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AMERICAN SAFE AIR

Bio-Safety in the Mail Room Using the SAMARI Negative Pressure Mail Room and ASAP II Automated Bio-Identification System

A WHITE PAPER

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Introduction

September 11, 2001 made it clear that symbols of the United States' lead role in the business world are prime terrorist targets. One month later, the dispersion of anthrax in the mail along the Eastern Seaboard made the threat of bio-terrorism a reality. These events amply demonstrate the large and immediate need for equipment to detect bio-terrorism agents in businesses that are icons of western culture.

Research International's ASAP II system.

In light of these circumstances, Research International of Monroe, Washington and American Safe Air of Mountain Home, Arkansas recently installed two advanced **Safe Mail Screening Rooms** in the headquarters mailroom of a major commercial U.S. Bank. Although protection of government facilities and the U.S. Postal Service has, of necessity, been the U.S. government's primary focus, our financial institutions are also vulnerable through the mail. There is compelling evidence that banking facilities are being considered high-value targets by terrorists. Research International's ASAP II biodetection system, in combination with American Safe Air's SAMARI negative pressure mail room[1], provide a cost effective solution for the protection of banking community personnel and assets.

American Safe Air's Samari Negative Pressure Mail Room (NPMR).

These cutting-edge technologies provide a much safer environment for screening and opening incoming mail. The ASAP II detection system and SAMARI negative pressure room together offer:

- Downdraft air flow protection of mailroom employees;
- Isolation and containment of suspected bio-terrorism agents with cleanroom-style certainty;
- Real time identification (20 minutes) of the agents with minimal production delay;
- Easy and cost-effective clean up, should contamination occur; and
- Low initial capital cost and low operating costs.

[1] These products from American Safe Air may be covered by one or more of the following patents: US 6,960,244B2 issued Nov. 1, 2005; US 7,377,952B2 issued May 27, 2008.

Automated Detection Systems for the Mailroom

ASAP II is an automated chemical, biological, and nuclear (CBW) detection and identification system that can be configured to meet a customer's exact needs. The bio-threat oriented component of the system can detect and identify from four to eight bio-agents in real time. When the ASAP II[2] system is equipped with the RAPTOR[2] bioassay module it can identify up to four agents, or when equipped with the BioHawk module, it is possible to identify up to eight agents. Periodically or on demand, a concentrated wet biosample is transferred to either the RAPTOR or BioHawk[2] identification system. In fifteen minutes these systems will identify the presence of any of the pre-selected agents on the coupon, and automatically notify the operator if the mail is clear or an agent has been detected.

These systems are typically used in a negative pressure room equipped with a downdraft table and can handle thousands of pieces of mail per hour. An air sampling module in the system continuously samples air drawn into the downdraft table while mail is being jogged or opened over the table's perforated top surface, and provides appropriate samples to the bio- and chemical oriented system components. Sampling is a continuous process that goes on until processing of the batch of mail is complete, whether it is a few minutes or several hours.

The cost of consumables in these systems is kept to a minimum. For example, disposable bioassay coupons are used that can be reused many times over a 48-hour period: 30 times for the RAPTOR or 10 times for the BioHawk. This system is designed to be operated by mailroom personnel and is fully automated, requiring little operator assistance. As an example, at the beginning of the day the operator need only insert a bioassay coupon and refill fluids- operations that can be completed in 10 minutes or less. The system is then ready to go unattended for a full day.

Installed Negative Pressure Mail Room (NPMR).

[2] These products from Research International, Inc. may be covered by one or more of the following patents: U.S. patents 6,532,8356,082,185; 6,136,611; 5,061,857 and 5,430,813; Japanese patents 3,429,282 and 3,754,440

Downdraft table with open cabinet door where ASAP II system is located. The laptop computer on which ASAP II control software is installed is also shown.

Cabinet space below downdraft table, which houses SASS air sampler on the left and environmental chamber where RAPTOR or BioHawk module is located, on the right.

The ASAP II system may also include automated chemical, explosives and nuclear detection. Subsystems currently specified for these targets include: the Mobile Trace explosive particle and vapor detection system from Morpho Detection (formerly GE Security); the ChemProFX chemical detection system from Environix OY; and the TSRM82 Gamma Radiation Detector, manufactured by VNIIA. The chemical and explosives detectors sample air through the same proprietary sampling structure used by the biodetection subsystem. This structure has been designed to provide each instrument with an air sample that is a statistically valid representation of air flowing through the downdraft table, independent of the target's

position on or over the downdraft table's working surface. If explosive particles and vapors, and/or chemical vapors are drawn into the downdraft table, these systems will instantaneously detect and send an alarm to the ASAP II control system. This system is being installed in The World Bank mailroom.

Radioactive and special nuclear materials are detected through the gamma radiation emitted by them. If you have concern that your mail could contain radioactive materials, the ASAP II's radiation detection subsystem's detector can be installed in close proximity to a conveyor carrying mail into the building, at a doorway entrance, or other pinch point. The detector head is compact and can be built into walls or columns, if need be.

The longest-operating ASAP II system that has been in continuous use has operated for five years in a Wells Fargo Bank mailroom in Charlotte, N.C. ASAP II systems are currently being installed at The US Justice Department, and the World Bank's Washington, D.C. mailroom.

BioAlert System

Research International manufactures and sells the **TacBio** particle detection system. This system samples air continually and monitors for rapid increases in either aerosol particle or bio-particle levels. It does not identify the type of bio-particle detected, but will notify the mailroom attendant if either excess particles or bio-particles are floating in the air. This early warning system gives the mailroom attendant notice of a potential threat and time to test for biological agents or other airborne threats before mail is delivered to a recipient, or is taken into an important building that houses a large number of personnel or critical assets.

American Safe Air's SAMARI Negative Pressure Mail Room Technology

American Safe Air has designed a process to protect against biological and chemical attacks that provides a controlled, contained and constantly monitored 'clean room' environment in which the mail is opened. Air pressure is maintained slightly lower than atmospheric, to ensure that no harmful materials in the mail are released into the remainder of the facility. These custom-engineered Negative Pressure Mail Rooms (NPMRs) can be rapidly and easily retrofitted to an existing facility (*see* Figure 2). This approach is unique in that it requires only minor facility modifications eliminating the need for lengthy and expensive build-outs.

How the NPMR System Works

These completely self-contained NPMR's are designed to contain chemical and biological agents, and to provide the maximum in protection to the operators within the NPMR. Additionally, by being freestanding structures, they reduce the impact on the greater facility in the event of an incident.

The solution to handling contaminated mail is not containment alone but containment paired with environmental control. American Safe Air Company, Inc., has pioneered a downdraft airflow strategy that combines HEPA high-efficiency filters on both incoming and outgoing air flows with engineered airflow paths and structures within the rooms (*see* Figure 3). These engineered airflows minimize exposure of personnel within the enclosures while the negative pressure environment provides complete isolation of potential contaminants within the room and prevents gross contamination of the entire facility: A hermetically sealed environment is created.

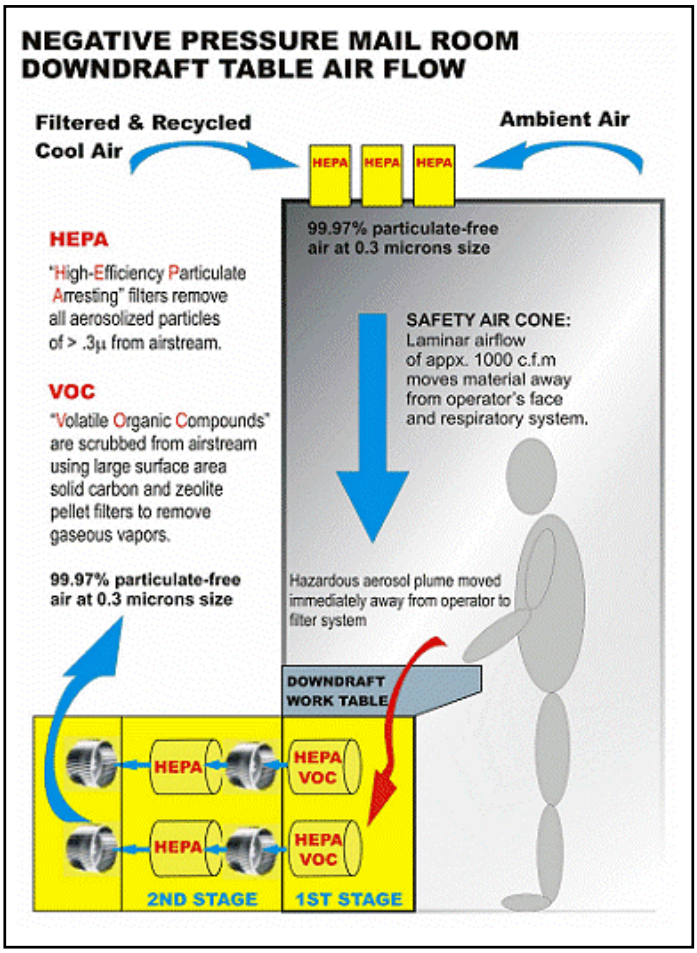

Figure 3: Illustration of how the NPMR and the downdraft table work.

Hand Held and Stand Alone Systems

In conjunction with our automated systems we also sell the following hand held and Stand-alone systems.

ChemPRO 100 Chemical Detection System

Hardened MobileTrace®

ChemPRO 100 Chemical Detection System, manufactured by Environics, Oy. is a hand held chemical detector for field detection and classification of Chemical Warfare Agents and selected Toxic Industrial Chemicals. If mail arrives with a peculiar smell or un-identified wet substance, this hand held detector can be used to immediately identify the chemical.

Mobile Trace Explosive Particle and Vapor Detector, manufactured by Morpho Detection, a GE partner, simultaneously tests for a wide range of explosives and narcotics in seconds. This system will identify explosives in packages or envelopes that are often un-detectable by x-ray machines. This handheld detector expands the range of target explosives you can identify in a single sample for faster more comprehensive screening. As noted, this system also detects a wide range of narcotics. The system tests for explosives and narcotics simultaneously in a single sample, for faster, more comprehensive screening.

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