APPLICATION STORY

Vehicle Mounted Bio-Aerosol Threat Monitoring

FLIR offers mounted sensors for bio-aerosol monitoring and sample collection in a broad range of vehicles.

FLIR IBAC 2
Vehicle Deployment

There is a growing need to mount biological detection systems into mobile platforms for reconnaissance and emergency response missions. Fixed-site point sensors monitor small, localized areas and require an airborne bio-threat to pass over them to be detected. The integration of a biological sensor onto a mobile platform widens the area of detection. It enables a response team to detect the threat before it reaches a vulnerable position. A mounted biological detection system provides reconnaissance vehicles early warning of bio-aerosol threats so they can be contained quickly, treated effectively, and decontaminated rapidly.

The FLIR IBAC 2 is the most mature and widely-used biological detector and collector system available. Over 1,000 sensors are deployed globally in active biological monitoring operations. The system is used to support a variety of applications, from tactical missions such as special event monitoring and emergency response to longer-term, fixed installation facility protection. It is well suited for integration into military vehicles and mobile laboratories where extreme environmental conditions and shock/vibration are expected. It provides real-time biological particle detection and sample collection for subsequent threat identification.

FEATURES & BENEFITS

- Affordable, COTS biological detection and collection system
- Low power and small footprint
- Continuous monitoring, real-time bio-detection
- Triggered or continuous sample collection for subsequent threat identification
- External and internal vehicle sample collection configurations

Figure 1. IBAC 2 Integrated in Military Vehicle (Collector (Left); Detector Inlet (Right))

VEHICLE CONFIGURATIONS

Based on specific vehicle project or program requirements, various bio-monitoring configurations can be accommodated. With the addition of the C100 collector, the IBAC 2 combines real-time airborne monitoring with triggered or continuous sample collection. Aerosol particles impact onto a dry filter unit (DFU) collection surface within the C100 (Figure 2). Particles can then be extracted into a liquid (Figure 3) for analysis by common bio-identification methods such as plating, PCR or immunoassay kits (Figure 4).

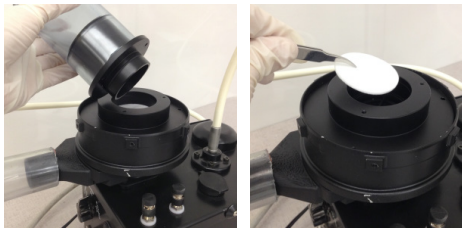

Figure 2. Sample Collection onto DFU

Figure 3. Particle Extraction from DFU into Liquid

Figure 4. Particles can be extracted from the DFU into a liquid and analyzed by bio-identification instruments like the Bruker pBDi system

Three vehicle deployment configurations are offered that provide safe, affordable and flexible bio-threat warning.

	Criteria	Config 1	Config 2	Config 3
1	Real-Time Bio-Detection and Alarm	X	X	X
2	Sample Collection - External		X	
3	Sample Collection - Internal			X

Vehicle Configuration 1:
Bio-Detection Only, No Sample Collection

Depending on customer preference, IBAC 2 or the detector inlet only is mounted on the exterior of the vehicle (Figure 5). In the case of external mounting, communications and power pass from inside the vehicle to the IBAC 2 and allow users inside the vehicle to monitor the external environment. An aerosol sample is not available for subsequent identification tests.

Key Features:

- Continuous monitoring of airborne bio-particles
- Real-time bio-detection and alarm trigger

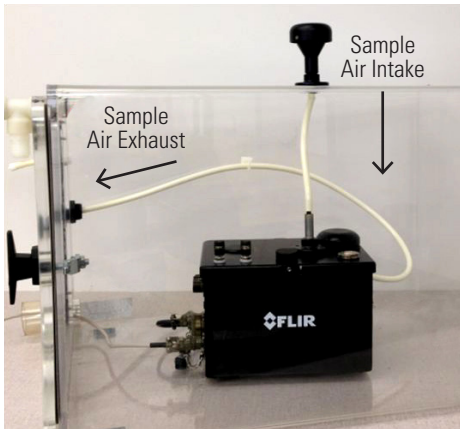

Figure 5. Vehicle Configuration 1 in representative enclosure. Detector inlet is mounted on the exterior of the vehicle.

Vehicle Configuration 2:
Bio-Detection with External Sample Collection

Depending on customer preference, IBAC 2 or the C100 only is mounted on the exterior of the vehicle. Sample collection occurs outside the vehicle (Figure 6). Communications and power pass from inside the vehicle to the IBAC 2 and allow users inside the vehicle to monitor the external environment. This is a simple setup for vehicles without a sealed internal glove box or onboard bio-identification equipment. In this application, the environment is monitored real-time and a sample is typically archived for retrieval from the vehicle's roof after the mission is completed.

Key Features:

- C100 located on top of vehicle's roof allows for sample collection
- Aerosol collection remains outside of the vehicle
- Good for vehicles without a biological glove box or onsite identification system
- DFU filter sample can be retrieved from vehicle's roof at completion of mission

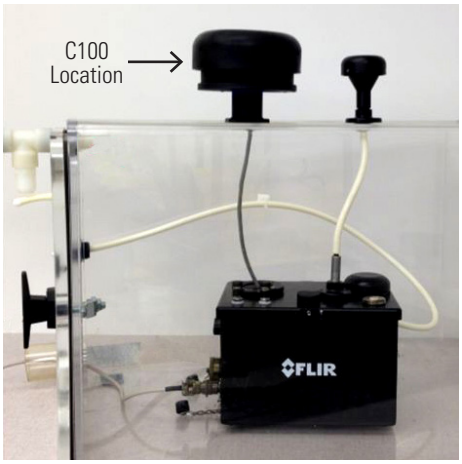

Figure 6. Vehicle Configuration 2 in representative enclosure. C100 and detector inlet are mounted on the exterior of the vehicle.

Vehicle Configuration 3:
Bio-Detection with Internal Sample Collection

The IBAC 2 and C100 collector are located within the sealed glove box within the vehicle (Figure 7). The outside air enters a sealed inlet mounted on the vehicle exterior and passes to the IBAC 2 and C100 collector via a sealed sample line. The air exhaust then exits the sealed glove box and out of the vehicle. This configuration is used for vehicles with an internal glove box or cabinet that allows safe handling of the DFU, sample extraction to liquid, and sample preparation for onboard bio-identification. Onboard bio-identification provides immediate awareness of a biological threat.

Key Features:

- C100 is located within the vehicle and allows for sample retrieval within the vehicle glove box
- Sampled air is drawn into the sealed glove box and can be exhausted out of the vehicle
- This configuration allows for sample collection, sample preparation, and bio-identification to occur within a sealed glove box

Figure 7. Vehicle Configuration 3 in representative enclosure. C100 inlet and detector inlet are mounted on the exterior of the vehicle.

SUMMARY

The IBAC 2 can operate unattended 24/7 without consumables. The trigger feature ensures it collects a sample only when a biological agent is detected, greatly reducing the cost of consumables and number of samples to identify. With over 3,000,000 hours of run time in relevant environments and numerous government tests validating its performance, the IBAC 2 is a proven solution that facilitates timely containment, treatment and remediation for concentrated levels of biological aerosols.

For more information about chemical, biological, radiological, and explosives detection solutions, or about this specific application, please visit:

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