# ASAP V™
Multi-Threat Detection System

Multi-Functional CBRN Solutions

INTRODUCTION

Urban infrastructures worldwide are coming under increasing threat from vandals, gangs, and recently, terrorists. The ASAP V is a modular, multi-sensor surveillance system designed for subways, airports, and other high-value/high-risk areas. ASAP V systems may be configured to uniquely match your particular concerns and budget, and Research International will work with you to provide a solution that best meets your requirements. Each ASAP V can integrate the following capabilities:

- NBC threat detection
- Explosives detection
- Smoke and fire detection
- Video and sound monitoring
- Intrusion detection

- Thermal imaging
- Meteorological data
- X-ray detection
- Large area air circulation and sampling methods
- Biological and radiological sample collection and storage

Each system operates as a discrete multi-tasking network node. Each node consists of a suite of detectors and samplers connected via an embedded PC: This local computer supports monitoring, local decision making, and communications. Information from each such node can be viewed locally, or transferred to a remote PC-based monitoring station via secure optical fiber, cell phone, Internet, Bluetooth, or other appropriate data linking technology. Sensors and sample collection devices may be physically located at the node, or mounted remotely and connected to the node by cable or wireless link.
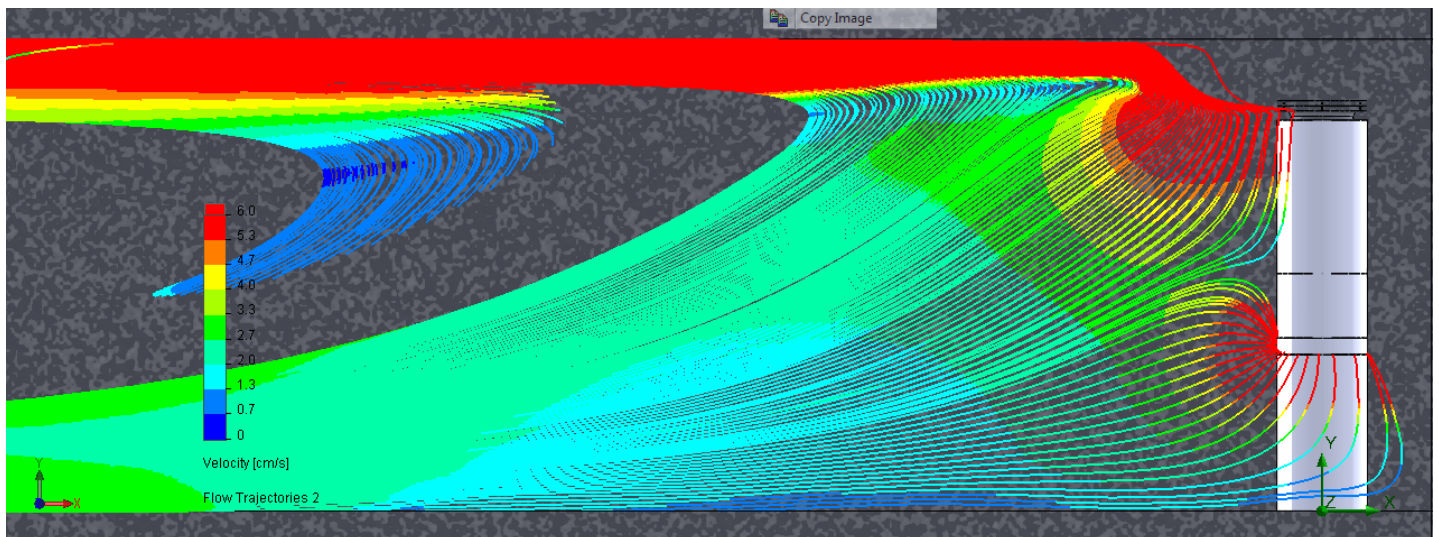
3D fluid dynamic modeling has been used to optimize external air sampling.

A wide range of master/slave connection options and programmed sampling and analysis protocols are provided. For example, an optical device is available that will detect unusual changes in biological aerosol levels. In response to a sudden increase, the system can be programmed to not only provide a visual and/or acoustic alarm, but also to turn on an aerosol sampler that collects particulates into a small volume of water, and to then perform an automated wet bioassay and electronically report the assay results.

As a second example, a radiation detection module may sense an abnormally high radiation level. The system can be programmed to issue a warning and to automatically run a radioactive aerosol collection protocol using a high-efficiency dry filter system.
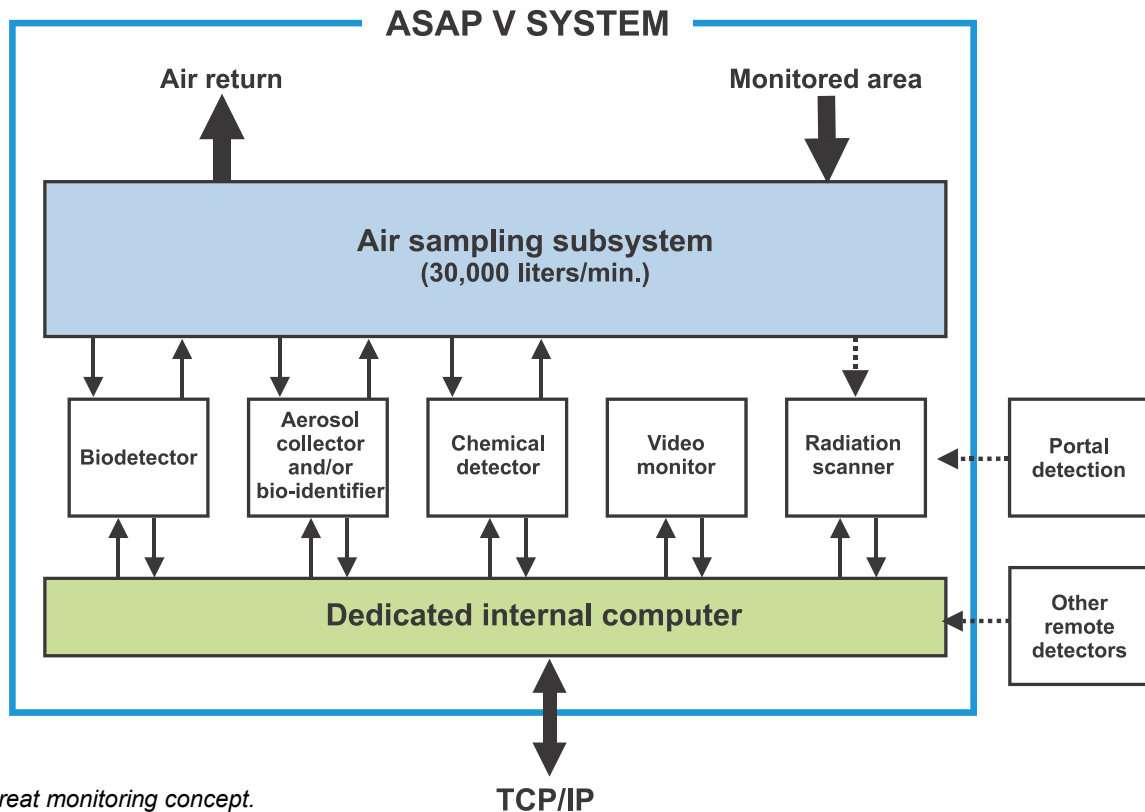
ASAP V multi-threat monitoring concept.

A Windows®-style user interface provides operators with immediate visual feedback regarding the status of the individual sensors. By a button click, the user can examine each detector's output over the past 24 hours. Through pull-down windows, each detector's performance can be examined or adjusted as appropriate for immediate conditions. Permanent records of sensor data are stored for archival study.

Several of the detection modules are described in the following sections. Contact Research International or its representative for more detailed information.

AEROSOL BIOPARTICULATES

A detection module based on optical scattering and biological fluorescence is used for classifying aerosol particles as being either of biological or non-biological origin. This technology monitors for unusual changes in the level of biological and non-biological aerosols.

BIOLOGICAL AGENTS

Airborne biological agents are first collected into a small amount of water or onto a high efficiency filter, and then analyzed using wet immunoassay methods. Both manual test strip and fully automated wet assay methods are available. For higher sensitivity, an aerosol pre-concentrator is also available. The automated bioassay systems use patented multiple-use coupons that provide up to 30 assays from a single coupon, greatly minimizing life cycle costs as compared to other wet bioassay strategies.

CHEMICAL AGENTS

Airborne chemical agents can be detected at each node using either ion mobility spectrometer or infrared spectrometer methods. The infrared method allows gases to be detected over a distance of up to 50 meters. Either approach offers fast and reliable detection of a wide range of airborne toxic industrial chemicals and chemical warfare agents with response times of only a few seconds.

NUCLEAR MATERIALS

Two modules are available based on Russian gamma ray scintillator products. One module is amenable to portal monitoring situations where the presence of radioisotopes and special nuclear materials are of concern at an entry point to a controlled area. The second module is more suited to area monitoring.

METEOROLOGICAL

This module is based on a meteorological system provided by Coastal Environmental Systems of Seattle, WA. Sensors can be provided for wind speed and direction, relative humidity, temperature, pressure, visibility, precipitation, and GPS location.

ASAP V system showing internal sensors.

EXPLOSIVES

The presence of unusual levels of explosive vapors and particulates is determined using a module based on Morpho System's MobileTrace ITMS technology. Analysis and reporting times are under 10 seconds.

INTRUSION DETECTION

Several intrusion detection technologies are available, based on detection methods ranging from microwave to acoustic to video.

THERMAL IMAGING

Body temperature imaging (8 to 14 microns, typ.) is an excellent method for performing covert surveillance or fire detection, among other functions. Advancements in thermal camera technologies have now made this cost-effective to incorporate into the ASAP V. Thermal imagers can be installed with arrays ranging up to 640 x 480 (VGA) in size.

Infrared spectral-based toxic gas detector. Uses no consumables.

RESEARCH INTERNATIONAL

Specifications for ASAP V Multi-Threat Detection System	
Characteristic	**Description**
Use profile	Automated/programmed/continuous identification of targeted toxins, viruses, bacteria, spores, industrial chemicals, unusually high levels of explosives, and nuclear materials.
Duty cycle	Continuous. Functional availability >99.3%.[1]
Air sampling rate	30,000 liters/minute.
Toxic Industrial Chemicals Subsystem	Ion mobility spectrometry or long baseline infrared spectrometry. Gas libraries of 15 to 40 targets, depending on technology used. Analysis time less than 10 seconds.
Explosives Subsystem	Ion trap mobility spectrometer; analysis time = 8 seconds.
Nuclear materials Subsystem	Area and portal styles available. Typical specifications: 0.05 to 3.0 MeV gamma detection window. Detects 360 kBq of Cs-137 and 6 gm Pu[2]; neutron detection optional.
Video subsystem	Up to1280 x 720 (HDTV) resolution +sound.
Thermal video subsystem	Up to 640 x 480 (VGA) + sound.
Bioidentification-Manual	Immunoassay test strips and machine reader: 12 minutes typical overall time.
Bioidentification-Automated	Four simultaneous assays performed on 1 cc samples using a credit card-size assay coupon. Coupon and associated re-useable reagents provide from 20 to 30 assays over a 48 hour use period. 15 to 30 minute combined collection and identification period.
X-ray subsystem	Detect 38 gauge wire guaranteed; penetrate 37mm of steel; 4096 gray scale.
Other Specifications	
User Interface	Windows® user interface. The coordination and interaction of sensors, samplers and analyzers may be set by the user through built-in software recipes.
Data storage/ programmability	Raw/processed data storage at each monitoring node. Operating protocols are re-programmable through an external communications link.
External communication	Ethernet based communication to remote locations worldwide. Wireless options also available.
Consumables	None, if wet bioassay identification is not used.
Physical Size	Depends on user requirements. Architectural column-style design is typically 0.9 meters diameter x 3 to 4 meters high.
Temperature range	Operating: For systems that do not support liquid-based bioassays, -20° to 60° C; for liquid-based bioassay systems, above freezing to 50° C.
Power consumption	750 watts typical with 30,000 LPM air circulation system installed.
Humidity	5% to 95%, non-condensing.
Research International, Inc. reserves the right to change product and system specifications without prior notice.	

NOTES:

1. Functional availability is the percentage of total work time the system is functional, averaged over a 90 calendar day period.
2. Search volume: 0.7m diameter X 2m length. Object speed 5 km/hr. Detection probability 50% at 95% confidence level, 0.17 false alarm rate, 20 ur/hr background.

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