



Photographer, Mike Barnette, CBDCOM

BIDS

—identifying BW agents on the battlefield

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The purpose of this article is to expand on a recent article published in the January 1995 CML, Army Chemical Review titled "BIDS - What is it? How does it work?"

—The authors

In recent years an increasing number of countries have been pursuing the capability to develop and employ biological warfare (BW) agents. BW agents offer an attractiveness that is unmatched by other weapons of mass destruction.

Generally, a relatively small amount of BW agent can inflict heavy casualties

and cause mass disruption of a campaign. BW agents can be delivered to virtually anywhere on the battlefield, are difficult to detect, normally are invisible to the senses, and have delayed effects.

During *Operation Desert Storm*, the US faced an enemy with the capability and the perceived willingness to use BW agents. With only a limited BW detection capability, US forces could have been vulnerable to an attack. In an attempt to mitigate this vulnerability, the Army deployed a limited aerosol BW agent detector. Since the war, the Army has worked quickly to develop, test, and

produce a state-of-the-art, integrated detection system to fill this urgent need. After just two and one-half years, the first platoon of the Biological Integrated Detection System (BIDS) will be delivered to the 11th Chemical Company to provide an initial biological defense capability. In late FY96, the system will be fielded to an America's Army Biological Detection Company, consisting of four reserve platoons and one active platoon.

The primary purpose of the BIDS is to detect and identify, quickly and accurately, large-scale biological

attacks. The presumptive identification of the BW agent is then reported to higher headquarters. A sample containing the suspected BW agent is collected by the BIDS and evacuated to the rear for further verification analysis.

BIDS are point detectors. They are employed as an operational-level integrated detection and warning array based on METT-T (see figure, next page). The Corps staff uses reported system results, other intelligence, and medical data to decide whether a BW attack has occurred. The staff then recommends the appropriate contamination avoidance and protective procedures.

Studies have shown that without an effective detection capability, a successful, large-area dissemination can make a Corps combat ineffective. However, for many agents, by detecting and identifying the attack, and dispensing the appropriate medical

treatment before the onset of symptoms, almost all casualties from BW agent exposure can be prevented.

The BIDS is a collectively protected S-788/G lightweight shelter (LMS) normally mounted on a dedicated heavy HMMWV (M1097), but may be dismantled for fixed site applications or transported by a UH-60 helicopter. The system is also C-130, LACV-30, and CH-47D transportable. Electrical power is provided by a towed 15 KW tactical quiet generator (PU-801).

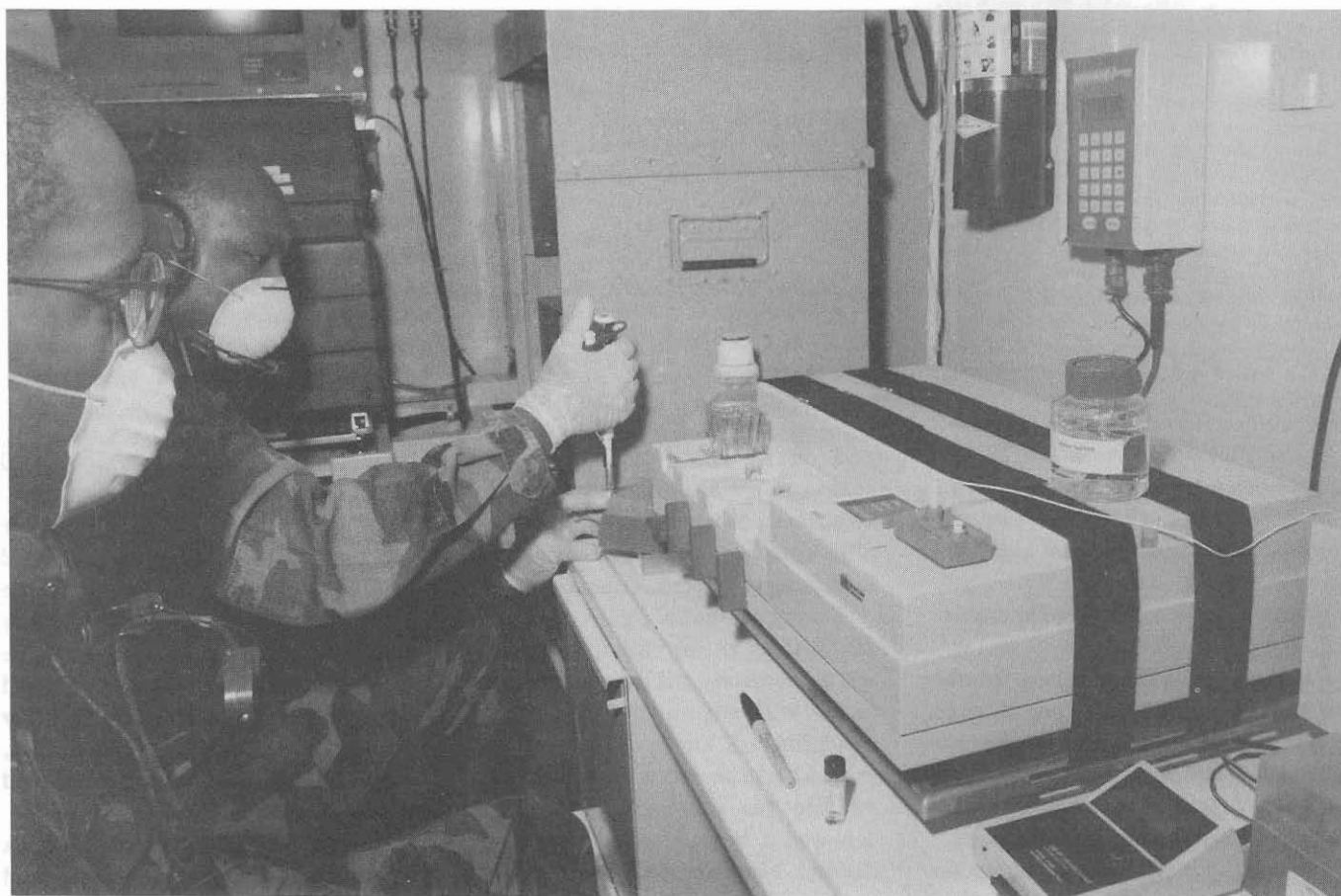
The heart of the system is the biological detection suite within the shelter. It is designed to detect key physical and chemical characteristics of a BW aerosol cloud consisting of 2-10 micron-sized solid particles of a distinct "synthetic" aerosol profile.

The BIDS biological detection suite consists of three detection components, two identification components, and two sampling components. These are the

High Volume Aerodynamic Particle Sizer (HVAPS), Microluminometer, Flow Cytometer (FCM), Threshold Device (THS), and Sensitive Membrane Antigen Rapid Test (SMART).

The sampling components consist of a Carousel Sample Liquid Collector (Liquid Sampler) and a Single Sample Liquid Collector (Biological Sampler). In addition, the detection suite contains both standard military and commercial auxiliary equipment. This equipment consists of the SINCGARS and HF radios, an environmental control unit, a meteorological sensor, and refrigeration containers.

A BIDS team consists of two vehicles, the BIDS and its support vehicle, and four soldiers. Two soldiers are required to perform the analytical duties within the detection suite. The other two are required to perform support duties. Duties of the support personnel include packaging and evacuating the collected



SFC Daniel Mack and SGT Lavon Harbor (CBDCOM) run a detection mission.

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BIDS Employment Array Long Spray Line Attack

sample to the rear, resupply, and providing security for the BIDS.

Continuous monitoring of the atmosphere is provided by the Aerosol Particle Sizer (APS). If the ambient "background" (particle size and concentration) changes within a short amount of time, it triggers an alert indicator to prompt the operators to start both the Liquid and Biological Samplers.

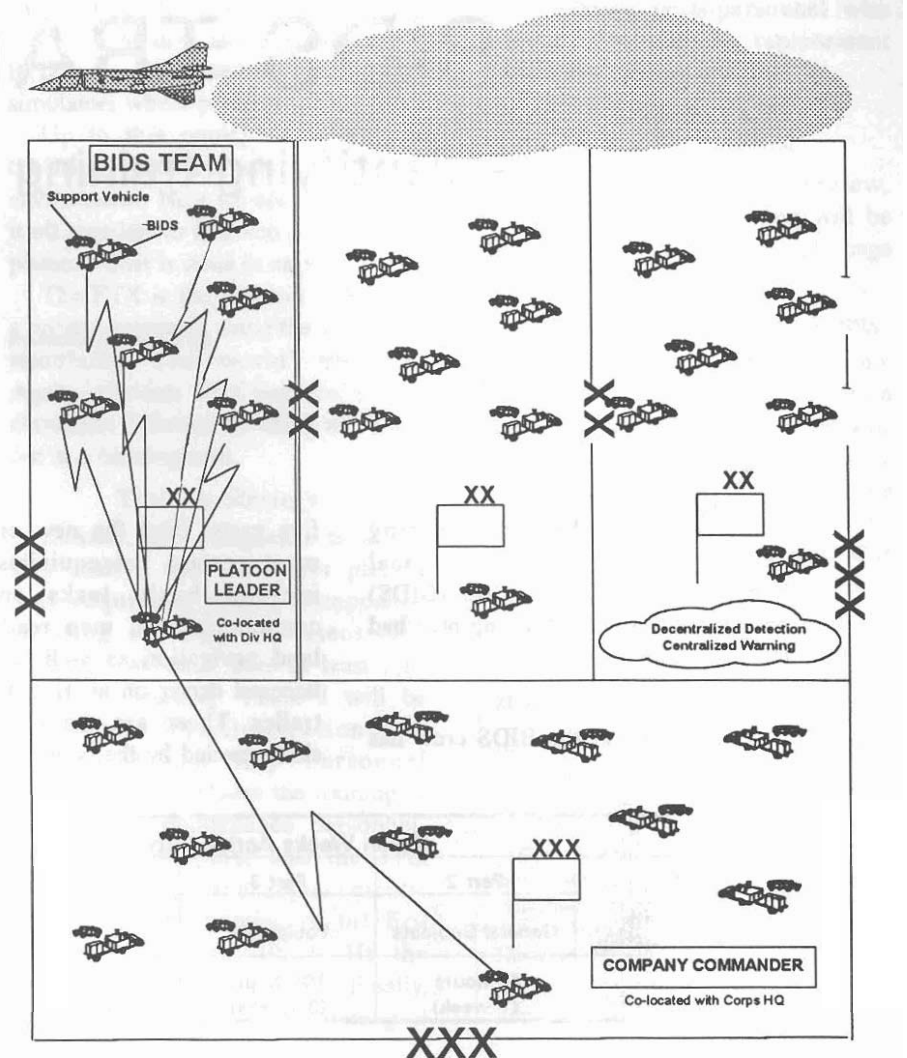
The Biological Sampler collects a sample for subsequent laboratory analysis, and the Liquid Sampler collects samples for immediate analysis within the BIDS. The operators first test the sample for non-specific BW indicators using the Microluminometer and the FCM.

Each test requires approximately three minutes to do. The Microluminometer will suggest whether Adenosine Triphosphate (ATP) is present in the sample. Since ATP is a universal energy source associated with all living cells, it will provide an indication as to whether the aerosol is composed of "living" (pollen, molds, BW agents) or nonliving materials (smoke, dust, and so forth).

The FCM indicates if the sample contains above normal levels of bacteria rather than molds or pollen. If either the APS, Microluminometer, or FCM are positive, the operator then attempts to identify the agent using the antibody-based THS and SMART.

SMART tickets are used only as a backup for the Threshold Device. These tests require approximately 15 minutes to do. Detector results are transmitted using the high frequency radio to the BIDS platoon leader. Normally, the entire process, that is from alert to identification to reporting of the results, occurs with 35 to 40 minutes.

The decision whether a biological attack has occurred is not made by the operator but in conjunction with the Corps Nuclear, Biological, and Chemical Center (NBCC) and other staff members. Multiple BIDS data are collected by the company commander and the NBCC, and correlated with other battlefield indicators such as friendly



activity, weather, enemy capability, and recent actions. Based on this information, the Corps staff will recommend to the commander the appropriate contamination avoidance and protection procedures for the situation to mitigate the effects of the attack.

Future plans for the BIDS include a preplanned product improvement phase (P³I) and an objective BIDS. The P³I BIDS will feature an expanded, more sensitive and semi-automatic detection capability, incorporating advance detectors such as a biological mass spectrometer, and an automatic biological detector to detect and identify additional biological agents at lower sensitivities and in less time than the Non-Development Item (NDI) BIDS.

This system will be fielded to a total of three Biological Detection Companies around FY99. The objective system will be a fully automated broad spectrum biological detector and should begin replacing P³I BIDS in FY03.

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