time -- is there a deadline?
• What is the budget?
The 4 Levels of Building Protection

PROTECTING BUILDING OCCUPANTS AND OPERATIONS FROM BIOLOGICAL AND CHEMICAL AIRBORNE THREATS: A FRAMEWORK FOR DECISION MAKING
Committee on Protecting Occupants of DOD Buildings from Chemical and Biological Release
National Academies Press

LP-1: Low-Level Passive Protection
- Select systems to minimize normal exposure
- Dilute indoor air and reduce recirculation
- Minimize leakage in HVAC system and in building (external and internal)
- Add filtering as needed for healthy workplace
- Protect air intakes to reduce air contaminants
- Use construction methods and materials that reduce chemical exposure
- Consider security, site selection, and operational activities that have dual-use advantages for building protection

LP-2: High-Level Passive Protection
(LP-1 + options specific to protection from biological and chemical threat agents)
- Upgrade filters (particulate and adsorption) specific for biological and chemical threat agents
- Use zoning with graded pressurization (compartmentalized)
- Provide local air-washing vestibules
- Protect air intakes specifically to reduce biological and chemical threats

LP-3: Low-Level Active Protection
- Ensure that a hidden threat agent is detected and identified in time to treat any exposed persons, essentially detect to treat
- Provide protection for latent-acting threat agents with possible treatment
- Include all human-in-the-loop detection options and responses in LP-2
- Consider site selection, protective access control, and operational responses specific to biological and chemical threats

LP-4: High-Level Active Protection
- Detect to protect (warn and mitigate)
- Include automated detection and response systems for faster reaction times
- Use a tiered detection-response system in most cases with currently available sensor technology. Typically, low-accuracy sensors trigger low-regret responses if a threat is detected, and sensors with confirmation and identification capability are used for higher-regret responses.
- Consider site selection, protective access control, and operational responses specific to biological and chemical threats
PathSensors LP-3 Protection

Detect-To-Treat

Active protection refers to protection with the capability of actively sensing the environment for the presence of threat agents. LP-3 offers low-level active protection and directly addresses one of the main vulnerabilities of passive systems (LP-1 and LP-2)—exposure of the building’s occupants to a threat agent that is not detected and identified in time to execute therapeutic responses. LP-3 is a “detect-to-treat” option that would allow identification of a threat agent in time for treatment. LP-3 requires a broad-spectrum detection and identification system that could determine the presence of a variety of known threats within the time period necessary for an operational response. The time for detection varies by threat agent; typically a biological threat agent requires the longest time to detect. Since the LP-3 option detects and identifies the threat in time only to treat the people exposed, it might not be an appropriate option for facilities that require continuous operations. Some threat agents that escape detection could have a quick disastrous impact on facility operations.

Implementation Details:
- Simple to install – plumb into existing central HVAC system
- Periodic testing – manually run a test every 24 hour period
PathSensors LP-4 Protection

Detect-To-Protect

LP-4 is a high-level active protection that addresses the second major vulnerability of the LP-1 through LP-3 approaches to building protection—the inability to mitigate an attack through timely detection. LP-4 would allow detection and identification early enough to treat the exposed victims and to make operational responses that might minimize the impact of the threat agent by preventing or limiting exposure. These operational responses might include high-regret options. The LP-4 option is considered to be at the edge of current detection and identification technology and ability to operationally deploy.

Implementation Details:

- Custom ductwork installed to provide location-specific air sampling
- Low-regret particle trigger for each inlet duct
- Real-time results – identification test complete within minutes after a trigger event
- Communication network installation to provide centralized test result reporting
- Automation enabled – change consumables cartridge once per week