



Daily Briefing

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Agencies seek to 'immunize' buildings against terror attacks

By Joe Fiorill, [Global Security Newswire](#)

As the FBI scrambles to figure out who has been sending ricin to U.S. government facilities, scientists are placing new emphasis on the development of systems to make buildings "immune" to biological and chemical agents.

The 2001 anthrax mailings and subsequent ricin scares have cast a spotlight on the potential for a devastating indoor biological or chemical attack. Although scientists say they can do little -- short of supplying gas masks -- to protect those in the immediate vicinity when a dangerous agent is released, systems to protect people in the rest of the building are approaching 100 percent effectiveness. The focus is on developing "immune building" technologies to prevent the spread of dangerous agents through heating, ventilation and air-conditioning (HVAC) systems.

"The most likely approach that would be used by terrorists would be to employ an aerosolizer to release the agents either into the ventilation duct or into general areas of the building," Penn State University immune building expert Wladyslaw Kowalski wrote in a recent paper.

As a result, experts say, more and more buildings are equipping their HVAC systems with sensors to detect a biological or chemical attack, as well as with filters, airflow-diversion technology and neutralizing equipment to prevent the agents from circulating throughout the building.

Chief Executive Officer Lee Hadin of Medical Air Solutions, which sells systems mainly to hospitals, said the capabilities of such technology have increased "logarithmically" over the past several years.

Despite the pace of research, improvements in building immunity do not appear to be high on the Bush administration's crowded homeland security priority list. An outline of the administration's major bioterrorism preparedness programs, delivered last October by Office of Science and Technology Policy Director John Marburger, included no mention of improving measures to protect buildings against internal attacks.

The recent ricin incident in the office of Senate Majority Leader Bill Frist, R-Tenn., again underscored the appeal of congressional targets to potential attackers, but it is difficult to say with certainty what types of technology have been installed in congressional HVAC systems.

Both the Capitol Police and the Architect of the Capitol refuse even to acknowledge the presence of HVAC-based defenses in congressional structures, but press reports and interviews with experts suggest all top U.S. government targets are protected by systems that involve sensors, high-efficiency particulate air (HEPA) filters and ultraviolet radiation that neutralizes pathogens.

Kowalski said the systems probably provide adequate protection against recirculation of dangerous agents, but Bio-Defense Research Group Chief Executive Officer Preston McGee said there could be room for improvement at federal buildings.

Across the Potomac River, an elite Defense Department research group has undertaken an Immune Building Program, seeking ways to protect military installations against internal attacks. Under the aegis of the Defense Advanced Research Projects Agency's Special Projects Office, the researchers are seeking to "make buildings far less attractive targets" by reducing the "effectiveness of attack via dynamic response of HVAC (and other) infrastructure," according to a 2002 lecture by the office's director, Amy Alving.

The office is gearing up for a full-scale demonstration next year of the results of its work. The system, according to Alving's 2002 presentation, uses sensors and HEPA filters during "normal operation," with "active defenses" -- backup filters, airflow diversion and agent neutralization -- to be used when the sensors indicate an attack may be under way.

The program is "developing components, systems and architectures so 'smart' HVAC systems, including sensors and neutralization devices, could be used to protect the occupants of the building from attack and isolate the attacked area instead of exacerbating its severity," DARPA Director Anthony Tether said last March.

Use of a "smart" or "active" system, however, could mean running the risk of false negative readings or other forms of sensor failure. Medical Air Solutions' Hadin said excessive reliance on sensors would be a cause for concern and that officials should instead "assume we're going to be attacked."

"It would be very dangerous to rely on sensors. That technology has only evolved within the last 16 months and has not risen to the level of efficiency" provided by some filters, Hadin said.

McGee, whose group's product is based on a "passive," catchall approach that combines several neutralization technologies, also said government facilities should not rely too heavily on sensor-triggered equipment. "I think it's important that the government consider having a passive system in place that can, in a real-time fashion, neutralize biological and chemical threat agents," McGee said.

Johns Hopkins University's Applied Physics Laboratory, which invented the technology being marketed by Bio-Defense Research Group, first announced last year that it had demonstrated a 100 percent kill rate for bacteria, viruses and spores. The first installations of Path-Away, as Bio-Defense Research Group's system is called, are about to take place at the laboratory and at a number of undisclosed sites, and the company plans within months to take the unusual step of testing the technology with live agents.

McGee said measures used in congressional buildings are unlikely to provide 100 percent protection but that his product would do so. Several other experts said 100 percent neutralization of chemical and biological agents in HVAC systems is technically impossible. Most existing systems let some fraction of 1 percent of agents slip through.

A New York company advised by Kowalski, Immune Building Systems, has adopted a somewhat different marketing approach, touting low cost combined with effectiveness that rivals that of expensive HEPA filters. While Bio-Defense Research Group's system involves no filters, Immune Building Systems' product combines a neutralization component and non-HEPA filters.

The National Air Filtration Association says on its Web site that the large filters are "not practical" because most HVAC systems require additional fan capacity and other adjustments to integrate them. Although many government facilities have HEPA filters in place, most commercial buildings cannot afford to install the filters, Kowalski said.

Firms offering non-HEPA systems are hoping that the difficulties associated with the high-efficiency filters will aid their quest for government as well as commercial work. "There has been opposition from a number of folks on the Hill and off the Hill about utilizing historical congressional space to put these large filters and big HVAC systems in," McGee said.

Since Sept. 11, 2001, said Kowalski, immune building efforts have mirrored those in other areas of homeland security, with an initial scramble for maximum security slowly giving way to a more nuanced approach.

"There was a rush to be conservative, to provide as much defensive capability as possible for major government buildings. I'm not going to criticize them, because certainly, there are some parts of our government that must be given the ultimate protection, no matter what the cost," Kowalski said.

With its claim of 100 percent effectiveness, compared with the 99.97 percent rate the National Air Filtration Association says is typical for filters, Bio-Defense Research Group is banking on a continued demand for the "ultimate protection" Kowalski cited. Recalling reports that billions of spores were present in some of the 2001 anthrax mailings, McGee suggested even a small improvement could save lives.

"If I can only kill 99 percent of those spores," he said, "that means I have 1 percent of 1 billion left. That's 10 million spores that I have left. That's a lot of spores left. You can kill a lot of people."

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