How the Biohazard Detection System was developed

The Postal Service is committed to keeping its employees and customers safe. To help counter the threat of anthrax in the mail, the Postal Service has developed a Biohazard Detection System (BDS) that will detect anthrax in the mail with high reliability. The system is designed for the highest possible level of detection.

The Biohazard Detection System (BDS) was developed for the Postal Service after postal managers consulted with the military, federal agencies, and other consultants. At the start, a system did not exist that met the needs of the Postal Service. In February 2002, the Postal Service Engineering division determined the core technology required and -- in April 2002 -- the pilot system requirements were released. From October of 2001 to September 2002 more than 20 systems were tested.

- In October 2001, after anthrax was identified in the mail, the Postal Service consulted with the Joint Program Office (JPO) for Biological Defense.

- The Postal Service then consulted with SBCCOM (the U.S. Army Soldier and Biological Chemical Command). The Postal Service tested jointly with SBCCOM, adapting SBCCOM's testing methods for biological warfare detection devices to postal equipment. SBCCOM assistance was critical to the whole testing process. They provided key staff, a test facility and expertise in testing of biological warfare defense systems. Their subject matter experts had much experience with evaluating and testing various kinds of detection equipment. A pilot system was identified and installed in a postal facility to determine if the new system would work in a mail processing facility.

- The Executive Office of the President's Office of Science and Technology Policy created an interagency working group that reviewed the performance of the BDS and confirmed with their own tests that the BDS is consistent with the state of the art laboratory-based detection systems and is sufficient to perform the task stipulated by the Postal Service.

- Agencies and offices that evaluated the BDS design included:

    -- USAMRIID (the United States Army Medical Research Institute of Infectious Diseases)

    -- Navy Medical Research Center

    -- NIST (National Institute of Standards and Technology)

    -- Department of Agriculture

    -- Johns Hopkins Applied Physics Lab

- The Northrop Grumman system was chosen based on several performance tests. Northrop Grumman worked with Smiths Detection to develop a system that would meet the Postal Service's critical needs. The combination of key components that make up BDS were based on commercial development of military biological detection designs. A key PCR (polymerase chain reaction) process was based on programs developed with Lawrence Livermore National Laboratory. Cepheid Inc. further refined that process, creating a completely automatic real-time PCR (polymerase chain reaction) that is the core component of the BDS. The sample collection was developed from a commercial particle collector, the SpinCon. That system was based on years of development of air sampling equipment by Midwest Research Institute. Northrop Grumman developed all the controls for the system to create a completely automated process for screening the mail.

- The BDS system is not composed of new technologies, but is rather a new combination of existing technologies. The BDS components are:

  o The cabinet containing the BDS sampling and identification systems.

  o The aerosol unit -- which collects the air samples and pumps them into the PCR cartridge.

  o The PCR unit -- inside the cabinet, tests the samples for DNA.

  o All the chemistry for the test (PCR) is contained in the cartridge. The cartridge design allows the system to quickly prepare the sample for testing. Every cartridge has a bar code so that it can be tracked.

  o The system connects to the postal LAN (local area network) to transmit the results of each test to the site controller, a data collection point.

  o The site controller -- manages the site and sends all notifications across national networks to Postal Service headquarters, law enforcement, and emergency responders.

Factoid:
The same technology used in the BDS system was used to monitor the air around the Winter Olympics in 2002.

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