

ARMY, MARINE CORPS, NAVY, AIR FORCE

**TACTICS, TECHNIQUES,
AND PROCEDURES
FOR
BIOLOGICAL
SURVEILLANCE**



**FM 3-11.86
MCWP 3.37.1C
NTTP 3-11.31
AFTTP (I) 3-2.44**

**DECEMBER
2003**

DISTRIBUTION RESTRICTION:
Approved for public release;
distribution is unlimited.

MULTISERVICE TACTICS, TECHNIQUES, AND PROCEDURES

FOREWORD

This publication has been prepared under our direction for use by our respective commands and other commands as appropriate.

STAN LILLIE

Colonel, USA
Commandant
US Army Chemical School

EDWARD HANLON, JR.

Lieutenant General, USMC
Commanding General
Marine Corps Combat
Development Command

R.A. ROUTE

Rear Admiral, USN
Commander
Navy Warfare Development Command

DAVID F. MACGHEE, JR.

Major General, USAF
Commander
Headquarters, Air Force Doctrine Center

**This publication is available on the General
Dennis J. Reimer Training and Doctrine
Digital Library at www.adtdl.army.mil**

PREFACE

1. Scope

This multiservice operations publication provides tactics, techniques, and procedures (TTP) for planning and conducting biological surveillance operations to monitor, detect, sample, identify, report, and evacuate samples of biological warfare (BW) agents used against United States (US) forces. The term "biological surveillance", as used in this publication, refers to the actions taken to detect and identify a BW attack has occurred. Users of this manual are nuclear, biological, and chemical (NBC)/chemical, biological and radiological (CBR) staff and medical officers, unit commanders, NBC noncommissioned officers (NCOs) and others involved in planning and conducting biological surveillance operations.

2. Purpose

a. The purpose of this publication is to provide commanders, staffs and unit leaders a key reference for the planning and conduct of biological surveillance operations. It serves as a key source document for development of other multiservice manuals and refinement of existing training support package (TSP), training center exercises and service school curriculum.

b. This manual provides the commander and his staff with the tools to support:

- Countering the biological threat.
- Provide input to support force protection (FP).
- Support medical requirements.

- Support the decision making process.

3. Application

This publication is designed for use at the operational and tactical level. The document will support command staff planning in preparing for and conducting biological surveillance operations. This manual also provides guidance to biological detection unit leaders and personnel for conducting biological surveillance.

4. Implementation Plan

Participating service command offices of primary responsibility (OPRs) will review this publication, validate the information, and reference and incorporate it in service and command manuals, regulations, and curricula as follows:

Army. The United States Army (USA) will incorporate this publication in USA training and doctrinal publications as directed by the commander, United States Army Training and Doctrine Command (TRADOC). Distribution is according to Department of the Army (DA) Form 12-99-R.

Marine Corps. The United States Marine Corps (USMC) will incorporate the procedures in this publication in training and doctrinal publications as directed by the commanding general (CG), US Marine Corps Combat Development Command (MCCDC). Distribution is according to the USMC publication distribution system.

Navy. The United States Navy (USN) will incorporate the procedures in this publication in training and doctrinal publications as directed by the commander, Navy Warfare Development Command (NWDC). Distribution is according to the military standard requisitioning and issue procedures (MILSTRIP).

Air Force. The United States Air Force (USAF) will validate and incorporate appropriate procedures according to applicable governing directives. It will develop and implement this and other NBC multiservice tactics, techniques, and procedures (MTTPs) through a series of USAF manuals providing service-specific TTPs. Distribution is according to the USAF publication distribution system.

5. User Information

a. The United States Army Chemical School (USACMLS) developed this publication with the joint participation of the approving service commands.

b. We encourage recommended changes for improving this publication. Key your comments to the specific page and paragraph and provide a rationale for each recommendation. Send comments and recommendation directly to—

Army

**Commandant
US Army Chemical School
ATTN: ATSN-CM-DD
401 MANSCEN Loop, Suite 1029
Fort Leonard Wood MO 65473-8926
COMM (573) 596-0131 extension 3-7364**

Marine Corps

**Commanding General
US Marine Corps Combat Development Command
ATTN: C42 (Director)
3300 Russell Road
Quantico VA 22134-5001
DSN 278-6234 COMM (703) 784-6234**

Navy

**Commander
Navy Warfare Development Command
ATTN: N5
686 Cushing Road
Newport, RI 02841-1207
DSN 948-4201 COMM (401) 841-4201**

Air Force

**HQ Air Force Doctrine Center
ATTN: DJ
216 Sweeney Boulevard Suite 109
Langley AFB VA 23665-2722
DSN 574-8091 COMM (757) 764-8091
E-mail Address: afdc.dj@langley.af.mil**

CHAPTER II	BIOLOGICAL SURVEILLANCE FUNCTIONS, RESPONSIBILITIES, AND CAPABILITIES	
	Background.....	II-1
	Responsibilities	II-2
	Capabilities.....	II-8
	Applying the Biological Detection Capabilities	II-16
CHAPTER III	BIOLOGICAL SURVEILLANCE PLANNING	
	Background.....	III-1
	Integrated Biological Surveillance Operations.....	III-1
	Tactical, Operational, and Strategic Planning	III-2
	Planning Process	III-3
	Integration.....	III-20
CHAPTER IV	BIOLOGICAL SAMPLE EVACUATION	
	Background.....	IV-1
	Sample Evacuation Requirements.....	IV-1
	Supported Unit Sample Evacuation Plan.....	IV-2
	Biological Detection Asset Sample Evacuation Plan	IV-3
	Biological Detection Asset Sample Evacuation Planning and Operational Considerations	IV-3
	Sample Evacuation Execution.....	IV-4
	Chain of Custody.....	IV-7
CHAPTER V	INFORMATION MANAGEMENT	
	Background.....	V-1
	Information Management.....	V-1
	Priority Information Requirements	V-2
	Reporting	V-3
	Information Collection and Operational Level Assessments.....	V-5
	Unit Incident Reporting.....	V-8
	Communications Architecture.....	V-15
APPENDIX A	MEDICAL COUNTERMEASURES AND PROTECTION	
	Background.....	A-1
	Medical Countermeasures	A-1
	Vaccines	A-3
	Medical Interventions	A-3
	Restriction of Movement.....	A-4
APPENDIX B	FIELD LABORATORY SUPPORT	
	Background.....	B-1
	Types of Laboratories.....	B-1
	Confidence Levels of Results of Laboratory Analysis	B-2
	Employment of Laboratories	B-4
	Laboratory Response Network for Biological Terrorism.....	B-5

APPENDIX C	BIOLOGICAL COLLECTION AND DETECTION CAPABILITIES AND LIMITATIONS	
	Background.....	C-1
	Joint Portal Shield	C-1
	Biological Integrated Detection System.....	C-3
	Joint Biological Point Detection System, Fixed Site/Trailer-Mounted Version	C-4
	Long-Range Biological Standoff Detection System	C-4
	Maritime Biological Agent Detection Capabilities	C-5
	Dry Filter Unit	C-5
	Department of Defense Biological Sampling Kit.....	C-7
	Common Limitation	C-8
APPENDIX D	BIOLOGICAL DETECTION CONTRACTED LOGISTIC SUPPORT	
	Background.....	D-1
	Principles	D-1
	Contracted Logistic Support Planning Considerations.....	D-2
	Employment	D-3
	Responsibilities	D-4
	Contracted Logistic Support Capabilities and Constraints	D-8
	Contracted Logistic Support Team Assessment.....	D-9
	Control of Contracted Logistic Support	D-9
	Contracted Logistic Support Concept	D-10
APPENDIX E	BIOLOGICAL COLLECTION AND DETECTION SYSTEM EMPLOYMENT	
	Background.....	E-1
	Mission.....	E-1
	Concept of Operations.....	E-1
	Employment Considerations	E-2
	Biological Warfare Threat Analysis (Intelligence Preparation of the Battlespace).....	E-8
	Duration and Modes of Operation for Biological Detection	E-10
	Biological Detection and/or Collector Employment Tactics	E-11
	Preparing a Biological Surveillance Plan (Sample)	E-16
	Maritime Biological Detection/Collection Employment Tactics	E-21
	Common Detection Site Selection Criteria for Biological Detection Systems.....	E-22
	Indoor Site Selection for Biological Detectors or Collectors	E-25
APPENDIX F	BIOLOGICAL WARFARE ATTACK WARNING	
	Background.....	F-1
	Warning Without a Biological Detection Capability	F-1
	Warning With a Biological Detection/Identification Capability... ..	F-2
	Centralized Versus Decentralized Warning	F-2
APPENDIX G	BIOLOGICAL WARFARE SAMPLE EVACUATION PLANNING, SAMPLE HANDLING, AND CHAIN OF CUSTODY	
	Background.....	G-1
	Sample Evacuation Planning and Execution	G-1
	Sample Evacuation Logistics Requirements	G-4

Preparing the Chain of Custody Document.....	G-4
Packaging Biological Samples.....	G-7
Assigning a Sample Identification Number.....	G-8
Packaging Supporting Documentation.....	G-10
The Completed Evacuation Package.....	G-11
Sample Evacuation Planning Considerations.....	G-11
Evacuation of a Background Sample.....	G-12

APPENDIX H LONG RANGE BIOLOGICAL STANDOFF DETECTION SYSTEM OPERATIONS

Background.....	H-1
Mission.....	H-1
Capabilities.....	H-1
Organization.....	H-2
Employment Planning.....	H-4
Long Range Biological Standoff Detection System Employment.....	H-6
Long Range Biological Standoff Detection System Mission Profiles.....	H-9
Mission Planning.....	H-9
Long Range Biological Standoff Detection System Mission Phases.....	H-17

APPENDIX I BIOLOGICAL INTEGRATED DETECTION SYSTEM UNIT OPERATIONS (M31A1 AND M31A2)

Background.....	I-1
Preplanned Product Improved Biological Integrated Detection System.....	I-1
Joint Biological Point Detection System (M31A2-Biological Integrated Detection System) System Operations.....	I-16
Biological Integrated Detection System Unit Information Management/Reports.....	I-22
Biological Integrated Detection System Unit Communication....	I-29

REFERENCES	References-1
-------------------------	---------------------

GLOSSARY	Glossary-1
-----------------------	-------------------

INDEX	Index-1
--------------------	----------------

FIGURES

I-1 METT-TC Factors that Impact Biological Surveillance.....	I-4
I-2 Preparing BW Risk-Reduction Measures.....	I-5
II-1 JBPDS and DFU Coverage of an APOD.....	II-12
II-2 BIDS Platoon Emplacement to Provide Coverage for JTF (Corps Size) Maneuver Forces for a Long-Line-Source Attack.....	II-12

II-3	Employment of Multiple Biological Detection Collection Systems (System of Systems).....	II-13
III-1	Biological Surveillance Operations.....	III-21
IV-1	Field Confirmatory Laboratory Support from USN Capability.....	IV-5
IV-2	Sample Collection Flow.....	IV-6
V-1	Maintaining Mission Readiness: “Detect to Treat”.....	V-3
V-2	Possible Biological Detection Network with Centralized Warning.....	V-4
B-1	Field Confirmatory Testing.....	B-4
B-2	LRN Structure.....	B-5
E-1	Biological Surveillance Mission Planning-Preattack.....	E-3
E-2	Biological Surveillance Mission Planning-Attack and Postattack.....	E-5
E-3	Conducting BW Threat Analysis (IPB).....	E-9
E-4	Dice-Five Array.....	E-14
E-5	Circle Employment.....	E-14
E-6	Picket Line Employment.....	E-15
E-7	Semi-Circle Employment.....	E-15
E-8	Example Uniform Detector Array (Dense Picket).....	E-16
E-9	Critical Node Array.....	E-17
E-10	Area Array Support.....	E-19
E-11	BIDS Deployment Areas.....	E-23
G-1	Chain of Custody Header Information (Sample).....	G-5
G-2	Chain of Custody Form Description of Articles (Example).....	G-6
G-3	Chain of Custody Form Signature/Purpose of Change (Example).....	G-7
H-1	LRBSDS Employment Concept.....	H-5
H-2	Sample LRBSDS Mission.....	H-8
H-3	Flight-Profile Examples For LRBSDS Missions.....	H-12
H-4	Optimal Altitude for Air Release.....	H-24
H-5	Optimal Altitude for Ground Release.....	H-25
H-6	Difference in Helicopter and NAI Elevation.....	H-25
H-7	Low Altitude Flight Profile Considerations.....	H-26
H-8	Two LRBSDSs Scanning an Entire NAI.....	H-26
H-9	An LRBSDS Scanning Checkerboard Pattern into an NAI.....	H-27
H-10	An LRBSDS Scanning the Front and Rear Edges of an NAI.....	H-27
H-11	Optimal Data-Collection Altitude.....	H-28

H-12	Minimum Single-Pass Altitude.....	H-28
H-13	Minimum Multi-Pass Altitude.....	H-29
H-14	Departure Report.....	H-31
H-15	Course-Leg Commencement Request.....	H-32
H-16	Course-Leg Commencement SITREP.....	H-32
H-17	Initial LAZER Detection Report.....	H-33
H-18	Follow-Up Detection Report.....	H-34
H-19	Cloud Loss Detection Report.....	H-35
I-1	Sample Event Tracking Form.....	I-26
I-2	Sample BIDS Incident Report for Event Tracking.....	I-27
I-3	Sample Biological Detection Platoon Sector Sketch.....	I-28
I-4	HF Network.....	I-32
I-5	MSE Network.....	I-32
I-6	VHF Network for M31, M31A1, and FBCB2 for M31A2 Only.....	I-33
I-7	Sample FBCB2 Free Message Text for Biological Incident Reports.....	I-34
I-1	Biological Surveillance Principles.....	I-11
II-1	Command Staff Biological Defense Responsibilities.....	II-3
II-2	Biological Detection and Collection Assets—Operational Envelope.....	II-9
II-3	Biological Sample Courier Tasks.....	II-15
III-1	Identifying Risk-Reduction Measures.....	III-4
III-2	Biological Surveillance Planning.....	III-5
V-1	Tracking BW Data.....	V-6
V-2	Biological Event Tracking Tool.....	V-7
V-3	Incident Report (Sample).....	V-9
V-4	Warning Level Applicability.....	V-10
V-5	System Confidence Levels.....	V-11
V-6	Biological Event Tracking Tool (Sample).....	V-14
C-1	BIDS Comparison.....	C-4
C-2	DFU 2000 Functions.....	C-6
C-3	DFU 2000 Biological Detection Process.....	C-7
E-1	Favorable, Marginal, Unfavorable or MET Conditions for BW Line-Source Release.....	E-10
E-2	Sample Duration Intervals for Biological Detection System or Collector Operations.....	E-11
F-1	Pros and Cons of the Centralized Warning System.....	F-3
F-2	Pros and Cons of Decentralized Warning System.....	F-3
G-1	Preparing a DFU Filter for Shipment.....	G-9
G-2	Sample Identification Numbers.....	G-10
G-3	Packing Supporting Documents for Evacuation.....	G-11
H-1	LRBSDS Employment Options.....	H-7
H-2	Example of an LRBSDS Staff Planning Checklist.....	H-10

TABLES

H-3	Helicopter NOE Altitude (150 to 1,000 Feet AGL)	H-14
H-4	Helicopter NOE Altitude (1,001 to 5,000 Feet AGL)	H-15
H-5	LRB SDS Mission Planning Checklist.....	H-16
H-6	LRB SDS Mission Preparation Checklist.....	H-20
H-7	Sample Air Mission Briefing Guide	H-21
H-8	LRB SDS Biological Detection Process.....	H-22
H-9	LRB SDS Biological Surveillance-Mission Execution Checklist (Sample).....	H-23
H-10	Data Items for LRB SDS Detection Report	H-36
H-11	LRB SDS Postoperations Checklist	H-38
I-1	P3I (M31A1 BIDS) System Functions	I-2
I-2	Preparing the Wet Collector for Shipment.....	I-5
I-3	Preparing the Alternate Sample Container for Shipment	I-6
I-4	Packing Supporting Documents for Evacuation	I-7
I-5	Comparison of the UVAPS, CBMS, and Mini-FCM.....	I-9
I-6	UVAPS, CBMS, and Mini-FCM Capabilities	I-9
I-7	Possible Impact of Environment on BIDS Component Results	I-11
I-8	P3I BIDS Background Data	I-11
I-9	P3I BIDS Event Data	I-12
I-10	P3I BIDS System-Level Process	I-14
I-11	P3I BIDS System-Level Response Profile	I-14
I-12	Factors that Could Influence Medium or Low Confidence Levels	I-15
I-13	JBPDS (M31A2-BIDS) Systems Functions	I-16
I-14	Packing Supporting Documents for Evacuation (JBPDS [M31A2-BIDS])	I-18
I-15	Background Characteristics.....	I-20
I-16	JBPDS (M31A2-BIDS) Background Data	I-21
I-17	JBPDS (M31A2-BIDS) Event Data.....	I-21
I-18	Sample BIDS SITREP	I-23

EXECUTIVE SUMMARY

Tactics, Techniques, and Procedures for Biological Surveillance

BIOLOGICAL SURVEILLANCE PRINCIPLES, CONCEPTS, AND THREAT

Chapter I provides the principles and concepts of biological and medical surveillance (MEDSURV). It discusses the execution of biological surveillance and MEDSURV and provides information on assessing the BW threat.

BIOLOGICAL SURVEILLANCE FUNCTIONS, RESPONSIBILITIES, AND CAPABILITIES

Chapter II provides an overview of the functions of biological surveillance. It continues on to define responsibilities of the staff in conducting biological surveillance operations. It also provides the capabilities required to execute biological surveillance operations.

BIOLOGICAL SURVEILLANCE PLANNING

Chapter III discusses planning of biological surveillance operations. It discusses integrated biological surveillance operations. It provides guidance for planning biological surveillance at the tactical, operational, and strategic levels. The chapter culminates with a discussion on the biological surveillance process and the integration of biological surveillance assets. The chapter provides a discussion on the biological surveillance annex to an operation order (OPORD).

BIOLOGICAL SAMPLE EVACUATION

Chapter IV provides guidelines for conducting biological sampling operations. It discusses sample evacuation requirements, coordination, planning, and execution. It provides guidance on maintaining sample chain of custody and conducting sample transfers. It also discusses the sample evacuation plan and subsequent sample analysis.

INFORMATION MANAGEMENT

Chapter V provides an overview of biological detection information management. It discusses the elements of BW attack determination and decision making to include priority information requirements, reporting, communications, operational-level assessments, and decisions.

PROGRAM PARTICIPANTS

The following commands and agencies participated in the development of this publication:

Army

United States Army Chemical School, 401 MANSCEN Loop, Suite 1029, Fort Leonard Wood, MO 65473.

United States Army Medical Department Center and School, 1400 E. Grayson Street, Fort Sam Houston, TX 78234.

United States Army Soldier Biological Chemical Command, Aberdeen Proving Ground, MD 21040.

Marine Corps

United States Marine Corps Combat Development Command, 3300 Russell Road, Suite 318A, Quantico, VA 22134-5021.

Navy

United States Navy Warfare Development Command, 686 Cushing Road, Sims Hall, Newport, RI 02841.

Air Force

United States Air Force Civil Engineer Support Activity, 14A Barnes Drive, Suite 1, Tyndall AFB, FL 32403.

United States Air Force Doctrine Center, Detachment 1, 216 Sweeney Boulevard, Suite 109, Langley AFB, VA 23665.

Chapter I

BIOLOGICAL SURVEILLANCE PRINCIPLES, CONCEPTS, AND THREATS

1. Background

Biological surveillance and MEDSURV operations are mutually supportive and critical in support of FP. Biological detection and MEDSURV could be the first line of defense against a biological attack. These operations can support identifying whether a BW attack occurred prior to the onset of symptoms among the force.

a. **Biological Surveillance.** Surveillance is the systematic observation of aerospace, surface, or subsurface areas, places, persons, or things by visual, aural, electronic, or other means. Specifically, biological surveillance is the observation of specific areas in an area of operations (AO) for biological hazards. This includes the use of biological detection or collection assets (i.e., conducting background monitoring and biological detection operations) and all source intelligences capable of providing information that a biological attack has occurred. It “paints the picture” on the status of the biological threat for the commander. It also includes the analysis and dissemination of the data collected.

b. **MEDSURV.**

(1) MEDSURV is the ongoing, systematic collection of health data essential to the evaluation, planning, and implementation of public health practice, closely integrated with timely dissemination of data as required by higher authority. A MEDSURV system includes a functional capacity for data collection, analysis, and dissemination of information linked to public health programs. The determination of unit-specific rates of illness and injuries of public health significance is the foundation of the MEDSURV program (see Appendix A). MEDSURV is closely integrated with the timely dissemination of this data to those responsible for prevention and control of disease and nonbattle injuries (DNBIs) and biological defense planning. The establishment of uniform and standardized health surveillance and readiness procedures for all deployments is listed in Chairman of the Joint Chiefs of Staff (CJCS) Memorandum Military Classification Manual (MCM)-0006-02, Department of Defense directive (DODD) 6490.2 and Department of Defense instruction (DODI) 6490.3.

(2) MEDSURV may provide the first indicator that a biological attack has occurred. If an attack is not detected directly, first indications may be an increase of illness among the affected population. Most BW agents induce symptoms after an incubation period. An influx of patients reporting similar symptoms may indicate an attack has occurred. Although it may be too late for medical countermeasures (see Appendix A) to help individuals who already show symptoms, the trend can alert the medical system to initiate protective measures such as vaccines or antibiotics for those who are exposed but not yet sick.

2. Surveillance Principles

Biological surveillance and MEDSURV are used to support early detection and identification of a biological agent attack. The early identification of a BW attack is critical to support measures such as postattack medical prophylaxis and treatment. The principles

of biological and medical attack surveillance directly support the NBC defense principles of Joint Publication (JP) 3-11 and Field Manual (FM) 3-11, *Multiservice Tactics, Techniques, And Procedures For Nuclear, Biological, And Chemical Defense Operations*, (i.e., contamination avoidance, protection, and decontamination). Biological and medical attack surveillance support measures such as BW agent contamination detection and identification or initiating postattack medical prophylaxis. The common features of biological surveillance and MEDSURV support identifying whether an enemy BW attack occurred. The principles that support the surveillance process of detecting and identifying BW attacks are as follows: maximize the probability of detection, orient on the threat, report all information promptly and accurately, develop the situation rapidly, and optimize use of all assets.

a. Maximize the probability of detection.

(1) Thorough intelligence preparation of the battlespace (IPB) allows commanders to optimally position detection and medical resources and establish strategies to increase the probability of detection and identification.

(2) The information collected and reported is directly applicable to the commander's critical information requirements (CCIR) developed during IPB, the prevention of DNBI, and to ongoing acknowledgement of the biological threat in the AO. For example, the supporting information from a laboratory conducting field confirmatory or definitive identification (see Appendix B) directly supports a commander's priority information requirements (IRs) (i.e., identifying that an enemy BW attack has occurred).

b. Orient on the Threat.

(1) The threat BW situation is assessed before commencing operations. The IPB will assess where, when, how, and why the enemy may employ biological weapons. IPB assists in focusing the surveillance efforts at the critical places and times. For example, biological detection and medical assets are assigned areas of responsibility (AORs) based on IPB, and the IPB process evaluates the AOR's weather and terrain to assess the environment's impact on BW agent employment.

(2) The surveillance process is also focused on background conditions such as the development of a profile of disease occurrence in the AO. This allows the staff planners to identify and differentiate background disease occurrence from actual BW attacks.

c. Report All Information Promptly and Accurately.

(1) Biological surveillance and MEDSURV are performed to obtain information. Higher commanders merge this information with other intelligence indicators to confirm biological attacks or make decisions. The information source will generally have a confidence level associated with the source. The source of the information can be an important element in the decision-making process. For example, there should be a high level of confidence in a laboratory's field confirmatory or definitive identification of a BW agent.

(2) Transmission of the information collected is uniform in method and schedule. Reporting of the interpreted information is clear, predictable, and coordinated with operation plans (OPLANs) and OPORDs.

d. Develop the Situation Rapidly.

(1) Once the unit or activity performing the biological surveillance or MEDSURV mission detects or identifies a BW agent, the information is forwarded rapidly through the reporting chain. The information is time sensitive and must be rapidly evaluated along with other intelligence indicators to update the commander's situational awareness (SA). For example, the information from a laboratory conducting field confirmatory identification could serve as the basis for a commander's decision.

(2) The surveillance plan uses the communications and network capabilities of the theater and the sustaining base to rapidly disseminate surveillance results throughout the command (i.e., intelligence, NBC, and command channels) and within the combat health support (CHS) system.

e. **Optimize Use of Biological Surveillance Capabilities.** When selecting biological surveillance (see Appendix C) and MEDSURV assets to perform a task, the commander considers the capabilities of the available assets. Based on the assigned mission, threat IPB, and system capabilities, the NBC and medical staff prepare their surveillance plans.

3. Concept of Biological and Medical Surveillance

The operational concept for biological surveillance is impacted by multiple factors such as mission, enemy, terrain and weather, troops and support available—time available and civilian (METT-TC) considerations. These factors are interrelated (e.g., terrain and weather impact BW agent employment and the location of a biological detector array). The biological surveillance planner considers these factors and analyzes the tradeoffs that exist between these different considerations. For example, surveillance planning allocates a limited number of detectors to areas or sites based on the commanders priorities (i.e., assessing the tradeoff between mission requirements and troops and support available). Achieving the tradeoff between these factors results in an overlap that should maximize the probability of detection (see Figure I-1 [page I-4]). For example, the siting of biological surveillance systems will be impacted by the following factors:

- Mission—What are the commander's IRs and priorities of effort?
- Enemy—What agent and delivery systems may be used by the enemy?
- Terrain and weather—What terrain is available to site available assets? How will weather and terrain impact BW aerosol releases?
- Troops and support available—How does the plan allocate a limited number of surveillance assets? How does the plan apportion sustainment resources (see Appendix D)?
- Time available and civilian—How much time is available before onset of BW agent symptoms? What is the estimated time for evacuation and laboratory analysis of samples? What is the estimated time to conduct postattack medical prophylaxis?

The concept integrates the METT-TC considerations into practical terms that will drive an effective probability of detection, and support development of viable courses of action (COAs) that are operationally and logistically supportable.

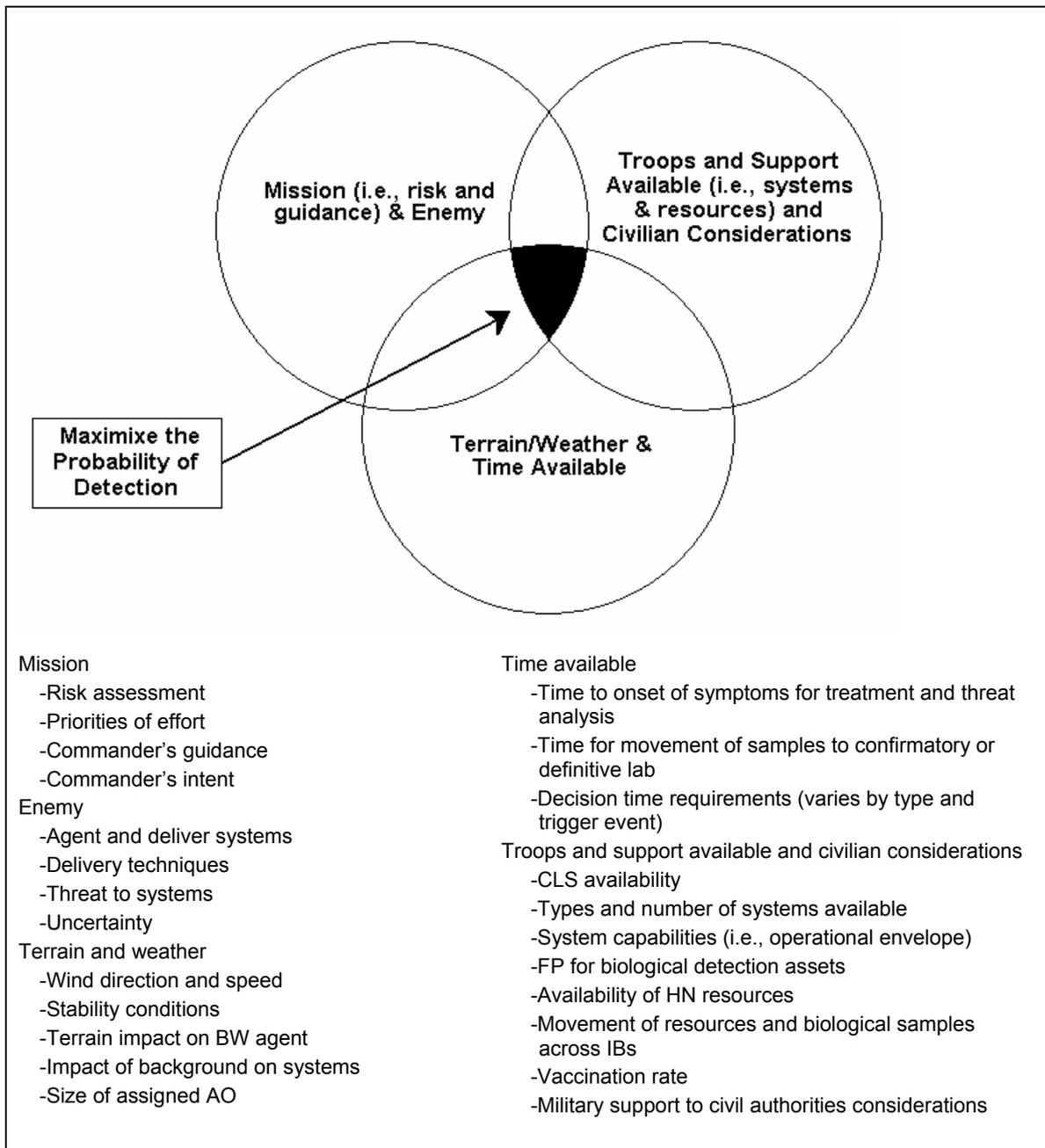


Figure I-1. METT-TC Factors that Impact Biological Surveillance

Defining the concept in terms of a workable process leads to the development of risk-reduction measures. Before this process of defining risk reduction-measures can begin, the command and staff ensure their understanding of the assigned mission and the higher commander's intent, guidance, risk assessment, constraints, and priorities of effort. An understanding of the mission provides the link between the mission and the concept of operations (CONOPS). To implement an operational concept that recommends effective risk reduction measures (see Figure I-2), the command and staff can use the following steps: detect and/or identify the BW hazard, assess the BW hazard, develop risk reduction

measures (controls) and make risk decisions, implement risk reduction measures (controls), and supervise and evaluate.

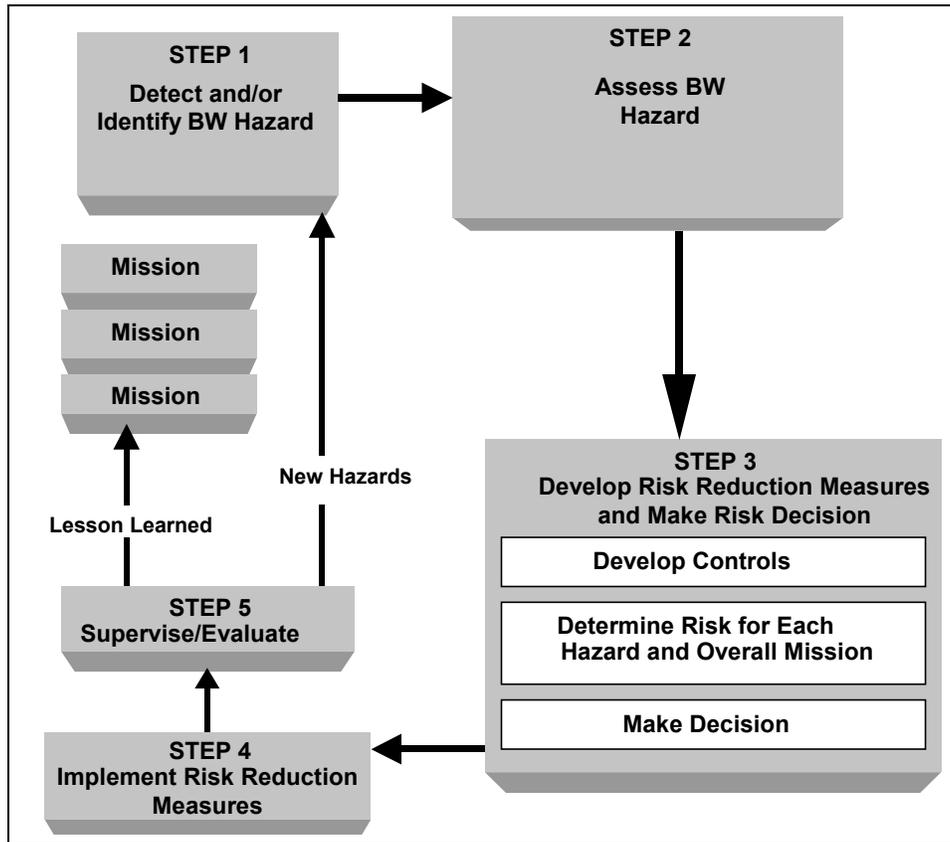


Figure I-2. Preparing BW Risk-Reduction Measures

a. Detecting and/or identifying the BW hazard. Risk decisions should be based on SA of the threat. The threat of a BW attack can be found in nearly all operational environments, and the ability of unit leaders and staff to detect and/or identify the hazard is essential. The command and staff consider the threats—

- BW agent capabilities.
- Available delivery systems.
- Delivery techniques.
- Likelihood of use of BW agent.
- Capability to attack and destroy US biological detection assets.

(1) Identifying the threat BW agent capability (i.e., traditional BW agents versus novel agents) is critical for ensuring that biological surveillance and MEDSURV resources are prepared to support force health protection.

(2) Identifying the BW hazard examines the how and where an enemy may use a BW agent (i.e., inside a building, outside line or point source). This is a challenging process based on the unpredictability of how a BW agent may be used.

b. Assessing the BW hazard. The command and staff can assess the probability and severity of BW attacks to determine the potential risk to the mission and personnel. The end result is an estimate of risk and an assessment of the overall risk to the mission that cannot be discounted. The risk assessment is directly related to the BW hazard identification and method of employment. BW hazard identification is key to determining protective measures, casualty estimates, and time before onset of symptoms. Methods of employment may include aerial sprayers, infected persons or vectors, or contaminated food or water. When sprayers and explosive devices are used, factors that will impact the risk assessment include terrain and weather. The two steps are interlinked and are used to support BW risk assessments. See Appendix E for more information on BW risk assessment.

(1) Terrain and weather impact the assessment of the BW hazard. Specific factors that are part of the assessment include—

- Wind direction and speed.
- Atmospheric stability conditions (e.g., stable, neutral, or unstable).
- Impact of terrain (natural and manmade) on BW agent cloud behavior.
- Impact of background conditions (environmental or manmade) on biological detection capabilities.
- Size of the AO.
- Impact of weather phenomena (i.e., sandstorms or tropical rainfall) on biological detection capabilities.

(2) The time available is an important factor in the assessment process, and is impacted by—

- The time to onset of symptoms following exposure to a BW agent.
- The time for movement of samples and for laboratory analysis.
- The time for support of the decision-making process.

(3) The protective posture of the personnel in the affected area is a critical factor in the assessment process, and is impacted by—

- Immediate availability of respiratory protection.
- Vaccination rate.
- Immediate availability of collective protection (COLPRO).

c. Developing risk reduction measures and making risk decisions.

(1) After assessing the BW threat and the potential hazard of a BW attack, the command and staff develop controls (risk-reduction measures) that should reduce the risk to the force. To be effective, each risk reduction measure developed must meet the following criteria:

- Suitability. It must mitigate (reduce the hazard).
- Feasibility. The unit must have the capability to implement the control.

(2) Examples of controls include the following critical measures:

- Preparing an employment plan that optimizes the use of available biological detection resources (see Appendix E for information that supports development of an employment plan).

- Establishing centralized or decentralized warning and reporting (see Appendix F).

- Preparing a sample collection plan that integrates the use of laboratories, sample courier assets, and biological detection assets (see Appendix G).

- Providing the required reports through established communications architecture to support the commander's SA.

- Preparing a logistics plan that integrates use of contracted logistic support (CLS) and standard military support.

- Preparing a plan for medical prophylaxis and treatment.

- Ensuring that command and control (C²) and support relationships are specified.

- Preparing a plan for minimizing spread of contamination, whether from the agent itself or contagious personnel.

- Implementing quality management (QM) practices.

- Providing quality management practices for the FP of surveillance resources.

- Establishing a plan for use of standoff detection systems (see Appendix H).

- Preparing a restriction of movement (ROM) plan to limit possible transmission of contagious BW agent.

(3) The development of risk-reduction measures hinges on suitability and feasibility considerations. Factors that will impact the risk reduction measure selected include—

- The number of biological systems available.

- The capability of the systems available (i.e., what is the operational envelope for the systems—individually or collectively) (see Appendixes C and I).

- The availability of CLS to support at one or more locations.

- The availability and location of supporting confirmatory and/or definitive laboratories, and sample courier resources.

- The availability of security resources to provide FP for low-density biological detection assets.

- The availability of host nation (HN) resources to support biological surveillance, etc.

- The mobility to move required resources (i.e., samples and logistics) intra-and intertheater.

- The capability to communicate required information and to obtain the required technical reach-back capability.

- The number of people exposed to the BW agent.

(4) The development of risk reduction measures is directly linked to the variables associated with the BW hazard identification and assessment. Further, the risk associated with each control measure is assessed along with the overall risk to the force.

d. **Implementing Risk-Reduction Measures.** The command and staff ensure that controls are integrated into standard operating procedures (SOPs), written and verbal orders, mission briefings, and staff estimates. The critical check for this step, with oversight, is to ensure that controls are converted into clear, simple execution orders that are understood at all levels.

e. **Supervising and Evaluating.** During mission preparation and execution, leaders complete the risk assessment process through supervision and evaluation. The continuous evaluation and assessment of risk levels may yield lessons learned and/or identification of new hazards. Supervision and evaluation is a basic form of QM.

4. Executing the Operational Concepts of Biological and Medical Surveillance

a. **Biological Surveillance.** Biological detection and collection assets are employed based on the mission, the risk assessment, and an evaluation of the threat force's capability to use BW agents. The commander will prioritize use of available assets and establish an employment plan that integrates use of fixed site and maneuver/maritime biological detection and collection assets. The operational settings for employing biological detection and collection elements include—

- Fixed-sites, ports, or airfield FP (critical node).
- Maneuver or maritime FP (area array).

(1) **Fixed sites, ports, or airfield FP.** This operational setting can occur when biological detection and/or collection assets are placed on or near a site to provide biological surveillance. They can be used to detect off-site or on-site attacks and can be employed to protect early-entry sites and C² sites such as an installation, aerial port of debarkation (APOD), seaport of debarkation (SPOD), or specific buildings. A METT-TC analysis will determine the number of systems required as point detectors or samplers for critical target areas such as logistics bases, C² locations, major airfields, airbases (ABs), naval bases, or ports. In joint operations (such as the protection of critical port facilities) biological detection and collection systems can also be placed inside critical buildings. Guidance on site selection, placement, and spacing can found in Appendix E.

(a) **Fixed site biological surveillance** provides for a redundant biological detection and collection capability. This capability may address the need for surveillance of the outside ambient air and internal building air.

(b) **Monitoring the outside ambient air** provides a capability to detect an external release of a biological agent from an overt or covert release. Additionally, critical buildings may be provided biological detection or collection capabilities internal to the structure's heating, ventilation, and air conditioning (HVAC) systems. These systems are used to detect possible covert or overt use of biological agents.

(2) Maneuver/Maritime FP. In this operational setting, the biological detection and/or collection elements will be employed in an array designed to optimize the probability of detection consistent with FP security requirements. Maritime or land force assets will be placed based on METT-TC considerations. The size of the force to be protected also has a direct impact on system placement. The biological detection assets should ideally be placed in depth throughout the AO to detect a biological agent cloud that may have been disseminated as a large area coverage attack or line source from a ground, maritime, or aerial platform. Guidance for employing assets can be found in Appendix E.

b. MEDSURV. Executing MEDSURV is a responsibility that is shared by the individual, unit leaders, senior commanders, and the health service support (HSS) system.

(1) Individuals support MEDSURV by –

- Reporting outbreaks of sickness or illness in the ranks.
- Complying with PVNTMED guidance.

(2) In executing MEDSURV, unit leaders –

• Inform personnel of illness, injury, and disease threats, the risks associated with those threats, and the countermeasures in place (or to be used) to minimize those risks while deployed.

- Ensure compliance with PVNTMED guidance.
- Promote PVNTMED programs and policies.
- Ensure completion of pre- and post-deployment health assessment

forms.

• Ensure environmental health assessments are documented to record any exposures.

(3) Senior commanders support execution of their MEDSURV responsibilities through –

• Supporting MEDSURV within their units with appropriate planning, resources, policy, enforcement, education, and training.

• Using MEDSURV information as the basis for unit health reporting and in all phases of planning.

• Reporting unit DNBI rates and health readiness in accordance with joint guidance, service policy, OPORDs, and OPLANs.

• Providing unit personnel status reports.

• Consolidating MEDSURV report information in determining health status and medical threat.

• Ensuring that personnel complete pre- and post-deployment health assessment forms (Department of Defense [DD] Form 2795 and DD Form 2796) and other requirements in accordance with joint guidance (see DODD 6490.2).

5. Biological Warfare Threat Triggers

From an operational standpoint, the command and staff IPB assesses the threat BW capability (i.e., when, where, and how an enemy may employ BW agents). However, the

command and staff retain a pragmatic view that the threat use of BW could be unpredictable. In response to a BW threat with unknown factors, the applicable OPLAN/OPORD outlines priorities of effort and trigger events (decision points) that will result in response that includes biological defense countermeasures. Understanding different trigger events is important because trigger events help determine how far along into the BW attack the response to the event begins. This helps to shape the ability of the force to respond. The closer the response (i.e., detect to treat) to an actual BW event, the less likely the damage (i.e., fewer number of casualties) to operations will be. BW attacks could occur against small- (i.e., fixed sites such as ports or airfields) or large-area targets (e.g., maneuver or maritime forces). An enemy could use point- or line-source BW weapons (overt or covert) against small or large targets to achieve surprise and unpredictability as to the time and place of attack. Several key indicators that might signal a BW attack are MEDSURV, detector activation, intelligence triggers, and weapons event triggers.

a. MEDSURV may result in the first detection of a BW event by assessing trends in medical symptoms among unit personnel reporting to clinics. Casualties may be the first indication of a biological attack. A postattack analysis of the event will influence operational decisions—decisions likely to be complicated by uncertainties regarding the nature and scope of the attack. For example, use of an infectious agent could lead to quarantine and/or ROM for US or HN assets.

b. Detector activation trigger refers to the discovery of a BW event via a signal from a detection device that a biological agent may be present in the environment. Detectors may or may not indicate presence of BW agents (due to the sensitivity of the devices and the possibility of false positives). Detectors are limited to those BW agents for which they are designed to find; they may not detect BW agents in certain media (e.g., food, water, soil). Networked aerosol detectors, positive presumptive test results, and supporting field confirmatory laboratory results help to determine whether a biological event is identified before the onset of casualties.

c. Intelligence trigger occurs when a commander receives an intelligence report indicating that an enemy possesses an offensive biological capability, that there is unusual enemy activity consistent with the logistics and operational use of a biological agent, or that a fixed site may be attacked with a biological agent. Information and intelligence from multiple sources (e.g., the general public, military intelligence, or national intelligence institutions in the HN) can provide advance warning of a biological attack. Intelligence warning is the most likely (perhaps only) trigger event that allows a commander the opportunity to take preattack actions.

d. Weapons event trigger refers to an overt attack by weapon systems, such as theater ballistic missiles (TBMs), submunitions, or artillery that might be armed with BW. Where intelligence has assessed a biological weapon capability, a weapons event in high-threat areas will likely be treated initially as an unknown agent. Detection, observation, or other notices of attack prior to casualties trigger during-attack actions. These actions initially focus on immediate actions to preserve human life. Detection of an attack in progress may result from upwind attack warning, detector alarm, or observable weapons events and should subsequently determine whether a chemical or biological agent was used.

6. Applying the Principles of Biological Surveillance

a. Applying the principles of biological surveillance helps to ensure that the supported commander receives the required capabilities. Table I-1 provides a sample of the biological surveillance principles and the association of example capabilities that could be required to support a joint force commander (JFC). In this example, a JFC is moving elements of a USA corps and light infantry division into an APOD (i.e., a main operations base [MOB]) and a maritime force is supporting operations from offshore.

(1) Maximize the probability of detection. The JFC biological surveillance capabilities are supported by the MOB Joint Portal Shield (JPS) and dry filter unit (DFU) detection and collection capabilities. The USA biological detection assets also support operations from detector sites (DSs) around the APOD. Shipboard biological surveillance capabilities (i.e., interim biological agent detector system [IBADS], and joint biological point detection system [JBPDS]) provide a monitoring capability offshore. Confirmatory laboratory support can be provided by an Air Force (AF) biological augmentation team (BAT) an Army Medical Laboratory (AML), and Navy Forward Deployed Preventive Medicine Unit (FDPMU). A Navy Environmental and Preventive Medicine Unit (NEPMU) can provide a reach-back capability.

(2) Orient on the threat. The command and staff conduct IPB to understand the operational environment (i.e., the impact of background conditions on biological detection), and the threats intent and capabilities.

Table I-1. Biological Surveillance Principles

Biological Surveillance Principles	Capability
Maximize Probability of Detection	Provide the JFC with biological surveillance and MEDSURV assets to support mission-essential APOD and maritime operations.
Orient on the Threat	Conduct IPB to ensure understanding of the operational environment (i.e., background conditions), threat intent, and capabilities.
Report Information Promptly and Accurately	Establish warning and reporting network between service components and the JFC.
Develop the Situation Rapidly	Provide for evacuation of presumptively identified BW samples to the supporting confirmatory or definitive laboratory.
Optimize Biological Surveillance Capabilities	Provide the JFC with biological surveillance, laboratory, and sample courier assets.

(3) Report all information rapidly and accurately. The JFC's warning and reporting system facilitates the prompt reporting and tracking of BW event information.

(4) Develop the situation rapidly. The movement of presumptively identified samples to confirmatory laboratories within 6 hours provides critical information to support decision points for the commander.

(5) Optimize biological surveillance capabilities. A networked team composed of medical and biological surveillance and sample couriers provides the resources needed for support of biological attack surveillance.

b. Implementing effective biological surveillance and MEDSURV should include QM practices that provide a group or series of measures and actions that are employed to ensure that a system, process, or analytical test is functioning properly. Omission of any

aspect of the QM program decreases the overall quality of the analytical result. Elements of a QM program can include—

(1) Proper operator training and certification that an operator/technician is knowledgeable and skilled to perform the analysis. Documentation of both initial and continuing training for all operators of the system or process must be maintained.

(2) Proficiency of each operator must be maintained through the periodic analysis of unknown samples (i.e., proficiency tests). The results must be verified and documented by a supervisor or designated observer who attests to the accuracy of the analysis and adherence to the proper analytical process.

(3) Preventive maintenance, checks, and services (PMCS) on all equipment/instruments must be conducted on a routine basis as recommended by the equipment operating manual. Documentation of the performance of PMCS and the problems corrected must be maintained.

(4) Critical reagents and controls must be transported and stored in the proper environment as directed by the manufacturer.

(5) Positive and negative controls should be performed, and the results should be obtained and documented.

(6) Management and supervisory personnel must maintain awareness of potential errors and problems to the system or process, evaluate personnel and process, document errors or problems, and take corrective action to eliminate or minimize such errors or problems.

7. Commander's Information Requirements-Sample Results and Medical Surveillance

a. The analysis and identification of a BW sample will support a commander's IR. The analysis of a sample can range from presumptive, to confirmatory, to definitive identification. The three levels of identification and their associated sample analysis definitions are addressed below.

(1) BW Agent Field Presumptive Identification. Presumptive identification is furnished through the positive results from a device such as using the hand-held assay (HHA). This process provides for the identification of a suspect BW agent by means of devices/materials/technologies that are based on detecting biological markers (biomarkers) using a single methodology (see Appendix B). Agent identification to species level, or differentiation among a family of similar agents, may not be possible. This is equivalent to the Laboratory Response Network (LRN) for bioterrorism Level A and the USA Biological Integrated Detection System (BIDS).

(2) BW Agent Field Confirmatory Identification. This process provides for the identification of a suspect BW agent by means of devices/ materials/technologies that are based on detecting biological markers using two or more independent biomarker results. The field confirmation identification process can be accomplished in a matter of hours (e.g., 6 to 8 hours). Examples might include the findings of the presumptive biomarker identification with the addition of a positive polymerase chain reaction (PCR), enzyme-linked immunosorbent assay (ELISA), or electrochemiluminescence (ECL) results, using specific target nucleic acid sequences for the organism and antibody recognition of agent-specific antigen sites, respectively. This is equivalent to field sample/specimen

identification that is conducted by forward-deployed or forward-positioned laboratories such as the USAF BAT, the AML, or FDPMMU (USN), or homeland security (HLS) LRN Level B or C (USA community hospitals or medical centers [MEDCENS]) asset. BW agent field confirmation identification is also available aboard selected aircraft carriers and amphibious ships, and selected medical facilities. These laboratories also have a reach-back capability with a definitive lab for consultation.

(3) BW Agent Definitive Identification. This process provides for the specific identification of a suspect biological agent as to genus and species, serological type, or toxin. This level of identification is by means of devices/materials/technologies that are based on two or more independent biomarker results and using different methodologies. The definitive identification process can be accomplished in several hours to a couple of days, depending on the number of tests required. This level of identification is performed in a reference laboratory with a broader variety of methodologies available and highly skilled testing personnel, thus providing the highest levels of accuracy. Final sample/specimen identification is accomplished at one of the nationally recognized continental United States (CONUS) reference laboratories such as the United States Army Medical Research Institute of Infectious Diseases (USAMRIID), the Navy Medical Research Institute (NMRI), or the Centers for Disease Control and Prevention (CDC).

b. Sample analysis from the BW agent identification process can provide the commander with critical information. However, the first obvious indicator of a BW attack may be an increase of illness among the affected population (i.e., MEDSURV).

c. The commander uses multiple information sources (i.e., sample analysis results and MEDSURV). This information supports the commander's SA and is critical input for critical decisions (i.e., detect-to-treat).

Chapter II

BIOLOGICAL SURVEILLANCE FUNCTIONS, RESPONSIBILITIES, AND CAPABILITIES

1. Background

The commander will use all available assets (i.e., MEDSURV, intelligence, and biological surveillance) to detect and mitigate the effects of biological attacks. Resulting detection information will feed directly into the US force warning and reporting system.

MEDSURV, intelligence, and biological surveillance are used to assess whether the enemy has used BW agents. For example, signals intelligence (SIGINT) may intercept enemy employment orders for a BW attack. Human intelligence (HUMINT) may also provide information on future enemy intentions and BW manufacturing capabilities and locations. MEDSURV assesses the incidence of illness to determine whether a biological attack may have occurred. Biological surveillance serves as another critical component of awareness. Biological surveillance capabilities include:

- Monitoring.
- Alerting.
- Collecting/sampling.
- Detecting.
- Identifying.
- Reporting.
- Evacuating sample and maintaining chain of custody.

a. **Monitoring.** When a biological detection asset such as JPS or the JBPDS is operational, it is continuously monitoring the air for an increase in number of aerosol particles within a certain size range that would be indicative of a BW attack. In addition, this may include the random or routine monitoring of food and water sources for contamination by HSS personnel.

b. **Alerting.** Alerts provide the initial determination that a biological attack may be occurring. Alerting devices determine if any change in the particulate background at the sensor may indicate a possible presence of biological agents. Selected alerting devices are also capable of determining whether biological mass is present in the ambient air.

c. **Sampling.** Sampling of the biological agent is a crucial part of the identification system. The sampling process collects possible BW samples for subsequent use in the identification process. It is important to note that the chain of custody must be initiated when the sample is taken by the first person taking the sample.

d. Detecting. Once a sample has been collected and concentrated, the detection process in selected biological systems determines if the particulates are biological or inorganic in origin. To accomplish this, the sample is passed to a generic detection component that analyzes the aerosol particles to determine if they are biological in origin. This component may also classify the suspect aerosol by broad category (e.g., spore, bacterium, toxin).

e. Identifying. The identification process provides a presumptive identification of the biological agent collected at the system level. Identification is generally limited to a preselected set of agents and cannot identify agents outside of this set without the addition of new identifier chemistry/equipment or preprogramming.

f. Reporting. The results from the biological surveillance process are reported through the established reporting architecture. The controlling headquarters (HQ) nuclear, biological, and chemical control center (NBCCC) analyzes these biological reports to determine and assess whether a BW attack occurred. Normally, this could be a joint task force (JTF), corps, numbered air force (NAF), or other operational level HQ.

g. Evacuating sample and maintaining chain of custody. Presumptively identified and background (environmental) samples are evacuated. Samples are collected, packaged, sealed, and documented. The chain of custody begins with the person taking the samples. A complete history of the circumstances about each sample's acquisition is provided. The purpose of the sample may be for support of treatment or attribution (evidentiary) or both. It is critical that the sample be maintained at 1 to 4 degrees Celsius (C) during storage and transport. Samples are evacuated to preselected sample transfer points (STPs), sample management facilities (SMFs), or directly to supporting laboratories. The chain of custody is maintained throughout the transfer process. Sampling and evacuation procedures are discussed in detail in Appendix G.

2. Responsibilities

The NBC medical officer and intelligence staffs work closely to provide for biological surveillance. They ensure biological and MEDSURV considerations are integrated in the decision-making process. Command and staff responsibilities for biological defense are outlined in Table II-1. Biological defense responsibilities differentiate command and staff responsibilities relative to biological planning and operations.

Table II-1. Command Staff Biological Defense Responsibilities

	BW Detection Planning and Execution Responsibilities
JTF/Operational-Level Commander	Allocates BW defense resources based upon METT-TC considerations. Determines protection required including immunizations.
COS	Reviews recommendations for priority IRs, priority target listing, and protective posture.
Intelligence	Assists in developing the biological surveillance plan in support of the R&S plan. Coordinates BW intelligence reports and potential adversary BW activities with the operations and NBC staffs and FSEs.
Operations	Integrates BW defense training into unit combat mission training requirements. Develops risk assessment for operations in BW environments and assesses OPTEMPO impact. Recommends targeting of BW-related activities. Rehearse/practice biological sample evacuation plans.
NBC Officer/NCO	Develops the biological surveillance annex in support of the R&S plan. Acts as the primary battle-staff advisor on NBC defense. Ensures that the BW defense considerations are part of the IPB process. Recommends biological detection and collection requirements and plans.
Logistics	Provides for supply and maintenance requirements.
Medical	Advises and assists the commander and his staff on health and human safety in a BW environment (including health effects, PVNTMED, treatment, and patient evacuation). Recommends vaccinations, pretreatment regime, and treatment plan. Conducts liaison with field confirmatory laboratories and medical facilities. Conducts health risk assessments and provides commanders with health risk information for operational decision making. Provides health risk assessment to the commander.

The following list of responsibilities and roles for operational-level or tactical commanders and staffs during biological defense operations are not all-inclusive but rather a general guide. The AF roles and responsibilities vary slightly from the guidance below and are outlined in Air Force Manual (AFMAN)-10-2602.

a. Commander.

- Prepares forces to defend against possible BW attacks, including training and equipping.
- Orders preemptive strikes on threat BW capabilities.
- Directs appropriate BW protective measures.
- Allocates biological defense resources.
- Directs biological surveillance based on threat and intelligence indicators.

- Determines protection and warning criteria and dissemination of BW attack warning.

b. Chief of Staff (COS)/Executive Officer (XO).

- Ensures staff estimates are coordinated and the staff integrates biological defense considerations into the tactical decision-making process.

- Ensures BW threat information is included when developing potential CCIR recommendations to the commander.

- Ensures BW surveillance is synchronized with other intelligence collection efforts and the mission.

- Reviews staff recommendations for employment of biological detection assets and warning the force.

- Ensures critical BW information is presented to the commander.

- Reviews recommendations for priority IRs, priority target listing, and protective posture.

c. Operations.

- Coordinates the staff BW risk assessment and recommends appropriate risk-reduction measures to conserve combat power and protect the force.

- Recommends troop listing for BW defense assets based on the BW threat and mission.

- Integrates BW defense training into unit combat mission training that orients on conditions and standards of combat.

- Implements FP measures for reaction to threat BW operations.

- Considers employment of biological detection assets in planning future operations.

- Recommends nomination of enemy BW targets and related activities with fire support coordinator (FSCOORD), intelligence, civil affairs (CA), and NBC defense officer.

- Allocates biological detection assets to current operations according to guidance.

- Ensures biological detection asset employment is synchronized with current (close, deep, and rear) operations.

- Assesses impact of operations in a BW environment on operating tempo (OPTEMPO).

- Integrates biological detection asset employment with branches developed to support current operations.

- Directs aviation and long-range biological detection assets to execute long-range BW surveillance according to commander's guidance/priorities.

- Coordinates rehearsal of sample evacuation plan.

d. Intelligence.

- Applies IPB products to support targeting of BW-related activities with fire support (FS) and tactical air assets.

- Disseminates weather reports/products from the staff weather officer (SWO) and assesses implications in a BW threat environment.

- Analyzes BW attack information to develop intelligence to predict future BW employment.

- Creates the reconnaissance and surveillance (R&S) plan. This plan, which can be embedded in existing war plans, should include the biological surveillance plan as an annex. The NBC defense officer will complete the biological surveillance annex, with input from the medical and intelligence officer, ensuring synchronization with the unit's overall R&S plan.

e. FS.

- Uses the FS target acquisition battery (TAB) radar and sound/flash ranging equipment to identify the locations of enemy indirect firing points used to conduct BW attacks.

- Destroys possible enemy BW attack indirect fire systems using counter-battery fire.

- Provides an alternate means of determining local weather.

- Provides data to NBC defense personnel so that collateral damage estimates can be made in regard to the release of BW agents that may occur as a result of the attack on enemy systems.

f. Logistics.

- Coordinates biological detection system CLS, as required.

- Coordinates with the HN through CA for any available unique biological detection supplies through foreign nation support (FNS) channels.

- Coordinates biological detection asset recovery and evacuation operations as necessary.

- Recommends allocation of transportation capabilities to support rapid displacement of biological detection assets.

- Forecasts resource requirements to support BW defense logistics requirements.

g. Personnel.

- Advises the commander and NBC defense officer on matters concerning biological detection asset personnel replacements.

- Requests and allocates biological detection personnel replacements as required.

h. CA.

- Coordinates use of HN medical facilities to treat BW casualties, if necessary.
- Determines availability of unique biological detection supplies from the local civil sector.

- Provides information (in the chief military observer [CMO] estimate) on likely civilian actions/reactions to a BW attack.

i. NBC Defense Officer.

- Advises the commander and staff on operations in a BW environment.

- Ensures BW-related activities are part of the IPB process.

- Recommends actions to minimize friendly and civilian vulnerability to BW attacks.

- Conducts BW vulnerability analysis in conjunction with the appropriate staff elements (i.e., staff threat working group).

- Participates in the target nomination process for enemy BW related targets.

- Recommends tasking to operations for biological detection assets to support the scheme of maneuver and incorporates these assets into plans and orders.

- Coordinates biological detection asset requirements with subordinate commands.

- Recommends surveillance missions based on BW indicators and technical knowledge of BW dissemination methods, agents, and favorable conditions.

- Plans, coordinates, and evaluates BW defense training in cooperation with the operations.

- Coordinates with the surgeon and medical staff in developing priorities of effort for BW surveillance assets.

- Provides the biological surveillance annex for the R&S plan to the intelligence officer. The annex will include a sample evacuation appendix that is coordinated with the surgeon/medical officer, the staff intelligence and transportation officer/NCO, and the sample courier unit.

j. Surgeon/Medical Officer.

(1) MEDSURV: DODI 6490.3 provides the following guidance for MEDSURV: during a deployment, the surgeon and the JTF surgeon will—

“Deploy technically specialized units with capability and expertise in the conduct of surveillance for occupational and environmental illnesses, injuries, and diseases, health hazard assessments, and advanced diagnostic testing... These specialized units may be deployed to meet the requirements of the deployed force through surveillance for occupational and environmental illnesses, injuries, and diseases, application of preventive medicine, use of advanced diagnostic testing, and coordination with combat stress control personnel. These units shall conduct health assessments of potential exposure to biological, chemical, or physical agents that threaten the health and safety of the command.”

(2) The surgeon/medical officer/medical NBC defense officer also—

- Advises and assists the commander and staff on health and human safety issues in a BW environment to include health effects, PVNTMED, treatment, and patient evacuation.

- Evaluates national medical intelligence in developing the BW vulnerability analysis and analyzes information on endemic diseases.

- Identifies and coordinates training and education of medical personnel on the medical management of personnel exposed to BW agents.

- Coordinates with designated supporting medical laboratory to plan for receipt and confirmatory analysis of suspected BW samples.

- Identifies HN and other laboratory support that may be available, to include integration with local and regional US and HN civilian MEDSURV assets.

k. SWO.

(1) Advises and assists the operations, intelligence, and NBC defense officers with weather support capabilities and limitations in support of operations in a BW threat environment (i.e., provides data to support development of hazard plumes).

(2) Prepares climatological studies and analyses in support of operations in a BW threat environment.

(3) Evaluates and disseminates weather data, including forecasts, in support of operations in a BW threat environment.

(4) Responds to requests for information (i.e., analyzes weather effects on BW).

1. Staff Judge Advocate (SJA). Provides legal advice regarding law of armed conflict (LOAC) and the attack of facilities suspected of being related to BW activities.

(1) Reviews chain of custody procedures.

(2) Provides guidance on issues that may occur if quarantine, ROM, and mass-vaccination operations are considered.

3. Capabilities

The commanders establish requirements for biological surveillance capabilities and synchronize their utilization to complement other supporting capabilities (i.e., MEDSURV and intelligence). The integrated use of biological detection assets, communication resources, escort courier and transportation assets, and laboratory resources are required to support an effective risk-reduction strategy.

a. Biological detection and collection assets. The concept of employment (COE) for biological detectors and collection systems help define where and how these assets will be used. Execution of biological detection operations support fixed site ports, airfields, and/or maneuver force operations. Individual systems can be employed collectively or as a system of systems (i.e., integrating the use of different systems). The COE for biological detection and collection systems lends itself to employment at fixed sites (critical node array) or to support of maneuver/maritime forces (area array). However, the COE for selected systems only lends itself one setting (i.e., fixed sites). See Table II-2 for information on the operational envelope for biological detection and collection assets. Table II-2 outlines the operational envelope for multiple biological detection and collection assets. The table indicates by system: COE (fixed sites, ports, and airfields and/or land maneuver/maritime forces support); capability (monitor, alert, collect, detect, and identify); point or standoff detection capability; CLS required (yes or no); sample produced for evacuation (yes or no); prime mover (primary vehicle) available (yes or no); power source available (yes or no); limitations (i.e., availability of detection or alert capabilities); and organic communications available (yes or no).

Table II-2. Biological Detection and Collection Assets–Operational Envelope

System/Kit	COE	Capability	Point or Standoff Detection	CLS Required	Produce Sample for Evacuation	Prime Mover Available	Power Source Available (i.e., generator)	Limitation	Organic Communications Capability
JPS	Fixed sites, ports, airfields	Monitor, alert, collect, identify (outside ambient air)	Point	Yes	Yes	No	Yes	No detection capability to complement the alert and presumptive identification capability	None
M31A2 BIDS	Maneuver land force, fixed site, port, air field	Monitor, alert, collect, identify (outside ambient air)	Point	Yes	Yes	Yes	Yes	No detection capability to complement the alert and presumptive identification capability.	AM/FM
M31A1 BIDS	Land maneuver force, fixed site, port, air field	Monitor, alert, detect, identify (outside ambient air)	Point	Yes	Yes	Yes	Yes	Approximately 25 minutes required from alert to presumptive identification	AM/FM
Fixed Site/ Trailer-Mounted JBPDS	Fixed sites, ports, air fields	Monitor, alert, collect, identify (outside ambient air)	Point	Yes	Yes	No	Yes	Approximately 25 minutes required from alert to presumptive identification	None
Man-Portable JBPDS	Fixed sites, port, air field	Monitor, alert, collect, identify (outside ambient air)	Point	Yes	Yes	No	Yes	Approximately 25 minutes required from alert to presumptive identification	None
Shipboard JBPDS	Maritime Force	Monitor, alert, collect, identify (outside ambient air)	Point	Yes	Yes	N/A	Yes	Approximately 25 minutes required from alert to presumptive identification	None

Table II-2. Biological Detection and Collection Assets – Operational Envelope (Continued)

System/Kit	COE	Capability	Point or Standoff Detection	CLS Required	Produce Sample for Evacuation	Prime Mover Available	Power Source Available (i.e., generator)	Limitation	Organic Communications Capability
DFU 1000	Fixed site, port air field	Collect and identify (internal building air)	Point	Yes	Yes	No	No (AC required)	No alerting capability	None
DFU 2000	Fixed site, port air field	Collect and identify (outside ambient air or internal building air)	Point	Yes	Yes	No	No (AC required)	No alerting capability	None
JSLNBCRS	Fixed site, port air field, land maneuver force	Monitor, alert, collect, identify (outside ambient air)	Point	Yes	Yes	Yes	Yes	N/A	FM
DOD Biological Sampling Kit	Maneuver land force, maritime force, fixed site port, air field	Sampling and identification (surface contamination)	Point	No	Yes	N/A	N/A	No alerting capability	None
LRB SDS	Maneuver land force, maritime force	Detection (outside ambient air)	Standoff	Yes	No	Yes	N/A	No presumptive identification capability	None

(1) COE for fixed sites, ports, and airfields and maneuver land or maritime forces.

(a) Fixed Sites, ports, and airfields. The COEs for multiple detectors and collectors lends themselves to fixed-site operations. Less the BIDS and Joint Service Light Nuclear Biological and Chemical Reconnaissance System (JSLNBCRS), these point detectors do not have authorized mobility assets, and do not have organic assigned operators. The fixed site commander provides the operators required to move these assets. Systems employed at fixed sites, ports, and airfields include—

- JPS.
- M31A1 or M31A2 BIDS.
- Fixed site/trailer-mounted JBPDS and man-portable JBPDS.
- DFUs
- JSLNBCRS.

(b) Maneuver land or maritime forces. The COEs for multiple detectors and collectors lend themselves to land or maritime forces. These systems are still point detectors, but have assigned, organic ground transportation (less the shipboard JBPDS/IBADS). These systems include—

- M31A1/M31A2 BIDS.
- JSLNBCRS.
- Shipboard JBPDS/IBADS (maritime only).

(2) Applying the COE for fixed sites, ports, and airfields (i.e., critical node array) and maneuver land/maritime forces (area array).

(a) Fixed Sites, ports, and airfield biological surveillance. Figure II-1 (page II-12) shows how the JBPDS and DFU can provide biological surveillance coverage of an APOD. This same employment can be used for other fixed sites, ports, and airfields. The biological detection assets provide decentralized reporting to the fixed site, port, or airfield NBCC.

(b) Maneuver forces biological surveillance. Figure II-2 (page II-12) shows a biological detection (BIDS) platoon providing surveillance for JTF maneuver forces (corps size) against a long-line-source attack. Concurrently, surveillance support is still provided at the APOD. The USA biological detection platoon provides centralized reporting directly to the JTF.

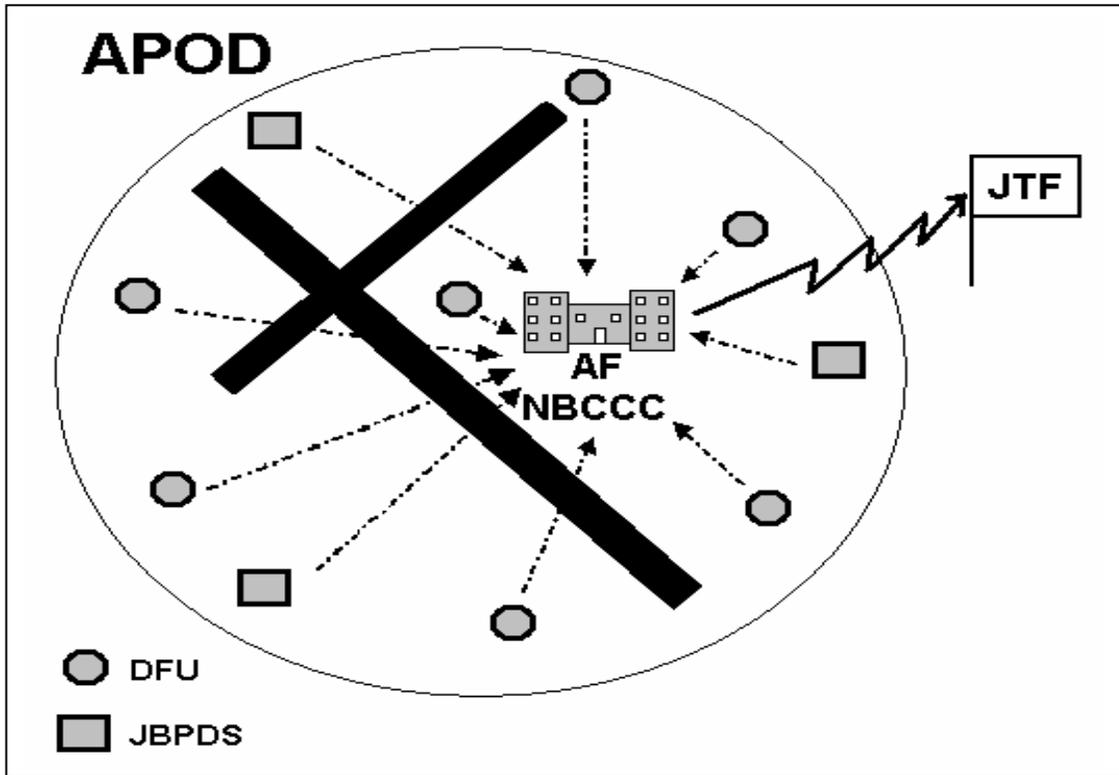


Figure II-1. JBPDS and DFU Coverage of an APOD

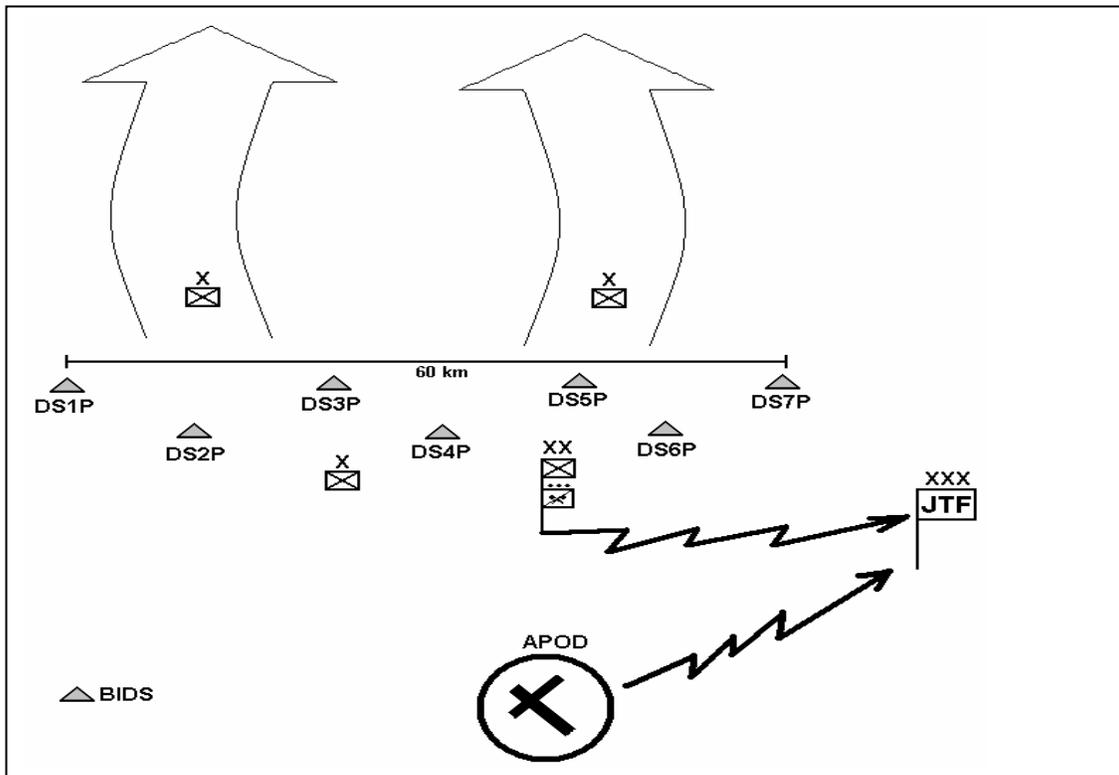


Figure II-2. BIDS Platoon Placement to Provide Coverage for JTF (Corps Size) Maneuver Forces for a Long-Line-Source Attack

(c) Use of multiple systems to support biological surveillance (i.e., a system-of-systems concept). See Figure II-3 for an illustration that indicates use of DFUs and JBPDS (trailer mounted/man-portable) and a USA biological detection unit. The DFU and JBPDS are located within the APOD perimeter using a dice-five employment tactic (see Appendix E). The BIDS unit is using a circular employment tactic within a US AO that is secure. The biological detection unit HQ provides decentralized reporting to the AB NBCC.

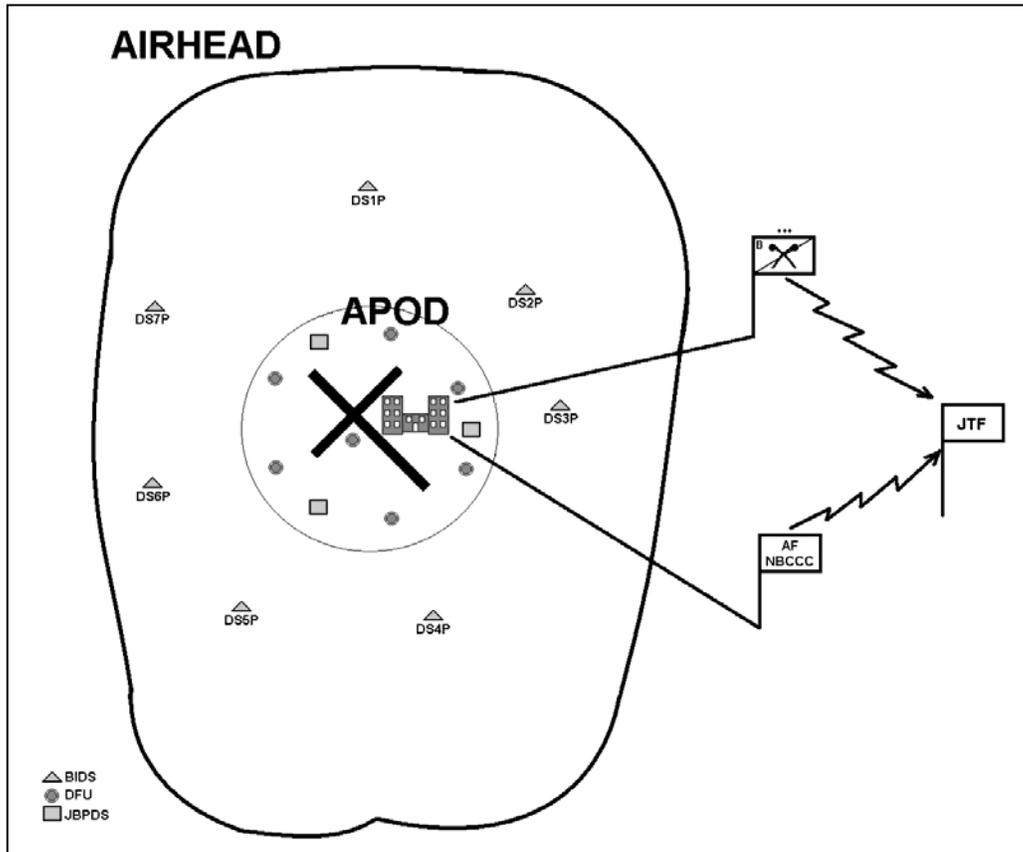


Figure II-3. Employment of Multiple Biological Detection Collection Systems (System of Systems)

b. Communications. Communications are important during biological surveillance operations. Biological surveillance assets must be capable of timely reporting of biological surveillance data to include personnel and logistics status. Also, units with biological surveillance assets must be capable of effective warning and reporting to subordinate and adjacent units, as well as higher command.

c. Laboratory Support. The commander has a number of critical decisions to make in a BW environment that require information that can only be provided by a supporting medical laboratory. A designated supporting laboratory will perform the field confirmatory identification of a BW attack. Service and in theater laboratory support include the FDPMU, Navy large deck platforms, the AF BAT, a theater Army medical laboratory (TAML) and other forward fixed-site laboratories (i.e., theater medical surveillance teams [TMSTs]).

d. Sample Courier.

(1) Of significant importance is the ability to courier suspected biological samples from biodetection assets to supporting laboratories while maintaining chain of custody. Under normal circumstances the biodetection asset is responsible for evacuation of their samples to a designated STP. However, depending on the proximity of the supporting lab, the biodetection asset may be required to evacuate the sample directly to the laboratory.

(2) The command must ensure it has an executable plan to get the samples to the supporting laboratories. In some cases dedicated technical escort unit (TEU) assets are used to escort samples. Priority for dedicated TEU assets will likely go to escorting samples from the theater back to the CONUS-based national laboratories for definitive analysis and identification.

(3) The combatant commander's sample evacuation plan must include the escort of samples within his AOR with and without TEU. This may require using other available assets besides TEU. A set of basic tasks is provided in Table II-3 that can be used to train in-theater couriers to transport biological samples. At all times the chain of custody must be maintained to insure legal and accurate reporting of biological attack surveillance results. Safety and security for the courier and the sample package are important.

(4) Transportation and storage of suspected biological samples is time-sensitive and the commander needs timely feedback so he can affect or initiate the appropriate countermeasures/prophylaxis. The samples must be properly packaged, sealed, and labeled. To support effective sample transport, the sample evacuation plan must allocate and task for the means to transport the sample.

Table II-3. Biological Sample Courier Tasks

Task	Action			
	Avoidance	Protection	Decontamination	Battle Management
Conduct Coordination	Obtain DOD sampling kits.	Obtain appropriate respiratory protection and gloves. Ensure that immunizations are up to date. Begin prophylaxis if required.	Obtain approved decontaminant solution.	Establish linkup point with biological sample generation asset.
Link Up	N/A	Don respiratory protection and gloves prior to linkup.	N/A	Report linkup to higher HQ.
Ensure Package Integrity	Use DOD Biological Sampling Kit to determine if outside of package is contaminated. Ensure package is packed according to applicable guidance. (e.g., IATA, CFR).	Place in additional transport bag/container as appropriate. Once package integrity is verified, respiratory protection is no longer required.	Conduct surface wipe-down of package. Conduct self-decontamination if required.	N/A
Transfer Sample (chain of custody)	Transfer sample package using appropriate chain of custody forms and procedures.	N/A	N/A	Report transfer of custody to higher HQ.
Coordinate Movement	N/A	N/A	N/A	Report departure and start of movement to higher HQ. Coordinate with applicable operations elements as required (e.g. movement through unit sectors.)
Safeguard and Transport Sample	Be prepared to conduct immediate action in the event of package breach.	Ensure IPE is on-hand during movement. Maintain sample at 1-4°C. Seal and repackage if required.	Conduct decontamination of package if required.	Report package breach if required.
Transfer Sample	Transfer sample package using appropriate chain of custody forms and procedures.	N/A	N/A	N/A

4. Applying the Biological Detection Capabilities

a. The actual “on-the-ground” biological surveillance requirements for an operation will be METT-TC-dependent. The planning process described in Chapter III provides an understanding of how to determine resource requirements for biological surveillance operations. The operational-level commander’s subordinate commanders may have available surveillance capabilities. The operational-level commander task-organizes and synchronizes the use of all available capabilities to meet mission requirements.

b. A commander must be aware of all resources available (See Appendix C) that can provide him with a robust and integrated biological detection plan of action. Not only must he know what his organic capabilities are, but also he must be aware of other HN assets that might be available.

c. The commander integrates the use of all available assets to include combat service support (CSS) (i.e., CLS - See Appendix D) to meet FP requirements. The commander integrates the use of maritime and land force biological surveillance assets.

(1) The maritime component provides surveillance support from the seaward side with ship-based IBADS, JBPDS, and/or DFUs. Additionally, the land force commander uses USA biological detection assets to provide critical node support at the APOD.

(2) The JFC NBCCC receives and integrates the input from both sources to maintain the required SA and uses the information to support required decisions.

Chapter III

BIOLOGICAL SURVEILLANCE PLANNING

1. Background

Biological surveillance planning supports the commander's CONOPS. The commander's clear, concise statement of where, when, and how he intends to concentrate combat power to accomplish the mission uses biological surveillance to maintain required SA. The commander's concept broadly outlines considerations necessary for developing viable biological surveillance.

Biological surveillance is conducted across the spectrum of military operations from peacetime to war. The nature of the threat and the technical complexity of conducting and maintaining an adequate detection, identification, and warning against a biological attack necessitates BW defense preparedness as well as facilitating appropriate and prompt medical actions. Biological detection planning occurs at all levels of operations from the strategic to the tactical levels and across the spectrum of military operations. Planning for biological detection provides the opportunity for leaders to limit an enemy's impact on operations using BW agents.

2. Integrated Biological Surveillance Operations

Biological detection resources are integrated into the command's intelligence, surveillance, and reconnaissance (ISR) plan. Biological detection assets are employed based on an assessment of the threat force's capability to use BW agents, and the commander will prioritize use of available assets and establish a plan that integrates use of all available capabilities. The combatant commander's biological surveillance plan integrates the use of land force, fixed site, and maritime assets. See Appendix E for detailed information on systems employment planning guidance.

a. Land force biological detection assets are employed in arrays designed to optimize the probability of detection consistent with security requirements. Assets will be located based on METT-TC considerations and size of the critical asset to be protected. The biological detection assets will ideally be placed upwind of the target area to detect a biological agent cloud that has been disseminated primarily as a point or line source from a ground or aerial platform.

b. Fixed-site biological detection assets are placed on or upwind of a site to provide BW detection. Fixed-site biological detection operations focus on a specific target such as a port, APOD, or SPOD. Biological detection assets are placed anywhere upwind or within the site to confirm or deny the presence of a biological agent. (Note: Detectors may have to be moved throughout the year as there are seasonal wind patterns that would change the physical location of "upwind of a site.") A METT-TC analysis will determine the number of systems required as point detectors for critical target areas such as logistics bases or major airfields/ABs, naval bases, or ports. In joint operations (i.e., the protection of critical port

facilities) biological detection systems can also be placed on ships for improved operational dispersion. Detectors and collection devices can also be placed inside critical facilities to monitor for BW agents.

c. Maritime assets use biological protection assets to support increased FP. Biological detectors are used to support monitoring operations while underway, in port, or when operating close to landmasses.

3. Tactical, Operational, and Strategic Planning

Tactical, operational, and strategic planning are interrelated. The actions taken at the tactical level have implications at the operational and strategic levels of war. For example, the biological agent liquid sample collected at the tactical level could be evacuated to the field confirmatory lab (operational level of war asset), and/or the definitive lab (strategic level of war asset) respectively.

a. Tactical. The tactical planning for biological surveillance focuses on ensuring that biological detection and collection operational requirements are met. The specific planning factors that are considered include ensuring that—

- Biological detection requirements are resourced (i.e., operators are trained and tasked to operate biological detection systems).
- Sample collection techniques and procedures are rehearsed and understood.
- The nuclear, biological, and chemical warning and reporting system (NBCWRS) is established and provides required reports to higher and adjacent commands (see Appendix F).
- The sample evacuation process is rehearsed and understood.
- Biological detection resources are integrated into FP plans.

b. Operational. Operational planning focuses on biological detection, identification, and warning capabilities to support air, maritime, and ground operations. IPB evaluates the adversary's capabilities and assesses what biological surveillance and detection assets may be required to mitigate identified vulnerabilities or capabilities. For example, adjustment of the time-phased force and deployment list (TPFDL) may be needed to add TEUs, AML capabilities, and biological detection units such as BIDS or LRBSDS (see Appendix H).

c. Strategic. Strategic planning prioritizes and provides required assets (i.e., biological detection units, supporting labs, and detection equipment) to support missions within the CONUS and outside the continental United States (OCONUS). Applicable strategic-level intelligence information is also furnished to provide timely and effective IPB.

- Priority intelligence requirements (PIRs) to the commander.
- Named areas of interest (NAIs) for biological surveillance operations.

- Biological detection unit taskings for the R&S plan.

4. Planning Process

The commander implements the concept of operations (see Chapter I) for biological surveillance through planning and implementing risk-reduction measures. The command and staff use their SA (i.e., battlespace visualization) to identify the risk-reduction measures that will be implemented in supporting OPLANs/OPORDs. A method that can be used to examine, assess, and implement the risk-reduction measures includes (see Table III-1):

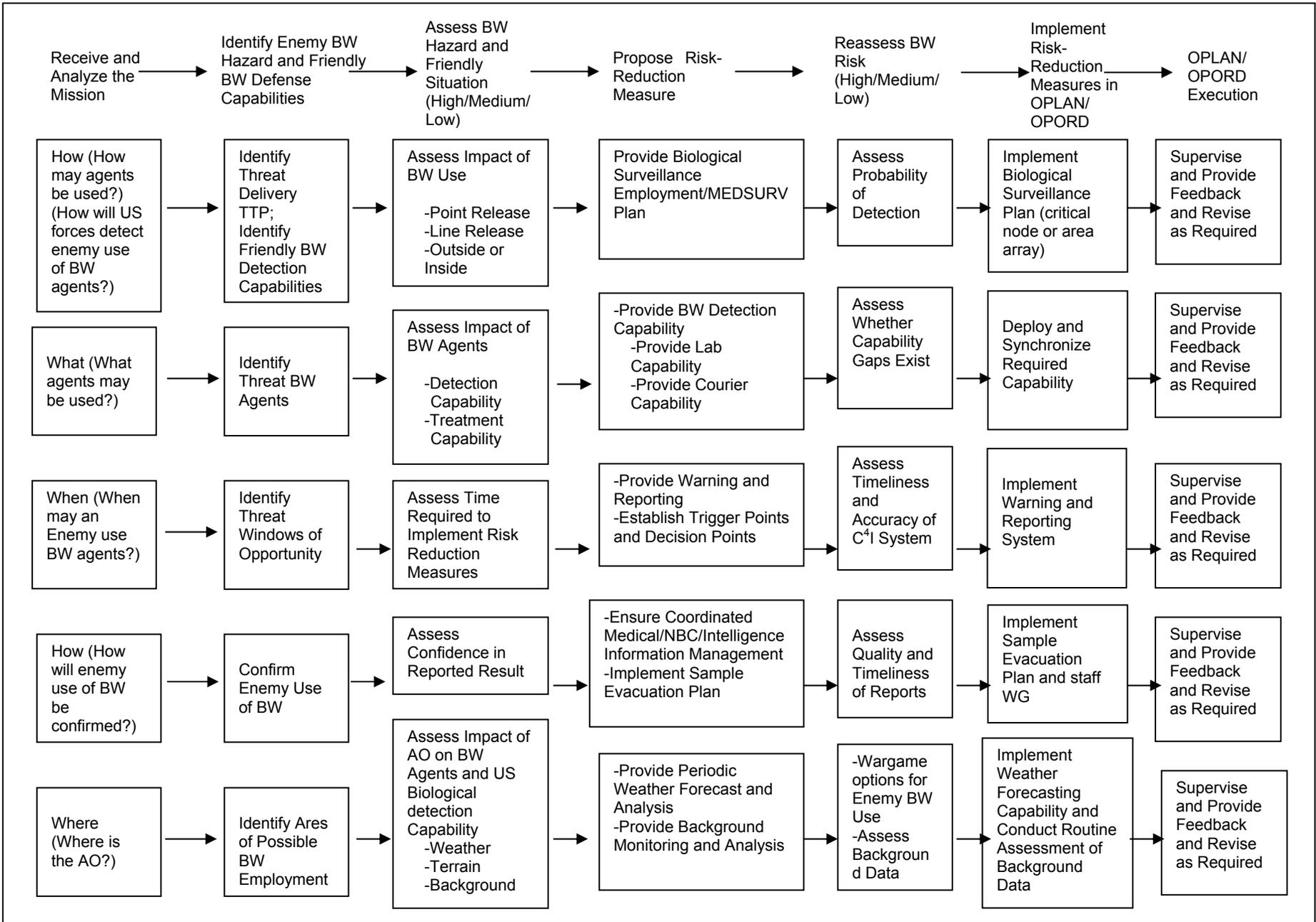
- Receiving and analyzing the mission.
- Identifying the enemy BW hazard and friendly BW defense capabilities.
- Assessing BW hazard and the impact on the friendly situation.
- Proposing risk reduction measures.
- Reassessing the BW risk.
- Implementing the risk reduction in an OPORD/OPLAN.
- Supervising, providing feedback, and making revisions as required.

As a continuous process, this is an iterative method. The different factors interrelate (i.e., the linkage between biological detection system presumptive and laboratory field confirmatory identification), support a time sensitive process, and focus on maximizing the probability of detection.

Preparation of a biological surveillance plan entails completing mission analysis, assessing COAs, preparing staff estimates, and subsequently developing the OPLAN/OPORD or annex. Critical operations considerations must be assessed during the decision-making process, and Table III-1 (page III-4) outlines many of those operational implications that must be considered and used during the planning process.

The operational-level commander develops an OPLAN/OPORD as a directive for issue to supporting or subordinate units that have biological surveillance responsibilities. There are key data elements (see Table III-2 [page III-5]) in the command's OPORD that the supporting or subordinate unit uses to prepare OPORDs or fragmentary orders (FRAGORDs) to support the higher supported commander's intent. Table III-2 (page III-5) outlines in three columns the key sections of an OPORD (i.e., situation, mission, execution, service support, and command and signal), key factors that are associated with each section, and operational implications that are associated with each OPLAN/OPORD development.

Table III-1. Identifying Risk-Reduction Measures



a. Situation. This paragraph of the biological surveillance plan is used to provide the enemy's most likely and most dangerous COAs. It provides the mission, commander's intent, and CONOPS for HQ one and two levels up, flank units, and other unit actions that can have significant effects on the unit's biological surveillance operations. It also lists units that are attached or detached to the HQ that issues the order.

Table III-2. Biological Surveillance Planning

Situation	Factor	Operational Implications
Enemy Forces	<ul style="list-style-type: none"> • Threat List of BW agents. <ul style="list-style-type: none"> • Detector/HHA tailoring. • Depth of array. 	<ul style="list-style-type: none"> • The list of AOR specific threat agents can affect requirements for different types of detectors and the specific immunoassays used on HHA tickets and system specific tickets. Also, the type of threat agents can drive the depth of the array used. It should be noted that all common surveillance reagents may be initially used and all attacks may be surprise attacks.
	<ul style="list-style-type: none"> • Dissemination method. <ul style="list-style-type: none"> • Munitions. • Dispersal systems. • Terrorist-type attack (food/water). • Direct contact with vector or contagious person. 	<ul style="list-style-type: none"> • The type of delivery systems the enemy has available can affect how the biological detector array is positioned (e.g., critical node versus area array).
	<ul style="list-style-type: none"> • Surprise. 	<ul style="list-style-type: none"> • Surprise attacks by the enemy can never be fully planned for. Yet, they can potentially be the most effective. Flexibility, effective C² and a robust detection array are keys to providing full-spectrum biological surveillance operations that can potentially provide coverage against surprise attacks.
	<ul style="list-style-type: none"> • Identify potential biological surveillance assets within the AOR. 	<ul style="list-style-type: none"> • Planning, coordination, and liaison determine what HN or other government organizations and NGOs can provide for support of biological surveillance. The commander and his staff must "think outside the box" about ways they can augment their unit's biological surveillance capabilities.

Table III-2. Biological Surveillance Planning (continued)

Situation	Factor	Operational Implications
Friendly forces	<ul style="list-style-type: none"> Identify biological surveillance assets. 	<ul style="list-style-type: none"> The command and staff analyze the task organization. The review determines what capabilities are available to support biological detection, medical laboratory, and escort operations.
	<ul style="list-style-type: none"> Review for other units or assets that may possess a BW agent detection capability. 	<ul style="list-style-type: none"> The command and staff determine what other military assets are available within the AOR. Some of these assets may include HN and allied military assets.
Attachments and detachments	<ul style="list-style-type: none"> Review task organization for biological surveillance assets, C² units (i.e., chemical brigade), technical escort, TAML. 	<ul style="list-style-type: none"> The established command and/or support relationship must be understood. This will impact factors such as reporting and logistics.
	<ul style="list-style-type: none"> Identify assets available for biological surveillance operations to include medical laboratory support, technical escort assets, and requests for assets to fill shortfalls. 	<ul style="list-style-type: none"> Identify any required capabilities that are not available.

b. **Mission.** The mission statement in the biological surveillance plan is based on the mission analysis.

Table III-2. Biological Surveillance Planning (continued)

Mission	Factor	Operational Implications
	<ul style="list-style-type: none"> Assess mission statement to determine specified and implied tasks; use this information for mission analysis. 	<p>The mission statement contains the five elements associated with every operation—</p> <ul style="list-style-type: none"> Who will execute the biological surveillance operations? What are the essential biological surveillance tasks? When will the biological surveillance operation begin? Where will the biological surveillance operations occur (AO, objectives, grid coordinates)? Why (for what purpose) will the force conduct biological surveillance operations?

c. **Execution.** The execution paragraph of the biological surveillance plan describes how the commander sees the actions of subordinate biological surveillance assets fitting together to accomplish the biological surveillance mission. It states the missions or tasks assigned to each subordinate biological surveillance asset to include any combat and combat support (CS) units that support biological surveillance operations.

Table III-2. Biological Surveillance Planning (continued)

Execution	Factor	Operational Implications
Maneuver	Timeline “race against the clock”	The biological surveillance plan must emphasize time as a critical factor of effective biological surveillance. Biological surveillance data and samples are time-sensitive. The window of opportunity to protect the force through warning and protective measures is very short. Also, samples sent to supporting laboratories for confirmatory identification can deteriorate over time.
	<ul style="list-style-type: none"> • Decision Tree high/medium/low threat 	A decision tree can be established identifying the types of decisions that need to be made at different levels of threat. These decision trees should never provide rubber-stamp actions for each threat level. They should instead identify when a decision is needed and possibly a tentative set of options that have been developed during the wargaming process.
	<ul style="list-style-type: none"> • Risk <ul style="list-style-type: none"> • Plan ahead • Redundant/risk • FP depth 	<ul style="list-style-type: none"> • The amount of risk the command is willing to assume will impact the monitoring methodology (i.e., all systems operational, sampling interval).
	<ul style="list-style-type: none"> • Confidence in results <ul style="list-style-type: none"> • Laboratory • Detector 	<ul style="list-style-type: none"> • The confidence of a detection of a biological attack is affected by the means by which it has been detected. • Detection by one biological detector has a lower confidence (medium confidence) level than if two biological detectors had made the detection (high confidence). • Confirmatory identification from a supporting laboratory confirms and bolsters medium-confidence detections and further reinforces high-confidence detections. • Confidence in a biological detection will affect how a commander and his staff implement mitigation measures.

Table III-2. Biological Surveillance Planning (Continued)

Execution	Factor	Operational Implications
<p style="text-align: center;">Maneuver (continued)</p>	<ul style="list-style-type: none"> • Post attack <ul style="list-style-type: none"> • Mitigate • Sampling/detector operations 	<ul style="list-style-type: none"> • After an attack has been identified (through presumptive and confirmatory identification) the unit must affect mitigation measures. These measures may come in the form of prophylaxis, heightened protective postures, and warning and reporting. • Post attack sampling and detector operations must be addressed. (e.g., increase or decreased sampling)
	<ul style="list-style-type: none"> • Controlling HQ Command and Staff <ul style="list-style-type: none"> • Receive • Analyze • Recommend • Decide • Disseminate • C² 	<p>The HQ command and staff that control the biological surveillance operations have the responsibility to—</p> <ul style="list-style-type: none"> • Be the central node for receipt of any information that may have impact on biological surveillance operations. This includes actual detection data, intelligence, MET, and medical information. • Analyze and synthesize all pertinent biological surveillance related information into reliable action sets. • Recommend COAs in response to biological attacks. • Decide on a COA in response to a biological attack. • Disseminate information and guidance about COAs in response to a biological attack. • Provide C² of operations conducted in response to a biological attack.

Table III-2. Biological Surveillance Planning (continued)

Execution	Factor	Operational Implications
<p>Maneuver (continued)</p>	<ul style="list-style-type: none"> • Pre-Plan <ul style="list-style-type: none"> • What • When • Value • Cost 	<ul style="list-style-type: none"> • The importance of preplanning cannot be overestimated. An effective and well-thought-out plan will save lives. • The cost and value of the employment of biological surveillance assets must always be considered. The costs of an effective biological surveillance program are weighed against the catastrophic effects of a successful biological attack.
	<ul style="list-style-type: none"> • Operational Implication 	<ul style="list-style-type: none"> • The plan should include the operational impact of biological surveillance on the force. It provides a clear and concise direct relation between benefits/losses and effective/ineffective biological surveillance operations.
<p>ISR</p>	<ul style="list-style-type: none"> • Point Detection 	<ul style="list-style-type: none"> • Critical nodes to be protected should be provided.
	<ul style="list-style-type: none"> • Standoff (LRBSDS) Detection 	<ul style="list-style-type: none"> • Guidance on the use of standoff detectors (when available) should be provided.
	<ul style="list-style-type: none"> • Minimum protocols • Sampling intervals • Consistency/standardization • Logistically supportable 	<ul style="list-style-type: none"> • Provide standard protocols to be used during biological surveillance operations. These protocols should provide minimum expected standards of conducting biological surveillance such as minimum sampling intervals, spacing between detectors, packaging of samples, time to execute sample evacuation, etc. • Any standard set should be logistically supportable. For example, if the DFUs are set with sampling intervals of 24 hours a day at 6 hour intervals then each DFU will be using as a minimum 4 HHAs a day. The rate of use of consumable (in this case HHAs) will need to be considered when establishing these standards.

Table III-2. Biological Surveillance Planning (continued)

Execution	Factor	Operational Implications
<p style="text-align: center;">ISR (continued)</p>	<ul style="list-style-type: none"> • Employment Plan <ul style="list-style-type: none"> • Where to assign assets • Spacing <ul style="list-style-type: none"> - Lateral - Depth • Number of assets <ul style="list-style-type: none"> - Prioritize - Allocate 	<ul style="list-style-type: none"> • To support the higher command's OPLAN, the unit prepares its monitoring plan to indicate how biological detectors will be employed. • Fixed Site (critical node). To support fixed site requirements, the commander will likely allocate JPS, DFU, or JBPDS (trailer/man-portable) assets (see Chapter II). • Maneuver force (area array). To support maneuver force requirements, the commander will likely allocate JSLNBCRS or BIDS assets (see Chapter II). • This monitoring plan should assign assets to specific critical nodes or into area arrays. • Spacing guidance should be provided not only for the distance between detectors laterally but also in depth. • Guidance also should be provided on what the priority of effort is and how the command will allocate biological surveillance assets to provide coverage in that priority.
	<ul style="list-style-type: none"> • Fixed sites, ports, and airfields • Maneuver land forces or maritime forces 	<ul style="list-style-type: none"> • Provide a scheme of maneuver that addresses how biological detection assets will best provide coverage against the threat. • As part of the process array, placement with regard to NAI location is critical for successful probability of detection. The array type used is affected by the size of the area of operations, and mission duration is impacted by factors such as weather.
<p style="text-align: center;">Air and missile defense</p>	<ul style="list-style-type: none"> • Air Defense warning 	<ul style="list-style-type: none"> • Other systems within the battlespace can impact on how biological surveillance occurs. The air and missile defense warning system can affect how biological surveillance is conducted. For example, upon warning of a missile attack, biological surveillance assets may be directed to switch from periodic to continuous monitoring.

Table III-2. Biological Surveillance Planning (continued)

Execution	Factor	Operational Implications
Information operations	<ul style="list-style-type: none"> • OPSEC/HHA Agent Codes 	<ul style="list-style-type: none"> • Codes have been assigned to the various immunoassay tickets to identify the agents they are capable of identifying. These codes are sensitive in nature and are classified SECRET. • The classification of these codes helps to maintain control of how a force reacts to a biological attack. The HQ that controls the biological detection assets maintains the codes and thus controls the release of detection data.
	<ul style="list-style-type: none"> • Automated DSTs 	<ul style="list-style-type: none"> • There are automated DSTs which can assist the commander and his staff in determining the impact of a biological attack. These DSTs can provide estimates of how far downwind the biological cloud will travel as well as an estimated “footprint” of the biological attack. • Selected DSTs also have the ability to transmit this data to subordinate, higher, and adjacent units.
Tasks to other CS units	<ul style="list-style-type: none"> • Determine the tasks for biological surveillance assets and priorities of effort 	<ul style="list-style-type: none"> • Specific tasks should be provided to biological surveillance assets to include supporting units. These tasks could include specific locations to conduct detection operations, tasks to technical escort assets for where to set up STPs, tasks to medical assets on storage and location of prophylaxis (e.g., forward positioning of antibiotics).

Table III-2. Biological Surveillance Planning (continued)

Execution	Factor	Operational Implications
CCIRs	<ul style="list-style-type: none"> Identify locations in space and time for NAIs/PIR 	<ul style="list-style-type: none"> Priority and critical IRs provide a focus for making the decisions on where to position biological detection assets.
Risk-reduction control measures	<ul style="list-style-type: none"> VA outputs 	<ul style="list-style-type: none"> During the planning process, the staff planner must conduct a biological vulnerability assessment of the organization. The results of this vulnerability assessment are a set of vulnerability reduction measures meant to lessen the risk and impact of a biological attack. The vulnerability assessment can influence how and where biological surveillance assets are deployed.
Environmental considerations	<ul style="list-style-type: none"> MET Data 	<ul style="list-style-type: none"> There are various sources of MET data. The staff MET officer must be consulted to determine which of these source(s) are appropriate for use with any dispersion predictions (see also Chapter V). Once identified, these sources should also be disseminated to biological detection assets.
	<ul style="list-style-type: none"> Effect on detection 	<ul style="list-style-type: none"> The background environmental conditions can also have various effects on biological detection operations. (e.g., an area with a high pollen count may cause false alerts in some field detectors). Harsh weather can cause difficulties in conducting biological surveillance operations. Sand storms, freezing rain, snow, ice, heat, and high humidity can affect air monitoring, sampling, and sample transport.

Table III-2. Biological Surveillance Planning (continued)

Execution	Factor	Operational Implications
Environmental considerations (continued)	<ul style="list-style-type: none"> • Terrain <ul style="list-style-type: none"> • Detector locations • Field Behavior • Borders <ul style="list-style-type: none"> - Samples - Resupply 	<ul style="list-style-type: none"> • Terrain will also affect how and where detectors should be placed. Terrain can create both direct and indirect effects on biological agent dispersion and downwind travel. • International borders can affect how suspected biological samples are transported. They may also affect resupply operations for biological assets.
	<ul style="list-style-type: none"> • Background 	<ul style="list-style-type: none"> • Assess impact of background environmental conditions on detection capabilities (e.g., background conditions will vary by season, and time of day). • Determine whether background levels may require use of alternate procedures for biological detectors (i.e., Release may not register due to high background and relatively low concentrations or highly variable background).
FP	<ul style="list-style-type: none"> • FPCON 	<ul style="list-style-type: none"> • FPCONs are other tools that influence biological surveillance operations. The higher the FPCON, the higher the threat. The planner can directly correlate his biological detection modes of operations (continuous versus periodic) as well as sampling intervals to current FPCONs levels.
	<ul style="list-style-type: none"> • FP 	<ul style="list-style-type: none"> • Biological surveillance and detection can be an integral part of force protection operations. Biological surveillance provides the tools required to protect the force from a biological attack.

Table III-2. Biological Surveillance Planning (continued)

Execution	Factor	Operational Implications
FP (continued)	<ul style="list-style-type: none"> Survivability 	<ul style="list-style-type: none"> Inversely, the planner must ensure biological surveillance assets are provided the tools and ability to effectively survive. Biological surveillance assets are unique within the battlespace. Their capabilities cannot be easily duplicated or reproduced. Thus, survivability is of key importance when planning biological surveillance.
Any additional coordinating instructions	<ul style="list-style-type: none"> Sample evacuation architecture 	<ul style="list-style-type: none"> Sample evacuation is a key element of biological surveillance. It must be thoroughly planned and executed to be successful. Key components of this plan include: escort elements, routes, communications, control, and visibility, and designated laboratory facilities.
	<ul style="list-style-type: none"> TPFDL 	<ul style="list-style-type: none"> A high priority should be given to the planning of the flow of biological surveillance assets into the AOR. As a build-up of forces occurs so must the network of biological surveillance assets to conduct health-risk assessment and FP. This “network” of biological surveillance assets not only includes biological detectors and samplers, but also the mechanisms needed to affect biological surveillance (e.g., escort, labs, CLS).

d. Service Support. This paragraph of the biological surveillance plan clarifies the concepts of support, materiel and services, medical support, and personnel support.

Table III-2. Biological Surveillance Planning (continued)

Service Support	Factor	Operational Implications
Support concept	<ul style="list-style-type: none"> • HNS 	<ul style="list-style-type: none"> • HNS must be considered when planning biological surveillance operations. The HN can provide invaluable assistance in characterizing the AOR (developing baseline biological background data). It could possibly provide valuable laboratory support as well as hospital access for mass-casualty events.
	<ul style="list-style-type: none"> • CLS 	<ul style="list-style-type: none"> • The service support section of the OPLAN/OPORD should indicate key information that includes— <ul style="list-style-type: none"> • Time of arrival for CLS. • CLS operating locations. • CLS support concept. • Life support concept for CLS (i.e., who provides CSS support?). • Any restrictions on use of CLS within the AOR. • Retrograde instructions for CLS line replacement units or supplies.

Table III-2. Biological Surveillance Planning (continued)

Service Support	Factor	Operational Implications
Support concept (continued)	<ul style="list-style-type: none"> Standard Military Support 	<ul style="list-style-type: none"> Wherever possible, the use of standard military support is encouraged. Many biological surveillance assets use unique items not normally found using standard military logistics channels. Many such systems are supported by CLS. The planner must be aware that even though a biological detection asset may have CLS available for its unique supply and maintenance requirements, they also require standard military support for all classes of supply as well as maintenance on common service items.
Transportation	<ul style="list-style-type: none"> Transport for BW surveillance assets 	<ul style="list-style-type: none"> Transportation for biological assets must be planned well enough in advance as to not hinder operations.
	<ul style="list-style-type: none"> Transport of sample 	<ul style="list-style-type: none"> Transportation of samples occurs <ul style="list-style-type: none"> From the detection site to the STP or directly to the supporting theater laboratory. From an STP to a supporting theater laboratory or back to CONUS. From a supporting theater laboratory back to CONUS. The plan must address what assets will be required to make the transport happen. Time plays a critical factor in transporting samples. Samples can be perishable and will lose their efficacy over time. Also, the longer it takes to accurately identify the biological agent, the more casualties should be expected.

Table III-2. Biological Surveillance Planning (continued)

Service Support	Factor	Operational Implications
Transportation (continued)	<ul style="list-style-type: none"> • Transport of CLS 	<ul style="list-style-type: none"> • Movement of biological surveillance assets may be complicated by the requirement for their maintenance and support sections (often times CLS) to move parts and personnel within the AOR and back to CONUS.
Materiel services	<ul style="list-style-type: none"> • QM/Assurance and Quality Checks • Tracking sample information • Coordination • CSS Shelf Life • PMCS • Safety 	<ul style="list-style-type: none"> • The effectiveness of biological surveillance operations greatly rests on how QA and checks are accomplished. • Establishing a chain of custody from the theaters of operation sample takers to the sample evaluators and to the ultimate archives requires a comprehensive understanding of the end-to-end sample flow, including all intermediate custodians and their ability to execute their portion of the chain without compromising any sample's integrity. • QA/QC must be maintained in the tracking of sensitive limited shelf-life items such as HHAs. • The quality of maintenance and storage of certain items affects the quality and effectiveness of biological surveillance operations. • Safety must be addressed during all aspects of biological surveillance. The collection of potentially dangerous BW agents, the transport of these agents, and the analysis of these agents must always be conducted with the utmost care. Deliberate planning and precise execution of plans developed should provide the framework for safe and effective operations.

Table III-2. Biological Surveillance Planning (continued)

Service Support	Factor	Operational Implications
Materiel services (continued)	<ul style="list-style-type: none"> • Cost of consumables 	<ul style="list-style-type: none"> • The cost of consumables must always be deliberately planned. Heightened threat levels will cause a higher rate of consumption of resources. For example, sampling intervals during these higher threat levels can impact on national/wholesale supply systems.
Medical evacuation and hospitalization	<ul style="list-style-type: none"> • Lab support 	<ul style="list-style-type: none"> • Laboratory support for biological surveillance must be identified and defined in the plan. Of key importance is understanding the capabilities of the supporting theater laboratories. The planner must understand the number of samples expected to be produced and sent to the lab, the lab's surge capabilities, and the expected turnaround time for confirmatory identification of suspected biological samples. If the supporting lab cannot process the expected volume of samples, an alternate course of action must be quickly developed to ensure timely confirmatory identification. These alternate COAs could include the use of HN labs, request for and augmentation of laboratory capabilities, or prioritization of samples. • Laboratory considerations need to be made for both clinical and environmental samples.
Personnel service support	<ul style="list-style-type: none"> • Assign personnel to operate DFU • Train personnel to operate 	<ul style="list-style-type: none"> • Many biological detectors do not specifically come with dedicated operators. As such, operators must be identified. These operators can be regularly assigned personnel, augmentation personnel, or even contracted personnel. • The planner must ensure personnel identified to operate any biological detectors are properly trained not only on the operation of their systems, but on other tasks such as packaging of samples, reporting, and supply and maintenance procedures.

e. Command and Signal. This paragraph of the biological surveillance plan identifies the chain of command and its location, and provides signal operating instructions (SOI), required reports and formats and times the reports are to be submitted.

Table III-2. Biological Surveillance Planning (continued)

Command and Signal	Factor	Operational Implications
Command	<ul style="list-style-type: none"> • Decision points (who makes decision) <ul style="list-style-type: none"> • Prophylaxis • Protect • Warning 	<ul style="list-style-type: none"> • The plan MUST identify the person that will make decisions concerning prophylaxis, protection, and warning. The plan must be clear and concise, and leave no doubt which level of command will make which specific decisions. When this decision-making is delegated to subordinate commanders, a clear understanding of the process of reporting any changes in prophylaxis, protection, and warning must occur.
Signal	<ul style="list-style-type: none"> • Communications Support Architecture 	<ul style="list-style-type: none"> • The plan must include a communications support architecture. This architecture will include how communications will occur among— <ul style="list-style-type: none"> • The biological surveillance asset • Supporting laboratories • Sample escort assets • C²
	<ul style="list-style-type: none"> • Reachback 	<ul style="list-style-type: none"> • Reachback assets should be provided in the plan, as well as information on how to communicate with reachback asset.
	<ul style="list-style-type: none"> • Reports 	<ul style="list-style-type: none"> • Required biological surveillance reports should be identified, along with instructions on how and when they are to be submitted.

5. Integration

The previous paragraphs describe key elements that must be considered in preparation of a biological surveillance plan.

a. Figure III-1 illustrates the integration of METT-TC considerations in the preparation of a biological surveillance employment plan. The employment planning considers the following factors.

(1) Mission. The JTF NBC staff receives mission guidance to provide maneuver forces and critical fixed site assets with biological surveillance support. The commander's priorities include supporting the first and second brigade and two critical fixed sites (i.e., the JTF HQ and the USAF bare base within the AO) with biological surveillance support.

(2) Enemy. The IPB indicates that the enemy has line and point source delivery capabilities with BW agents (bacterial agents and toxins).

(3) Terrain and Weather. The terrain is relatively flat and dusty (i.e., an arid environment), and the wind speed and direction favor enemy use of agents.

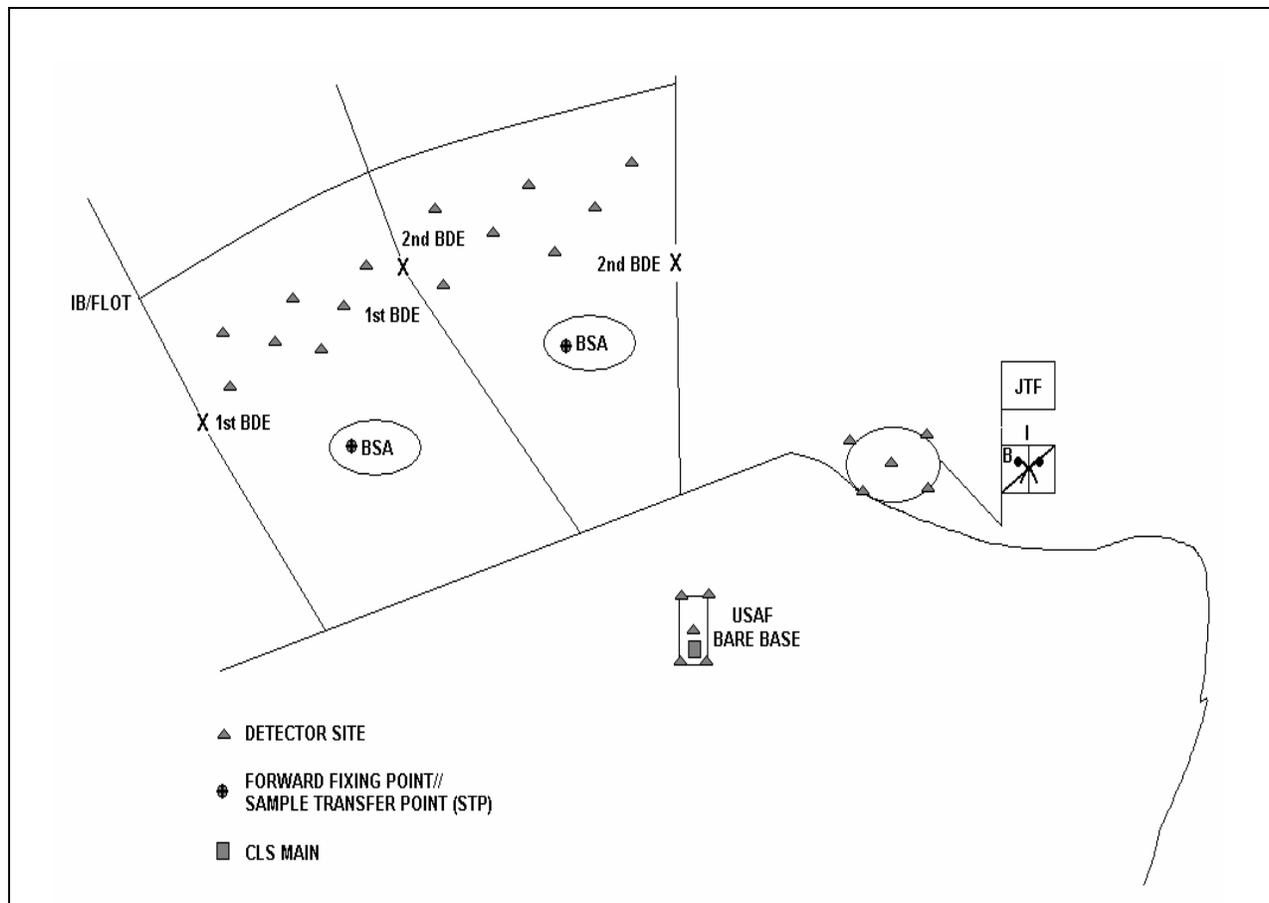
(4) Troops and Support Available. JTF assets include one USA chemical company (biological detection) with two BIDS platoons (7 systems per platoon; 14 systems total), and JPS (i.e., available at the JTF HQ) and JBPDS assets (i.e., available at the USAF bare base).

(5) Time Available. Based on time required for field confirmatory identification, postattack medical prophylaxis is a viable option for protection of US forces.

b. The JTF integrates the biological detection assets into the command's overall reconnaissance and surveillance plan to support the command's maneuver forces and fixed sites.

(1) Maneuver Force Support (area array). Based on an enemy line source capability, USA BIDS platoon assets provide the maneuver force with area array support. The biological detection unit leader applies METT-TC and uses Appendix tools to estimate separation distances between systems and to estimate how far downwind from an estimated release BW agent release point (RP) to place the array. The biological detection unit leader balances the actual siting of the systems with FP guidance. The modified dice-five employment tactic is used in the brigades to provide coverage in depth.

(2) Fixed Site Support (critical node). Based on an enemy point source capability, JPS and JBPDS (man-portable and trailer-mounted) are used in critical node arrays at the JTF HQ and USAF bare base. The planning process applies METT-TC and uses Appendix E tools to provide guidance on estimated separation distances for the systems. A dice-five employment tactic is used at the fixed sites to provide biological surveillance support.



The Setting	Biological Surveillance Plan (Selected Elements)
<p>Location: Southwest Asia environment</p> <p>Resources available: 1 USA Chemical Company (biological detection) (two platoons – 7 BIDS per platoon); CLS; JPS assets support the JTF HQ, and JBPDS (trailer and man portable versions) support the USAF bare base.</p> <p>Mission: Provide biological surveillance support for the JTF.</p> <p>Assessed Threat: Ground and air point or line release of BW agents.</p> <p>Tasks: Provide USA 1st and 2nd Brigades with area array biological surveillance support; provide critical fixed sites (i.e., JTF HQ and USAF bare base) with critical node biological surveillance.</p>	<ul style="list-style-type: none"> • Employment. The friendly COE uses USA BIDS assets to provide area array coverage for USA maneuver forces (1st and 2nd Bde). The COE uses JPS and the JBPDS to provide critical node support. • CLS. CLS Main was established at the USAF bare base with forward fixing point for resupply and exchange of JBPDS line replacement units in the 1st and 2nd Bde BSAs. • Sample evacuation. BIDS support teams evacuated samples to STPs. Escort teams were met at STPs. Escort teams delivered samples to TAML. • Reporting. Centralized reporting is provided from the BIDS platoon HQ to the BIDS company HQ that is collocated with the JTF. The TAML reports results to JTF. Decentralized reporting is conducted at the two critical fixed sites. In turn, the base operations centers report to the JTF HQ. • Weather/background. Background samples are analyzed by TAML.

Figure III-1. Biological Surveillance Operations

Chapter IV

BIOLOGICAL SAMPLE EVACUATION

1. Background

Biological sampling is the process or technique of selecting, packaging, and documenting the collection of biological material. Correct collecting, packaging, handling, and transporting techniques of suspected biological agents are critical elements for accuracy in analysis of environmental samples and clinical specimens. The quality of any analytical evaluation is directly related to the quality of the sample/specimen and the degree of post-collection degradation that occurs prior to testing. HSS personnel collect and submit specimens for suspect biological hazards/agents involving humans and animals. PVNTMED and veterinary personnel collect and submit water, ice samples, food samples (e.g., fruits and vegetables), environmental samples (including soil), and specimens from animals for suspect biological hazards/agents. Specimens and samples collected that are suspected of being exposed or containing a biological agent should be forwarded to the field confirmatory laboratory that is designated by the applicable combatant commander and in turn to the CONUS reference laboratory for definitive identification directed in current OPLANs and operation tasks (OPTASKs). The command surgeon will recommend priorities of effort and what labs should receive samples for confirmatory and/or definitive identification. See Appendix G for detailed information on BW sample evacuation.

2. Sample Evacuation Requirements

There are specific requirements that must occur to effectively evacuate a sample to the appropriate agency. Some of these requirements are as follows:

- Maintain sample integrity through proper packaging, maintaining the sample at 1 to 4 degrees C (33 to 39 degrees Fahrenheit [F]), and ensuring an uninterrupted chain of custody, and a timely exfiltration.
 - Obtain effective transportation and shipment coordination and clearances.
 - Prioritize the process for the transport and analysis of samples.
 - Providing appropriately trained personnel or units to transport samples.
 - Coordinate with appropriate command and staff transportation authorities to help ensure the transport and transfer of a sample is uninterrupted across international borders or to another government agency. The intent is unimpeded and controlled sample flow.
- Evacuate background samples for laboratory analysis for characterization of the background environment within the AO.
 - Maintain sample tracking and visibility.

- Identify sample destination (i.e., theater lab, CONUS laboratory). This action is coordinated by the theater surgeon/medical officer.
- Identifying HN laboratory capabilities in coordination with the CA staff.

3. Supported Unit Sample Evacuation Plan

Detailed planning and coordination are critical in order for sample evacuation to be successful. There are two key levels of command in the sample evacuation and planning process—the supported unit and the biological detection unit. Once planning and coordination have been accomplished, the OPLAN/OPORD provides the who, what, where, when, and why to ensure successful sample evacuation.

a. The planning and coordination process begins at the supported unit. The allocation of time is a critical factor, and the commander must provide guidance to subordinate units as early as possible.

b. The supporting unit should ensure that the following topics are covered in the OPLAN/OPORD. See Appendix G for more detail on sample evacuation planning.

(1) **Assets.** List the required assets needed to execute the sample and specimen evacuation mission. As a minimum, biological detection assets, courier assets, and medical and environmental laboratory assets are required. If medical laboratory support is not available in-theater, samples will require forwarding to alternate locations (i.e., CONUS). Identification of laboratory location and point of contact (POC) is also required.

(2) **Priorities.** The OPLAN/OPORD sample evacuation annex may direct that selected samples (e.g., first reported use of BW in the AOR by presumptive identification) be evacuated to designated STPs within a specific time frame. For example, the area medical laboratory (AML) mission statement indicates that the BIDS sample should be completed within 12 hours of the reported attack. It can take the AML approximately 6 to 8 hours for field confirmatory analysis and days for a definitive analysis. Therefore, it is important that the sample evacuation process be completed as soon as possible.

(3) **Reporting.** The higher HQ should direct any reporting requirements, such as status of number of samples that have been evacuated.

(4) **Coordination.** The annex should indicate specific instructions on topics such as locations for supporting assets such as the sample courier, the supporting medical laboratory, or security elements, and/or provide supporting communications information.

c. The supported unit (higher HQ) should conduct actions to support the overall sample evacuation process (e.g., providing resources, establishing priorities, conducting coordination, and providing and requesting reports); however, the issuing of FRAGORDs to initiate the sample evacuation process will likely occur at the detection unit's command.

4. Biological Detection Asset Sample Evacuation Plan

The biological detection unit's sample evacuation plan should complement the supported unit's sample evacuation plan and describe what will be accomplished, and it should be coordinated with the higher HQ, NBC officer, intelligence officer, the courier element, and supporting AML. The plan should include the following elements:

- a. Designation of primary and alternate STPs for the biological detection asset and TEU or designated unit for linkup. The STPs should be as close as possible to the biological detection asset.
- b. Provision of frequencies for communications between all involved elements in the sample evacuation process. This allows two-way communications (as required) between detection asset, technical escort, and the laboratory.
- c. Designation of what unit (if any) has been tasked to provide security for support teams/technical escort.
- d. Designation of primary and alternate evacuation routes.
- e. Designation of STP reporting requirements. The sample transfer teams should notify their controlling HQ with information such as STP arrival and departure times and/or time sample transferred to technical escort.
- f. Notification of sample confirmatory or definitive identification from the supporting laboratory, which will be reported to the theater surgeon/medical officer who will recommend to the commander the subsequent dissemination of that information. The supported commander will determine the distribution of the results within the AO.
- g. Coordination with the supporting unit and the tasked sample courier unit to ensure that all sample numbers, supporting documentation, and sample preparation is correct to ensure a viable sample is delivered to the supporting medical laboratory.

5. Biological Detection Asset Sample Evacuation Planning and Operational Considerations

- a. The unit or command with biological detection assets must publish an OPLAN/OPORD before any operation. The commander or leader ensures that the unit's OPLAN/OPORD reflects the higher commander's intent.
- b. The biological detection asset plays a critical role in the sample evacuation process. The biological detection asset must come up with a sample evacuation plan and ensure that the assumptions discussed below are taken into consideration.
 - (1) Higher HQ, on an exception basis, may individually manage sample evacuation (i.e., first reported BW event in the combatant commander's AOR).
 - (2) Samples that support presumptive identification should be evacuated.
 - (3) Sample evacuation should occur as soon as possible, operational situation permitting.

(4) Unless otherwise directed, direct coordination should be conducted between technical escort, the theater medical/environmental laboratories, and biological detection assets.

(5) Sample evacuation will be a time-sensitive process due to multiple factors: legal implications, verification of first use, and agent viability.

(6) Priorities should be established for sample evacuation based on factors associated with BW event tracking.

6. Sample Evacuation Execution

a. In preparing for execution of sample evacuation, the commander prioritizes the samples that should be evacuated. The commander considers the following when determining priority of samples.

- What is the time sensitivity for a specific sample evacuation package?
- Where was the sample collected (i.e., the proximity of transportation or courier assets for sample transport)?
- What is the role of the sample in the overall process of the operation (i.e., is it being used to support “detect to treat” or “verification of agent or release decisions”)?
- How many resources (i.e., consumables) are needed to support analysis and testing?

b. All samples will be evacuated to confirmatory laboratories for analysis. Laboratories will prioritize sample analysis based on critical background information (i.e., time sensitivity and role of the sample). The laboratory commander will determine the numbers and types of samples to be analyzed.

c. Sample evacuation execution relies on an effective means to evacuate the sample. TEU assets may be available; however, if TEU assets are not available, other courier personnel can be trained to perform escort responsibilities.

d. Sample evacuation packages from biological detection units require field confirmatory identification support. The applicable service component or special operations forces (SOF) element prepares the sample and an escort element transports the sample. The supporting medical/environmental laboratory destination for field confirmatory testing could range from sending the package to a ship-based laboratory (see Figure IV-1), an AF laboratory, or to an AML.

e. Personnel packaging, transporting, and storing samples must ensure the integrity of the sample from the time it is first taken until it is delivered to the supporting laboratory. The temperature at which the sample is stored and transported is crucial to its viability. Samples should be transported and stored at 1 to 4 degrees C (33 to 39.2 degrees F). The sample courier should be able to periodically check the temperature maintained within the sample transfer case (STC) to ensure continued sample viability.

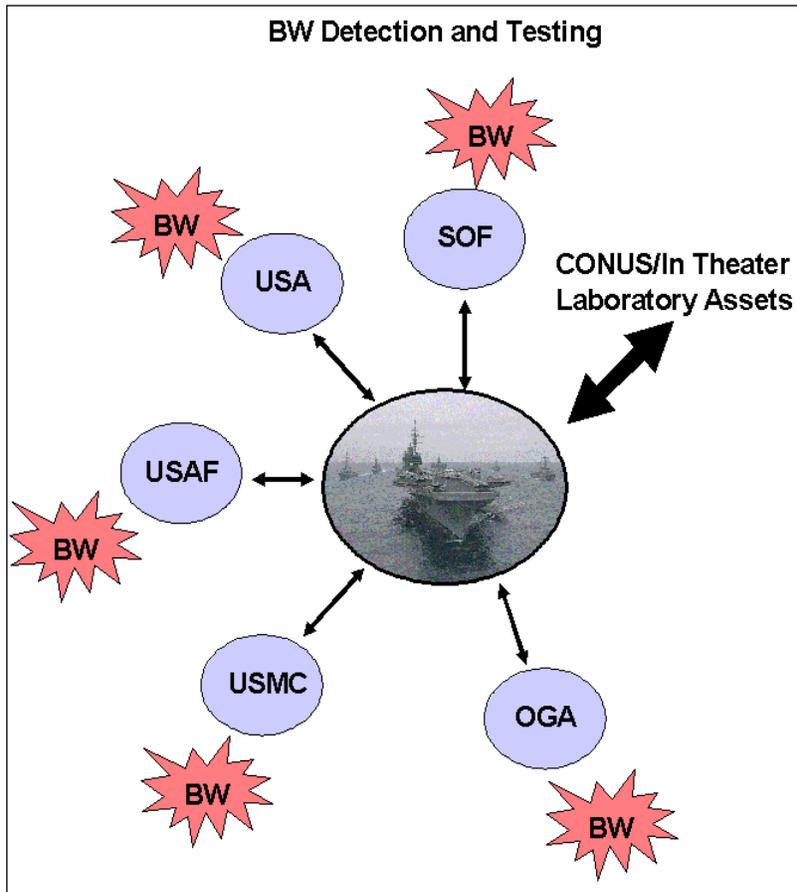


Figure IV-1.

Confirmatory Laboratory Support from USN Capability

Field

f. Samples can also be evacuated to CONUS definitive laboratories for further analysis. The decision to return a sample to CONUS will be made by the confirmatory laboratory, theater medical officer, theater commander, or CONUS higher commands. Figure IV-2 (page IV-6) provides a depiction of sample flow from sample collection to CONUS definitive laboratory analysis and reporting.

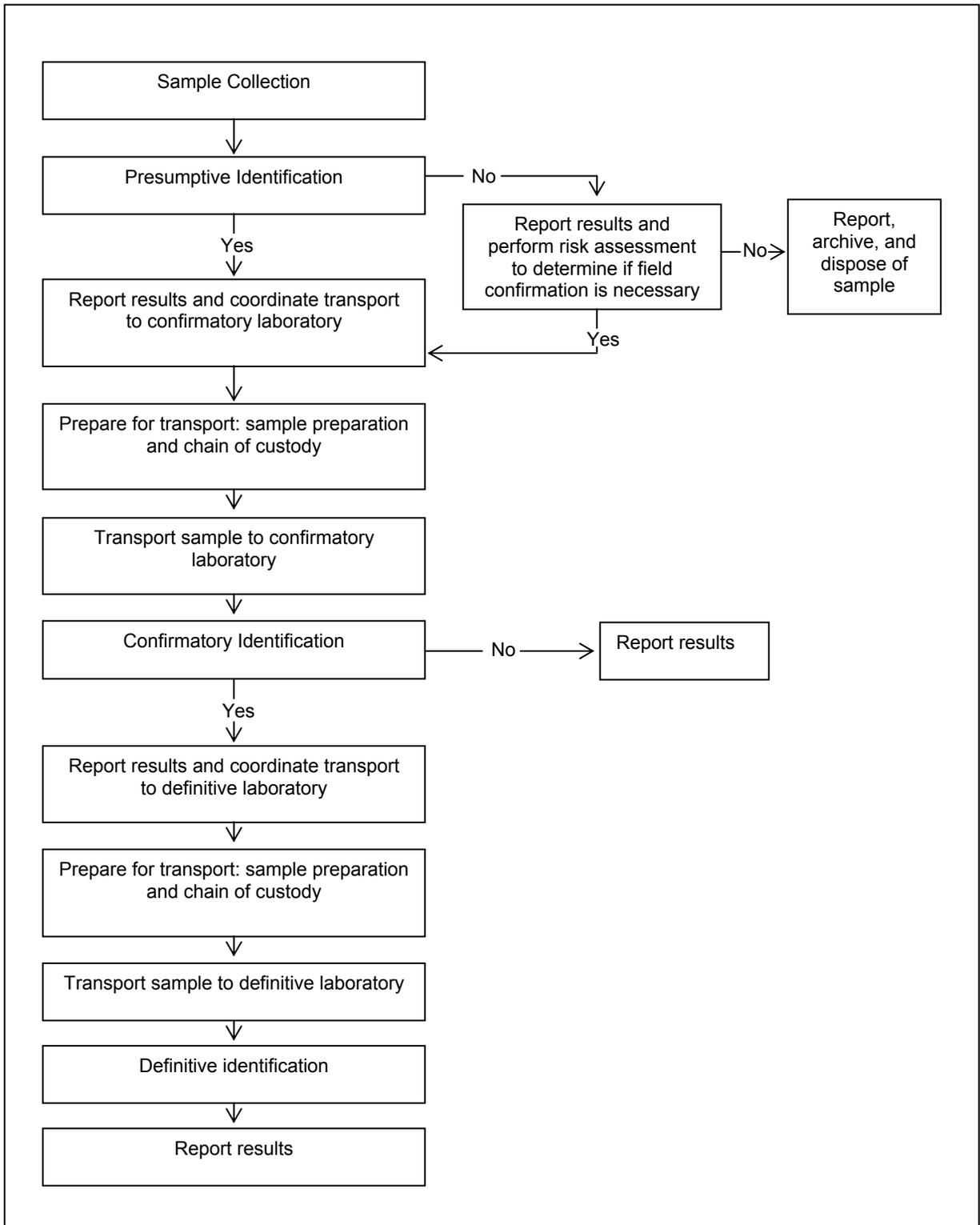


Figure IV-2. Sample Collection Flow

7. Chain of Custody

a. A strict chain of custody must be maintained for every sample/specimen collected. The chain of custody document must accompany the sample/specimen during transport from the point of collection to the receiving medical laboratory to the final disposition of the sample. Each time the sample/specimen is transferred to another individual, the receiving person must sign the document to show that he received the sample/specimen and state what happened to the sample/specimen while in his custody. The document will provide the answer to the following questions.

- When was the sample/specimen collected?
- Who has maintained custody of the sample/specimen?
- What has been done with the sample/specimen at each change of custody?

b. The samples or specimens must be appropriately packaged, labeled, and evacuated to the designated medical/environmental laboratory for confirmation of a biological attack. The standard chain of custody for the evacuation could be as follows.

- Sampling unit.
- Sample courier or other command-designated courier personnel.
- In-theater supporting laboratory.
- Designated CONUS laboratory.

Chapter V

INFORMATION MANAGEMENT

1. Background

The collection, analysis, and integration of biological surveillance and MEDSURV information support identifying the agent that was used provide indication of the AO that was exposed and aid medical assets in determining the proper treatment. This information management integration process will likely occur at operational-level HQ (i.e., JTF, component command) and/or at fixed site, port, or airfield operations centers (OPCENs). The objectives of timely BW information management focus on early warning and the saving of lives. These objectives support SA, reducing the decision cycle, and decreasing the detection time. The time gained by decreasing detection time can support earlier initiation of medical intervention measures and thereby save lives.

2. Information Management

Commanders require accurate and timely information as they prepare for operations in a biological threat environment.

a. The NBC staff will monitor and track biological surveillance information and the command surgeon will monitor and track medical surveillance data. Ongoing coordination between the NBC and medical staff and the intelligence section support decisions that rely on SA and an understanding of the significance of the information. The commander and staff apply the information from intelligence, medical, and surveillance systems to support—

- BW event (aerosol tracking).
- Hazard predictions.
- Warning, reporting, and notification.
- Casualty prevention.
- Prophylaxis and treatment plan execution.
- Sample evacuation operations.
- Casualty management.

b. Units obtain relevant data from multiple sources (i.e., sensors, detectors, medical staffs). The applicable report data (i.e., laboratory results, time of detection, BW sensor result from BIDS [See Appendix I], weather data, and location) is processed, extracted, formatted, and forwarded. Commanders and their staff evaluate the information to assess its impact on operations. Risk assessment is part of the decision-making process and may result in directives/orders to help mitigate the impact of the assessed biological hazard. Commanders may direct an integrated series of protective measures (i.e., administration of prophylaxis) to decrease the level of risk (i.e., decrease exposure opportunity) or mitigate

effects of exposure. Because SA is an ongoing process, the plan is revised as updated information is received.

c. HSS personnel establish an exposure record documenting exposure levels and risk assessment information for each affected person.

3. Priority Information Requirements

The commander and staff determine priority information requirements and IRs to support MEDSURV and biological surveillance.

a. The command and staff conduct preplanning to determine critical data requirements. The relevant choices are prioritized as priority IR and a data collection plan is prepared. The overall data collection effort shares common characteristics.

(1) Connectivity from lower-to-higher and higher-to-lower with adjacent and supporting units and state/HN agencies (i.e., communications with supporting medical laboratories and BW sensors).

(2) Ability to forward relevant data to multiple echelons of command simultaneously.

(3) Ability to conduct technical reachback to obtain access to national-level medical, intelligence, operational, logistics, or technical information to provide information for operational assessments. Reachback provides the additional capability to enhance effective use of modeling and simulation to conduct region-specific, expert evaluation of potential biological weapons effects as well as toxic industrial biological (TIB) releases.

(4) Ability to receive, process, and evaluate data. Data received may be incomplete; therefore, it is assessed and evaluated in light of information sources.

(5) Ability to focus data collection on the command's IRs (i.e., has an enemy BW attack occurred?).

b. Multiple risks impact BW defense planning. It is impractical to require units to don individual protective equipment (IPE) for prolonged periods. It is critical to be able to determine if a BW attack has occurred before agent symptoms begin appearing, if possible. Initiating prophylaxis before the onset of symptoms will reduce the number of casualties. Before implementing critical decisions (i.e., treatment), the command and staff assess the confidences in the information that is provided. Figure V-1 provides an approximate average for the percentage of casualties avoided if antibiotics are issued promptly after exposure. The averages are based on the initiation of prophylaxis for traditional BW bacterial agents. For example, casualties may be avoided if antibiotics are administered on the day of exposure.

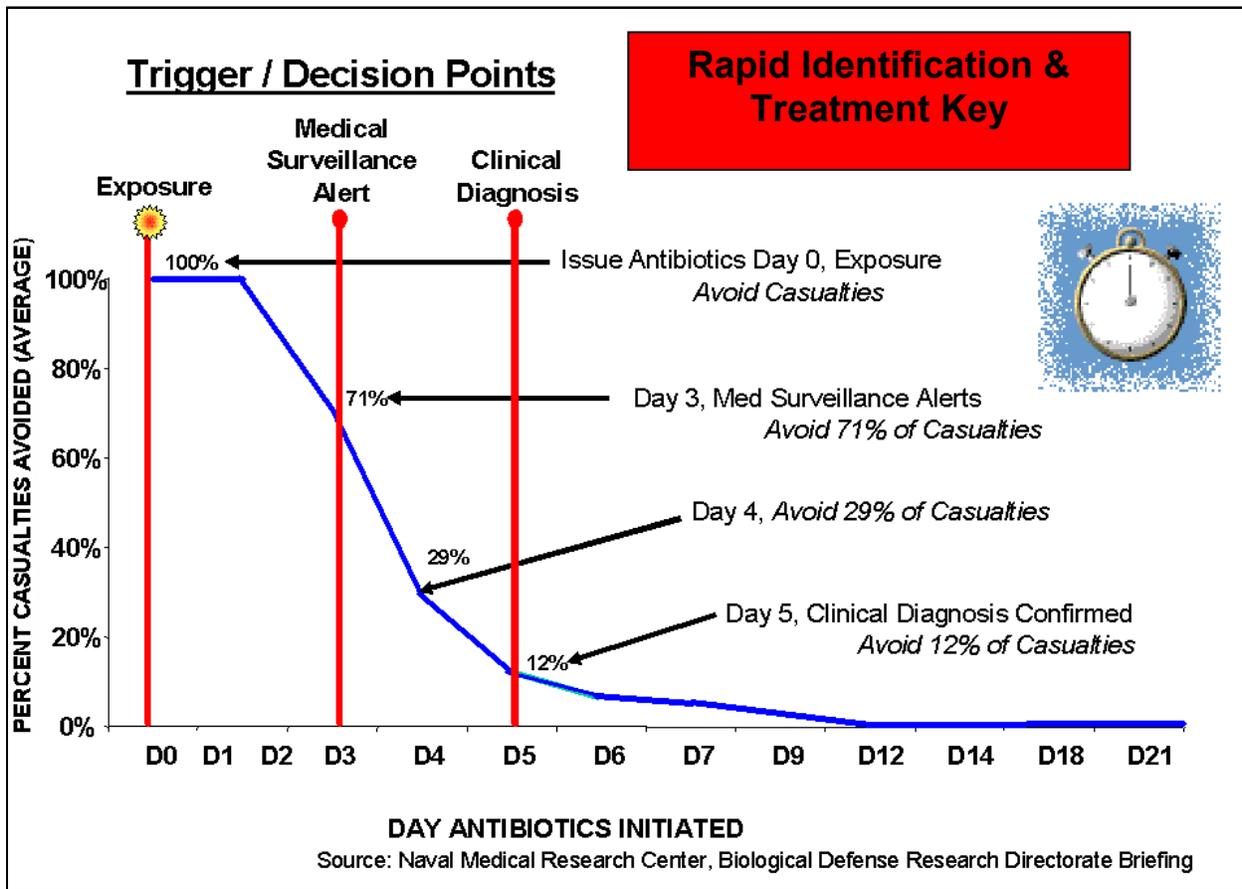


Figure V-1. Maintaining Mission Readiness: “Detect to Treat”

4. Reporting

If properly executed, biological reporting provides commanders time and information (as much as possible) to react to biological events. In turn, commanders direct actions needed to minimize the impact of attacks. Quick and accurate reporting provides the information necessary for command decisions and responses.

a. Reporting is the link between successful battlespace awareness, decision making, and effective operations in a biological contaminated environment. To be useful, biological surveillance report information (i.e., MEDSURV and BW sensor results) must be collected and distributed, entered, and quickly analyzed. Once analyzed, this information is used as battlefield intelligence. During a biological event, the volume of information received by C² elements could become overwhelming and slow information analysis. Programs such as Joint Warning and Reporting Network (JWARN) and the Force XXI Battle Command/Brigade and Below (FBCB²) will help automate the reporting process and organize biological detection data.

b. The maintenance of SA is critical. Timelines of reporting are critical to ensure that time sensitive decisions are made within other critical timelines (i.e., before onset of BW agent symptoms). For example, a biological detection asset (i.e., USA BIDS unit) could be required to support the AF component of a JTF. The USA biological detection element complies with a direct reporting requirement through the AF component. However, the

JTF OPORD requires that the biological detection unit HQ also provide voice/digital reporting to the JTF NBCCC (see Figure V-2). The prompt, accurate reporting of biological surveillance information is critical, and the operational-level commander (i.e., JTF) uses this information to support time sensitive decisions.

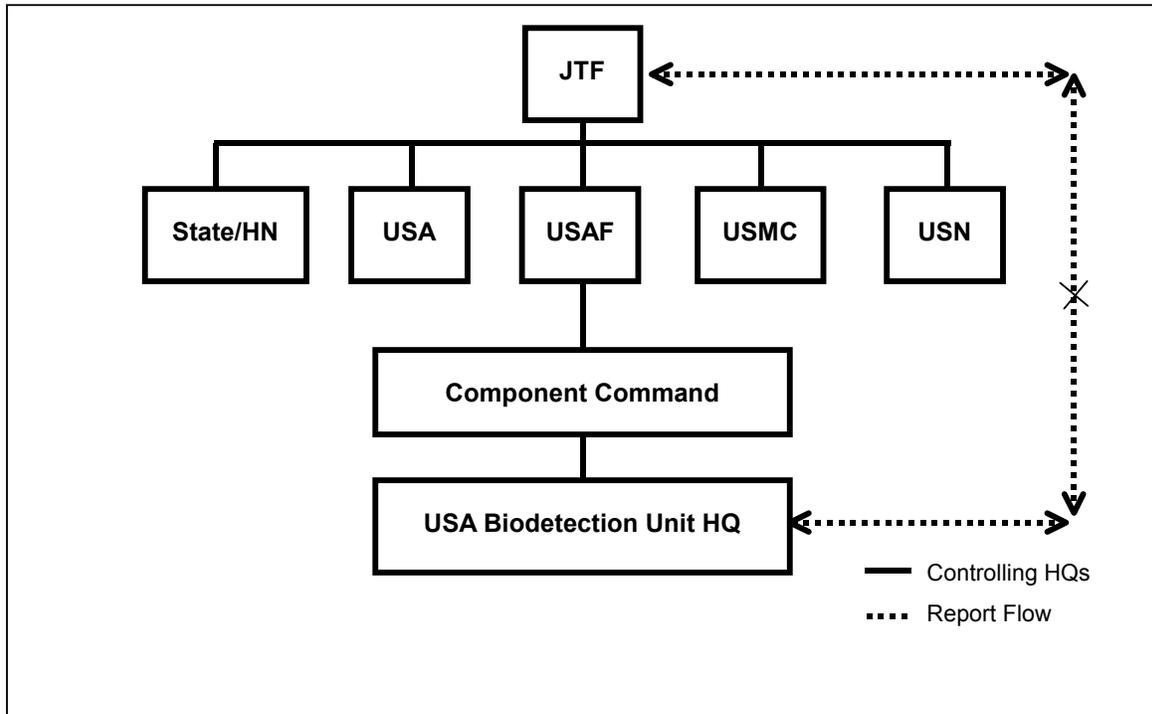


Figure V-2. Possible Biological Detection Network with Centralized Warning

c. NBCCCs receive reports from subordinate NBCCCs and/or supporting biological detection units. Many of the reports will be preformatted NBCWRS reports according to service doctrine manuals such as FM 3-3. For example, an NBC-1 (BIO) report should be reported from a biological surveillance unit HQ, or an NBC-4 (BIO) report for an NBC survey team reporting the results of surface contamination sampling through use of the Department of Defense (DOD) biological sampling kit. The NBCCC also coordinates with the medical and intelligence staff to receive key information from assets such as the medical/environmental laboratories. This information will most likely be in the form of unformatted free text messages. The NBCCC is responsible for:

- (1) Correlating and validating all NBC reports from subordinate commands and reporting activities (i.e., fixed site detection or collection assets, LRBSDS, JSLNBCRS, BIDS units).
- (2) Assigning a temporary strike serial number to all validated attacks. The combatant command (command authority) (COCOM) nuclear, biological, and chemical center (NBCC) assigns the permanent strike serial number.
- (3) Preparing formatted NBC reports and overlays for the Global Command and Control System (GCCS), FFCB², JWARN, and NBCWRS.

(4) Ensuring that subordinate reporting activities use standard reporting formats.

(5) Reporting any issues with regard to interoperability within the reporting network.

5. Information Collection and Operational Level Assessments

Information collection should generally follow a pattern and can be tracked during preattack, attack, and postattack operations (see Table V-1 [page V-6]). The unit or staff may use an integrated information collection tool (i.e., a matrix) to record and assess the input from different sources (see Table V-2 [page V-7]). The biological event-tracking tool can be used to monitor MEDSURV results, preattack data (current BW risk assessment, weather conditions, and impact of background conditions), attack data (alert, detection, and identification), postattack (laboratory results), and remarks data (i.e., local activity).

The tracking of key information can support decisions such as to warn, protect, or treat. The decisions are based on input from the NBC, medical, and intelligence staffs. They are products of the IPB and include consideration of risk.

- Warn. The decision to warn is based on the assumption that there is a threat of an upwind aerosol cloud moving toward the warned forces. It also can be a notification that exposure may have already occurred. A warning should be accompanied by treatment and/or protection guidance to ensure a consistent, effective response.

- Protect. The decision to assume a protective posture must take into account force capabilities and vulnerabilities. Control measures implemented could include using available protective equipment, conducting detection and identification of biological agents, and assessing unit vulnerability to suspected agent (i.e., vaccinated/unvaccinated forces).

- Treat. The decision to administer post-exposure prophylaxis or treatment is made after there is evidence of likely exposure to a BW agent. The decision is made by the commander with advice from the surgeon with the supporting input from the NBC officer and intelligence staff. The senior medical officer will recommend the appropriate prophylaxis or treatment regimen.

Table V-1. Tracking BW Data

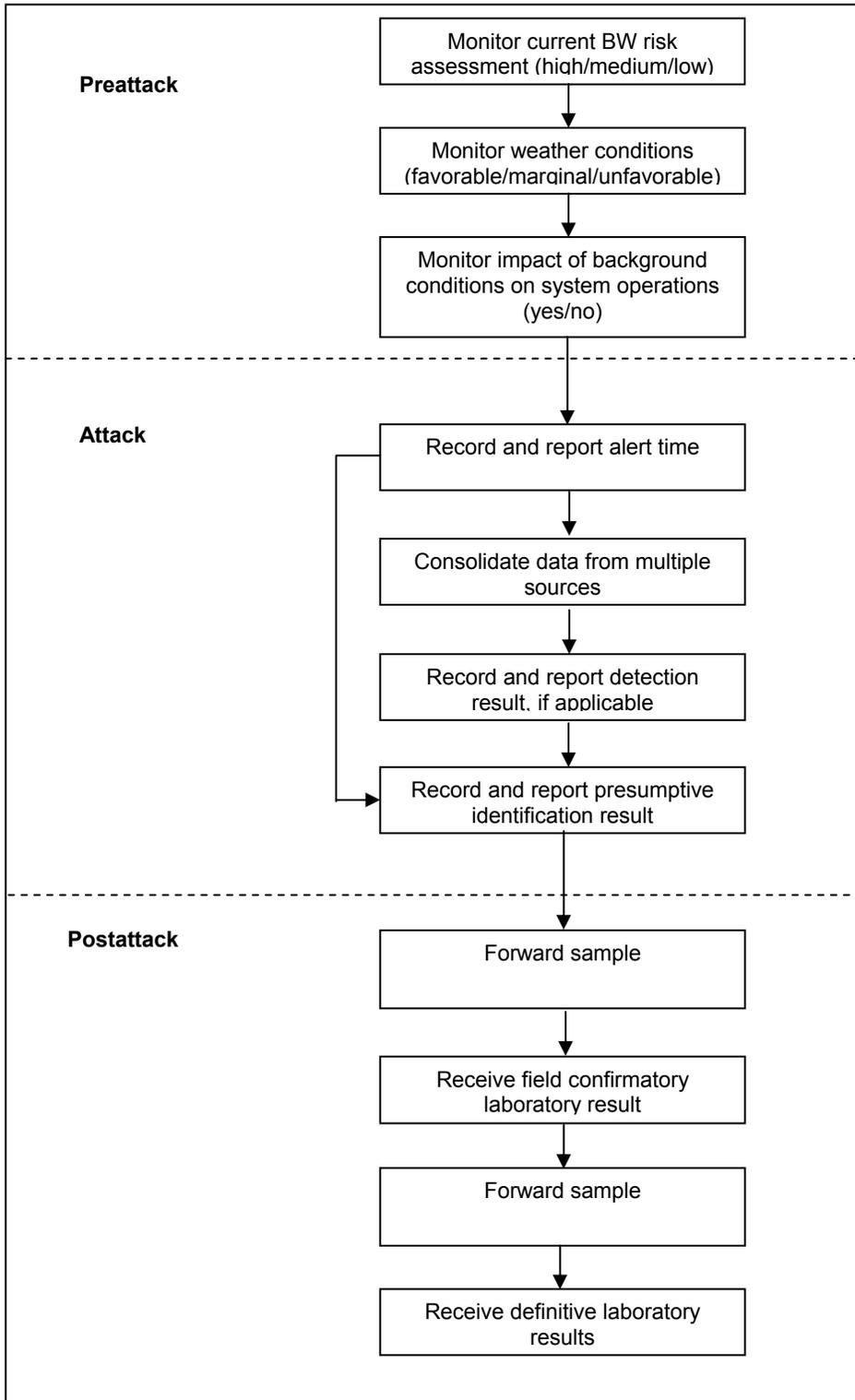


Table V-2. Biological Event Tracking Tool

Medical Surveillance	Preattack			Attack ¹			Postattack	Remarks														
BW Used Yes/No/Unknown	Current BW Risk Assessment H/Med/L	Weather Conditions F/M/U	Impact of Background Conditions on System Operations Yes/No	Alert Time (Time)	Detection Result C/S/T	ID Result (PI)/Time/Confidence Level	ID Result (FC/DI/Time)	Note: Record information such as other available intelligence, local activity, type of biological detection system used, etc.														
Note 1: Attack results are recorded following receipt, analysis, and evaluation of reports to help ensure consistency and correlation of data.																						
<p>Legend:</p> <table border="0"> <tr> <td>Unk – Unknown</td> <td>C – Cells</td> </tr> <tr> <td>H – High</td> <td>S – Spores</td> </tr> <tr> <td>Med – Medium</td> <td>T – Toxin</td> </tr> <tr> <td>L – Low</td> <td>PI – Presumptive Identification</td> </tr> <tr> <td>F – Favorable</td> <td>FC – Field Confirmatory</td> </tr> <tr> <td>M – Marginal</td> <td>DI – Definitive Identification</td> </tr> <tr> <td>U – Unfavorable</td> <td>ID - Identification</td> </tr> </table>									Unk – Unknown	C – Cells	H – High	S – Spores	Med – Medium	T – Toxin	L – Low	PI – Presumptive Identification	F – Favorable	FC – Field Confirmatory	M – Marginal	DI – Definitive Identification	U – Unfavorable	ID - Identification
Unk – Unknown	C – Cells																					
H – High	S – Spores																					
Med – Medium	T – Toxin																					
L – Low	PI – Presumptive Identification																					
F – Favorable	FC – Field Confirmatory																					
M – Marginal	DI – Definitive Identification																					
U – Unfavorable	ID - Identification																					

a. MEDSURV. The collection, analysis, and dissemination of surveillance information may be the first and only indicator of BW use. The direct and clear flow of information to the controlling HQ commander, medical officer (primary recipient), and NBC defense officer facilitates the rapid dissemination of protection, prophylaxis, and warning guidance.

b. Preattack Information. Preattack information recorded will include current BW risk assessment, weather conditions, and the impact of background conditions on system operations.

c. Attack Information. The evaluated BW report results from BW attacks provide alert, detection (if applicable), and presumptive identification with an associated confidence level (low, medium, or high).

(1) At the operational (e.g., JTF HQ) or tactical level (e.g., fixed-site OPCEN), an aggregate picture is available from the information generated by a biodetector array. From these results, aerosol tracking hazard predictions and reports are prepared.

(2) Other key information that the NBC staff may track includes consistency among the NBC-1 (BIO) reports received, the type of biological detection system that reported the information, the confidence level associated with the report, and any other related analysis (i.e., consistency and correlation in the reported results).

d. Postattack. The identification result from the supporting laboratory will be recorded.

e. Remarks. Other information (i.e., available intelligence) will be provided in the remarks section of the BW event-tracking tool.

6. Unit Incident Reporting

a. The following should be reported from the biological detection unit HQ or system level operator to the designated HQ (i.e., NBCCC or unit OPCEN).

- Presumptive positive BW identification results.
- Status reports as required.
- Other reports as required by mission, threat, background, meteorological (MET), or location characteristics.

b. All report information from the biological surveillance assets is recorded manually or electronically. For example, JBPDS data is recorded and saved electronically. Following a BW event (e.g., alert and/or identification data), the information is saved to provide a record. At end of shift or end of mission, the information is saved for further follow-on use and analysis, as required. Background data is also saved as a baseline for future use.

c. The incident report (see Table V-3) is used by the operator to record and subsequently report alert (or the sampling interval) and identification information obtained during biological detection operations. It is used to report both background and actual alert/sampling intervals and identification information. The biological detection or collection system operators maintain the information for each background collection and identification result. For the biological detection system incident report, there are two fundamental fields of data that are routinely compiled and reported for a BW event. These are the alert/collection and identification fields of data. Alert and/or collection data includes alert/collection interval times and MET data, and the identification data provides positive (i.e., agent code) or negative results. The remarks section is used to record the associated confidence result, external conditions/activity, and the system operating mode (i.e., cold weather mode), if applicable. The remarks section of the sampling incident report (i.e., DFU) will include weather information (as of the time of the sample collection) to include environmental conditions (e.g., sandstorm).

Table V-3. Incident Report (Sample)

Alert/ Collection	MET Data	Identification		
		System 1 :	System 2 :	System 3 :
1. Alert Time (DTG): _____	2. MET Data: a. Wind Speed (kph/mph): _____	a. Location/ID: _____	a. Location/ID: _____	a. Location/ID: _____
2. Collection Interval: _____	b. Wind Direction (degree): _____	b. DTG: _____	b. DTG: _____	b. DTG: _____
		c. Agent Code: _____	c. Agent Code: _____	c. Agent Code: _____
		or	or	or
		Negative	Negative	Negative
Team ID:				
Team Leader Signature:				
Sample Identification Number:				
Remarks:				
Confidence Level:				
External Conditions:				
Operating Mode:				

d. Biological surveillance information reporting can be set up for three levels of warning. Table V-4 provides a summary of the warning levels (i.e., Levels 1-3).

Note: The incident report format may be adapted to meet theater requirements; however, the basic data fields must be used. Additionally, some system specific reporting requirements may require additional data (e.g., M31A1 BIDS incident report provides detection data).

Table V-4. Warning Level Applicability

Warning Level	Applicable to Automated Detection Assets	Applicable to Manual Sampling Assets	Applicable to Supporting Laboratory
Level 1 – Detection Notice <ul style="list-style-type: none"> • Applicable only to automated detection assets (JPS/JBPDS) because of their system detection capability. • Not applicable to manual sampling assets (DFUs). They do not have an alerting capability. 	X	N/A	N/A
Level 2 – Biological Presumptive Identification <ul style="list-style-type: none"> • Based on a presumptive identification from a biological detection system or HHA testing. 	X	X	N/A
Level 3 – Field Confirmatory Identification <ul style="list-style-type: none"> • Applicable to receipt of results from a supporting laboratory that validates the Level 3 results. 	N/A	N/A	X

(1) Level 1: Detection Notice.

(a) This indicates that the detector has alerted to the presence of biological particles in the air. Level 1 capability is not applicable to manual sampler operations.

(b) Automated Actions. Upon a detection notice, the system will automatically collect an aerosol sample and analyze it using automated HHAs to determine if a BW agent is present. A Level 2 warning occurs if the HHA result is positive. If the assay is negative, the Level 1 warning will be cleared.

(2) Level 2: Biological Presumptive Identification.

(a) This indicates that the system has read one or more of the assays as being positive or a single HHA has shown positive results from a collection asset (i.e., a DFU).

(b) Upon receipt of positive presumptive identification, the operator will prepare a collected sample (liquid or dry) for sample evacuation.

(3) Level 3: Validated Biological Confirmatory Identification.

(a) This indicates that a medical laboratory provided a positive field confirmatory result.

(b) Communication and coordination is maintained with the command surgeon and the NBCCC.

e. The analysis of the results from the employment of multiple BW detectors or collectors basically consists of assessing the results from subordinate units and consolidating and evaluating the data to ensure usable and complete information. The objective of BW event tracking is to assess the probability that a BW attack has been detected. Based on BW event tracking, the results provide an associated confidence level (Table V-5). During the planning process, the information on the confidence level is assigned to a BW event and that information may serve as a trigger to support a commander's decision points (i.e., protection, treatment). A single-system presumptive identification provides a medium level of confidence. A medium level of confidence indicates the potential presence of a BW agent; however, other information sources (i.e., MEDSURV, other biological detector results, intelligence) must be reviewed to determine if there is other confirming data. Multiple confirming consistent indicators of a BW attack (i.e., two or more biological detectors with consistent, presumptive identification results) provide a high confidence level.

Table V-5. System Confidence Levels

		Level of Confidence	
		Medium	High
Number Of Systems Reporting Presumptive Identification Results	Single-System Presumptive Identification	X	
	Multiple-System Presumptive Identification		X

f. The following should be reported from the biological detection unit HQ to the higher HQ NBCC.

- Positive BW identification results.
- Other reports as required by mission, threat, background, MET, or location characteristics. This information may include reports on system/component operational readiness or significant local activities (i.e., unusual weather phenomena).
- Status reports as required.

g. All report information is recorded manually or electronically. Following a BW event (e.g., alert and/or identification data), the information is saved to provide a record. At end of a mission, the information is saved for further follow-on use and analysis as required. Background data is also saved as a baseline for future use. This information will be retained for a minimum of three years following the end of the operation unless otherwise instructed by individual service regulation or DOD policy. This background information is especially important for after action reviews and for follow-on health surveillance as required.

h. Incident reports are used to record and subsequently report alert and identification information obtained during biological detection operations to the NBCC. The NBCC generates the appropriate NBC report (e.g., an NBC-1) from the incident

report(s). It is used to report both background and actual detection and identification information. For the incident report, there are two fundamental fields of data that are routinely compiled and reported for a BW event. These are the alert and identification fields of data and detection data (if applicable). Alert data includes alert time and MET data; identification data/identification contains the agent identification code (or negative) and the mode of operation of the system during the event. The incident report will also include environmental conditions (e.g., sandstorm) and the presumptive identification result.

i. The reporting of laboratory results from field confirmatory may take hours and the definitive results are provided in hours to days. The definitive results provide a more sensitive result; however, the commander may assess that in-theater field confirmatory results provide a sufficient basis for approving prophylaxis and other treatment recommendations.

j. The reporting of supporting information is important for a BW attack assessment. The supporting information can be used to help corroborate that a BW occurred.

(1) Intelligence. Intelligence represents a valuable and significant component. The confidence placed in detection and identification increases with the certainty that the enemy is assessed to have a particular agent. For example, if a group of detectors are indicating anthrax and it is known that the enemy has anthrax in its arsenal, then higher confidence may be placed in the detector response. Other intelligence considerations may include the following:

- Any indication of intent or instances of past use of BW agents by the enemy.
- Past employment techniques may determine the enemy's pattern of agent use.
- IPB also plays a key role in the assessment of results from MEDSURV and BW sensors. Assessing in advance where the enemy is most likely to originate a biological attack, and then actually detecting a biological attack downwind from that source can increase confidence that this might be an actual attack. Determining where these potential dissemination points are depends upon intelligence information, such as what agents the enemy is known to possess and what dissemination equipment they have (e.g., point-source or line-source weapons).

(2) Weather. Weather is important in considering whether or not an enemy can disseminate a biological agent effectively. For BW, MET data at ground level and up to 100 meters or more over a large area is important. Among the considerations are—

- (a) Wind direction. The wind direction should be towards friendly forces.
- (b) Wind speed. This should be conducive to effective agent dissemination while minimizing agent dilution through turbulence and dispersion. Biological agents can be employed effectively at most wind speeds.

(c) Atmospheric stability. A combination of wind speed, cloud cover and solar angle (time of day) can be represented as stability factors 1 (very unstable) through 7 (very stable). A large-scale biological attack would most likely be effective under somewhat stable atmospheric conditions. Unstable conditions involve a large degree of vertical dispersion, resulting in decreased downwind travel. Further information on how atmospheric stability can affect biological attacks can be found in service publications such as FM 3-6.

(d) Precipitation. Generally, precipitation does not have much of an impact on biological aerosol cloud “washout” unless the rain is unusually heavy for an extended time.

(e) Effect of terrain on meteorology. Surface contours and the overall roughness of the surface, influence the direction and speed of agent flow. Higher concentrations can be expected in valleys and depressions, which also tend to direct the flow of the aerosol cloud. Rough ground (vegetation, forests, and rocks) tends to retard agent flow and increase the vertical dispersion of the agent resulting in decreased downwind travel and concentration.

(f) Agents that can be effectively dispensed in the atmosphere.

k. The systematic collection of information over time supports the SA. Table V-6 (page V-14) provides a sample BW event tracking tool that used the following information input to track BW-related activity from preattack through postattack.

(1) Preattack information collection.

- Current BW risk assessment was assessed as medium based on threat activity.
- Weather conditions were assessed as marginal within the AO.
- Reports from the biological detection unit HQ indicated that background conditions were having no impact on system-level results.

(2) Attack information collection.

- Collated and evaluated incoming reports from a JBPDS-equipped BIDS unit that indicated an alert time at 220100L May 03.
- Follow-up reports indicated a presumptive identification at 220120L May 03, confidence level high.

(3) Postattack information collection. Laboratory feedback provided positive field confirmatory results at 220700L May 03.

(4) Remarks information collection. No unusual outside activity was noted on any of the incoming reports.

Table V-6. Biological Event Tracking Tool (Sample)

Medical Surveillance	Preattack			Attack ¹			Postattack	Remarks														
BW Used Yes/No/Unknown	Current BW RA H/Med/L	Weather Conditions F/M/U	Impact of Background Conditions on System Operations Yes/No	Alert Time (Time)	Detection Result C/S/T	ID Result (PI)/Time/Confidence Level	ID Result (FC/DI/Time)	Note: Record information such as other available intelligence, local activity, type of biological detection system used, etc.														
Unk	Med	M	No	220100L	N/A	Positive for agent XXXX@ 22012 High	FC positive for agent XXXX 220700L	JBPDS ID @ APOD; no unusual outside activity														
<p>Note 1: Attack results are recorded following receipt, analysis, and evaluation of reports to help ensure consistency and correlation of data.</p> <p>Legend:</p> <table border="0"> <tr> <td>Unk – Unknown</td> <td>C – Cells</td> </tr> <tr> <td>H – High</td> <td>S – Spores</td> </tr> <tr> <td>Med – Medium</td> <td>T – Toxin</td> </tr> <tr> <td>L – Low</td> <td>PI – Presumptive Identification</td> </tr> <tr> <td>F – Favorable</td> <td>FC – Field Confirmatory</td> </tr> <tr> <td>M – Marginal</td> <td>DI – Definitive Identification</td> </tr> <tr> <td>U – Unfavorable</td> <td>ID - Identification</td> </tr> </table>									Unk – Unknown	C – Cells	H – High	S – Spores	Med – Medium	T – Toxin	L – Low	PI – Presumptive Identification	F – Favorable	FC – Field Confirmatory	M – Marginal	DI – Definitive Identification	U – Unfavorable	ID - Identification
Unk – Unknown	C – Cells																					
H – High	S – Spores																					
Med – Medium	T – Toxin																					
L – Low	PI – Presumptive Identification																					
F – Favorable	FC – Field Confirmatory																					
M – Marginal	DI – Definitive Identification																					
U – Unfavorable	ID - Identification																					

7. Communications Architecture

a. The communications architecture uses standard, existing protocols. For example, the NBCWRS is used as the basis for forwarding of NBC reports (according to Allied Tactical Publication [ATP]-45[B]). The standard communication guidelines that are used for command or supporting relationships also apply. For example, supporting biological detection or medical laboratories provide report results to those supported HQ that are designated in OPORDs/OPLANs.

b. The communications architecture identified in the controlling HQ OPLAN/OPORD and/or SOI identifies the key linkages. These communications linkages include the requirement for exchange of information between the supporting laboratories and the command surgeon or between the biological surveillance resources and the supporting confirmatory laboratory (i.e., advance notification to the laboratory that a sample is enroute).

Appendix A

MEDICAL COUNTERMEASURES AND PROTECTION

1. Background

Medical countermeasures can include PVNTMED, immunization, diagnosis, prophylaxis, treating mass casualties, and supporting psychological casualties. Medical countermeasures focus on the prevention of BW agent casualties. The unit surgeon provides recommendations to the commander on medical countermeasures that are implemented through applicable directives and OPLANs/OPORDs.

2. Medical Countermeasures

a. PVNTMED. Specially trained medical personnel and units assist in maintaining the health of the command with the goal of preventing diseases before they occur. Recent conflicts have demonstrated that PVNTMED practices such as good field sanitation and hygiene can significantly reduce natural occurrences of infectious diseases. Many of these same principles can be applied as countermeasures against BW agents.

b. Immunization. Making an individual immune is one of the most effective defenses against BW agents. Immunity is produced when an individual is vaccinated with a vaccine or toxoid. Vaccine lead-time will have a major impact on operations, particularly during the critical phase of deployment. The time factor impacts must be considered in force projection and requirements for early intelligence assessment and predeployment planning.

c. Epidemiological Analysis.

(1) Any unusual occurrence of multiple simultaneous cases of illness with similar presenting symptoms, especially within regions with higher likelihood of biological attack, should prompt the medical staff to consider biological agents as a potential cause. Epidemiological analysis can only be effective if the system responds quickly and decisively to medical trends. Although it may be too late for medical countermeasures to help individuals who already show symptoms, the trend can alert the medical system to initiate protective measures such as vaccines or antibiotics for those who are exposed but not yet sick.

(2) With a covert biological agent attack, the most likely first indicator of an event would be an increased number of patients presenting with clinical features caused by the disseminated disease agent. Therefore, health care providers must use epidemiology to detect and respond rapidly to a biological agent attack.

(3) A sound epidemiologic investigation of disease outbreak, whether natural or human-engineered, will assist medical personnel in identifying the pathogen, as well as instituting the appropriate medical interventions. Documenting the affected population,

possible routes of exposure, and signs and symptoms of disease—along with rapid laboratory identification of the causative agents—will greatly increase the ability to institute an appropriate medical and public health response. Good epidemiologic information can guide the appropriate follow-up of those potentially exposed, as well as assist in risk communication and responses to the media.

(4) Many diseases caused by weaponized biological agents present with nonspecific clinical features that could be difficult to diagnose and recognize as a biological attack. The disease pattern that develops is an important factor in differentiating between a natural and a terrorist or warfare attack. It is important to remember that naturally occurring epidemics can have one or more of these characteristics and a biological attack may have none.

(5) Once a biological attack or any outbreak of disease is suspected, the epidemiologic investigation should begin. The conduct of the investigation will not differ significantly, whether or not the outbreak is intentional. The first step is to confirm that a disease outbreak has occurred. A case definition should be constructed to determine the number of cases and the attack rate. The case definition allows investigators who are separated geographically to use the same criteria when evaluating the outbreak. The use of objective criteria in the development of a case definition is very important in determining an accurate case number, as additional cases may be found and some cases may be excluded, especially as the potential exists for hysteria to be confused with actual disease. The estimated rate of illness should be compared with rates during previous years to determine if the rate constitutes a deviation from the “norm.”

d. Prophylaxis and Treatment. Prophylaxis is preventive action taken before infection. Treatment is the care of personnel after they have been exposed to a biological agent. For some BW agents, there is a window of opportunity between infection and onset of symptoms where medical treatments are particularly effective. Medical treatments that are initiated outside the window of opportunity are less effective. Therefore it is critical to ascertain which agent(s) were used in the attack and when the attack occurred. See FM 8-284/Navy Medical Pamphlet (NAVMEDP)-5042/AFMAN (I) 44-156/Marine Corps Reference Publication (MCRP) 4-11.1C for information on treatment of BW agent casualties.

e. Mass Casualties and Quarantine. The medical system will be hard pressed in providing medical support for large numbers of biological casualties. If large numbers of casualties occur, some primary care will be the responsibility of the unit commander with organic assets and limited medical augmentation. The provision of this care will need to be a coordinated effort. Units attacked with contagious BW agents may have to be quarantined. It may become necessary for the US force commander to request and obtain additional support to handle mass casualties.

f. Psychological Effects. The use of biological weapons will cause some personnel to seek medical treatment although they have not been infected with a biological agent. Combat stress control/mental health detachments/teams will be needed to provide counseling for these personnel. Trained and disciplined units will be less susceptible to the psychological effects of BW.

3. Vaccines

Currently the only Food and Drug Administration (FDA) approved vaccines are for the following BW agents: anthrax, Venezuelan equine encephalitis (VEE), and smallpox. While vaccination before exposure provides a high level of protection from the specific biological agent, vaccination after exposure can be an effective medical alternative for some agents. The anthrax vaccine is very effective if administered according to guidelines and can greatly reduce the impact of an attack with anthrax spores. If all military personnel in the affected area are immunized against anthrax, the effect and impact on medical resources will be greatly reduced.

4. Medical Interventions

a. When available, vaccinations can reduce the susceptibility of target populations to attacks by specific biological agents. Vaccines for some agents are more effective than for others, though most will nevertheless reduce the vulnerability of the population immunized.

b. Treatments after a BW attack are available for many agents, but in most cases, they must be applied before the onset of symptoms. Treatments administered after exposure, but before symptoms, are referred to as post-exposure prophylaxis or preventive treatment. Vaccinations are available for some agents, but in most cases they must be applied before the onset of symptoms. In most cases, preventive treatments will only be initiated if the attack is detected before onset of symptoms. This is problematic in a threat environment where covert attacks are possible. Attacks using toxins are more difficult to address because, in general, toxins act more quickly than pathogens, leaving less time for detection, identification, and evaluation before large segments of the population fall ill.

c. A BW attack could quickly overwhelm any local medical system. To be prepared requires prestaged equipment and medications, plus a robust program to train medical personnel and exercise procedures. Medical treatment facilities (MTFs) must be prepared to issue medical countermeasures, decontaminate, and treat expected biological casualties. Non-medical personnel may be required to assist with basic maintenance tasks and with quarantine. Additionally, MTFs should anticipate the need for—and incorporate the resources of—the surrounding medical community into their biological detection response plans. Finally, MTFs must provide the installation commander with timely and accurate assessments of capabilities and limitations. These assessments must take into account any coordination that may have occurred for local medical support.

d. Even if an attack is detected in time to implement medical countermeasures, organization, infrastructure, and equipment must be in place in advance for the response to be effective.

e. Contingency plans should designate facilities for holding large numbers of casualties (e.g., gymnasiums, schools, and churches) while providing care based on triage reports. This may also require the planning for vehicles to transport the mass casualties to the designated facilities (i.e., buses, and vans). Public information countermeasures can also help to limit the problem. Additionally, quarantine of potentially exposed personnel and isolation of patients would be required to prevent the spread of disease. The mission

impacts of implementation of ROM and transportation of personnel, patients, and supplies need to be considered for movement within, into, and out of the theater.

5. Restriction of Movement

a. The terms “quarantine” and “isolation” are often used in the context of preventing contact between healthy populations and those either infected or suspected of being infected with an infectious disease. Quarantine involves the detention of an individual or group suspected of having been exposed to an infectious disease, until it is deemed that they have escaped infection (usually once the incubation period has lapsed). Isolation is the separation of an infected individual from a healthy population (usually refers to patients in an MTF). During military operations where personnel have contracted or are suspected of having been exposed to an infectious disease, mission assessments are conducted by the commander to consider whether quarantine or isolation. Thus, the more universal term ROM, is used to for preventing contact with or detaining persons suspected or known to have been exposed to an infectious agent.

b. ROM is a tool for maintaining operational effectiveness in the face of an infectious disease, whether natural or artificial (such as a BW attack). The goal is to control the spread of the disease by restricting contact between healthy groups of personnel and those who have, or are suspected of having, contracted it. Personnel covered by ROM do not necessarily need to be removed from operations; wherever possible, ROM should be implemented in such a way as to allow them to continue their mission. ROM may also be necessary to reduce the risk of transferring an infectious disease back to the home base.

c. If ROM is contemplated at any stage during an operation, coordination should be conducted with assets such as HN forces, and it must be with the full knowledge that the impact on operational effectiveness is likely to be significant. The unit surgeon, with assistance from other staff elements (i.e., legal and CA staff), will support the commander in the assessment of unit operational assessment. The only stage of an operation when ROM is unlikely to play a significant deleterious role is during the close of an operation when personnel are being returned home. Here, ROM would be aimed not at preserving the fighting integrity of the force, but rather reducing the risk of introducing infectious disease into the CONUS base.

d. ROM implementation will restrict the ability of the commander to use affected force elements. In practice, the operational impact of disease control measures will need to be balanced against the potential consequences of the spread of an infectious disease. Operational pressures may dictate a policy that accepts the limited spread of an infectious disease because the implementation of ROM would result in the loss of the military objective.

Appendix B

Field Laboratory Support

1. Background

Field laboratory support may include laboratories with various capabilities for analyzing clinical and environmental samples that may contain BW agents. Depending on which laboratories are deployed and available, one or more of these laboratories may be designated the role of confirming a presumptive identification of a BW agent in a sample analyzed at another site or by another method. This confirmatory identification further enhances the COCOM's ability to make timely and accurate decisions. Field confirmatory identification may require definitive identification by a CONUS laboratory.

2. Types of Laboratories

Analysis of biological threat agents generally requires laboratories with capabilities different from that possessed by routine hospital/clinical laboratories. Because of the risk of shutting down an entire hospital laboratory (and therefore the functionality of the hospital) if the laboratory becomes contaminated with a BW agent from an environmental source (e.g., powders), it is inadvisable or even prohibited to take many types of environmental samples into a hospital laboratory. Clinical specimens containing BW agents do not pose the same degree of risk for contaminating the laboratory, so processing routine clinical specimens that contain BW agents is acceptable in the hospital laboratory.

Even if associated with or collocated with hospitals, the following laboratories possess the special capabilities necessary for field confirmatory identification of biological threat agents.

a. AF. The BAT is a flexible, rapidly deployable laboratory team assigned to the deployed MTF. The BAT expands theater force health protection (FHP) by introducing best-available advanced microbiological testing capabilities such as the joint biological agent identification and diagnostic system (JBAIDS). The BAT analytical tools can identify both naturally occurring and induced pathogens in clinical and environmental samples. The BAT provides a preventive capability through analytical test data to support early warning of pathogen exposures as well as assessment of extent and type of microbial contamination in other various substances (food, air, water, or soil).

b. USA.

(1) The AML is the specialized laboratory in a theater AO that provides medical and chemical laboratory support. The AML provides in-theater field confirmatory identification of NBC threat agents in various samples and specimens. Using sophisticated equipment and methods, the AML has the capability to analyze and identify NBC agents in a variety of specimens/samples such as air, soil, water, animal tissue, vegetation, and food, as well as human blood, sputum, blood, and feces. Direct support from CONUS-based

laboratories aids the AML with identification of NBC agents. Command decisions on use of protective/preventive measures and patient care may be based on the AML findings. However, further CONUS-based testing must be undertaken for definitive identification of NBC agents and for forensic analysis purposes.

(2) The clinical laboratory of the combat support hospital (CSH) will have microbiology culture and identification capability when augmented with the microbiology augmentation set (M403). This may be accomplished either by directly augmenting the hospital laboratory or by augmenting with a medical team (infectious disease). When the JBAIDS instrument is fielded and included in the microbiology augmentation set, this laboratory will have the capability of providing detection and field confirmatory identification testing for BW agents in clinical specimens that are collected for patient diagnosis.

c. USN. The four NEPMUs and their respective deployable platforms, the FDPMU, provide a robust biological laboratory confirmatory capability through the employment of PCR, ELISA, and culture confirmation for BW agents and militarily significant infectious diseases. These capabilities greatly enhance theater-level FHP and provide commanders with real-time, on-scene risk-assessment tools.

3. Confidence Levels of Results of Laboratory Analysis

There is no one set parameter that determines nuances of levels of confidence in the laboratory results. Confidence in the laboratory results is based on a combination of the scientific quality and accuracy of the test methodology, the number and type of biological markers detected, the technical expertise of the testing personnel, and the environmental conditions in which the laboratory is operating.

a. Biological Marker (or biomarker). A biomarker refers to the characteristics of a biological agent (microorganism or toxin) are specific or unique to that agent. Some biomarkers are more useful or accurate in identifying the biological agent than other markers. Likewise, some types of scientific devices/methodology are more sensitive and accurate in detecting certain types of biomarkers.

(1) The types of biomarkers include—

(a) Specific nucleic acid sequences unique to the bacteria or viruses recognized by employing a technique such as PCR.

(b) Specific antigens associated with the bacteria, viruses, or toxins identified by techniques such as ELISA or ECL assay or hand-held immunological assay.

(c) Specific enzymatic or growth properties as demonstrated on biochemical tests or selective media such as characteristic colony morphology on culture and phage inhibition.

(d) Specific microscopic characteristics such as those identified using Gram stain (GS), fluorescent antibody (FA) stain, immunohistochemical (IHC) stain, or cytopathic effects (CPE).

(2) Confirmatory and definitive testing requires positive results from two or more independent biomarkers. Independent biomarkers are those that are significantly different from another either biologically such as uniquely different gene sequences or uniquely different antigens. Different methodologies are those that test for biomarkers in technologically different manners, such as PCR versus ECL, or HHA versus PCR. Analyzing a sample twice using HHAs is only employing one methodology. However, the level of confidence is increased if a particular methodology is employed to test for two different biomarkers (e.g., PCR testing for two or more gene sequences).

b. Sensitivity. The sensitivity of a test is its ability to detect the presence of a biological agent. This is the proportion of tests (samples) with positive test results out of all samples that truly contain the biological agent (regardless of whether the biological agent is detected or not).

(1) Sensitivity is the proportion (percentage) of true positives divided by the total of true-positive and false-negative results (i.e., the more false-negatives a test allows, the less sensitive it is).

(2) A false-negative test result is one that is negative although the biological agent is actually present. It may occur because the concentration (amount) of a biological agent is below the detection level of the test methodology/instrument, binders or inhibitors that may be present in the sample, temperature deviations from the test protocol, bad reagents, equipment malfunctions, etc.

c. Specificity. The specificity of a test is its ability to correctly indicate that a biologic agent is not present in the sample when, in fact, the sample is devoid of the biological agent. This is the proportion of tests (samples) with true-negative test results divided by the total of true-negative and false-positive results (i.e., the more false-positives a test allows, the less specific it is). A false-positive test result is one that indicates a biological agent is present when that agent is actually not present. Common causes for false-positive results are cross-reactions to various substances in the sample or reagents.

d. Predictive Value of Test Results.

(1) Screening tests are often designed to be very sensitive so they do not miss a true biological agent (i.e., detecting all true-positives and a few false-positives). However, an increase of false-positives results in decreased specificity, so that a positive screening test is only a presumptive positive.

(2) The positive predictive value (PPV) of a positive test result from a single screening test is the test's ability to correctly predict the actual presence of a biological agent. Prevalence is very useful when evaluating stable population or infection rates for epidemiologic studies. However, prevalence is very difficult to accurately assess when the likelihood of the biological agent being present is extremely low (i.e., in BW scenarios). Repeating a positive screening test does not add clarity or accuracy. Tests may react positively or negatively from one sample to another when the concentration of the biological agent is near the threshold limits of detection for the test methodology.

(3) The challenges of predictive values and specificity associated with screening tests are largely alleviated by confirmatory tests. Confirmatory tests have been designed to be highly specific in identifying biological agents. However, this design may result in an increase of false-negative results, thus leading to decreased sensitivity, so it would not be ideal as a screening test. To increase the accuracy and specificity of confirmatory tests, testing is conducted for more than one biomarker, whether by the same or different methodologies.

4. Employment of Laboratories

The determination of which laboratories are deployed depends on the anticipated nature of samples to be processed. The following illustration indicates the possible employment of laboratories to perform presumptive and confirmatory testing. Laboratories employing JBAIDS (see Figure B-1) are employing field confirmatory testing; however, positive results are checked by the AML or other designated higher-level confirmatory laboratory. The JBAIDS helps to serve as a quality screening system to reduce the workload on the AML (or other designated confirmatory laboratory).

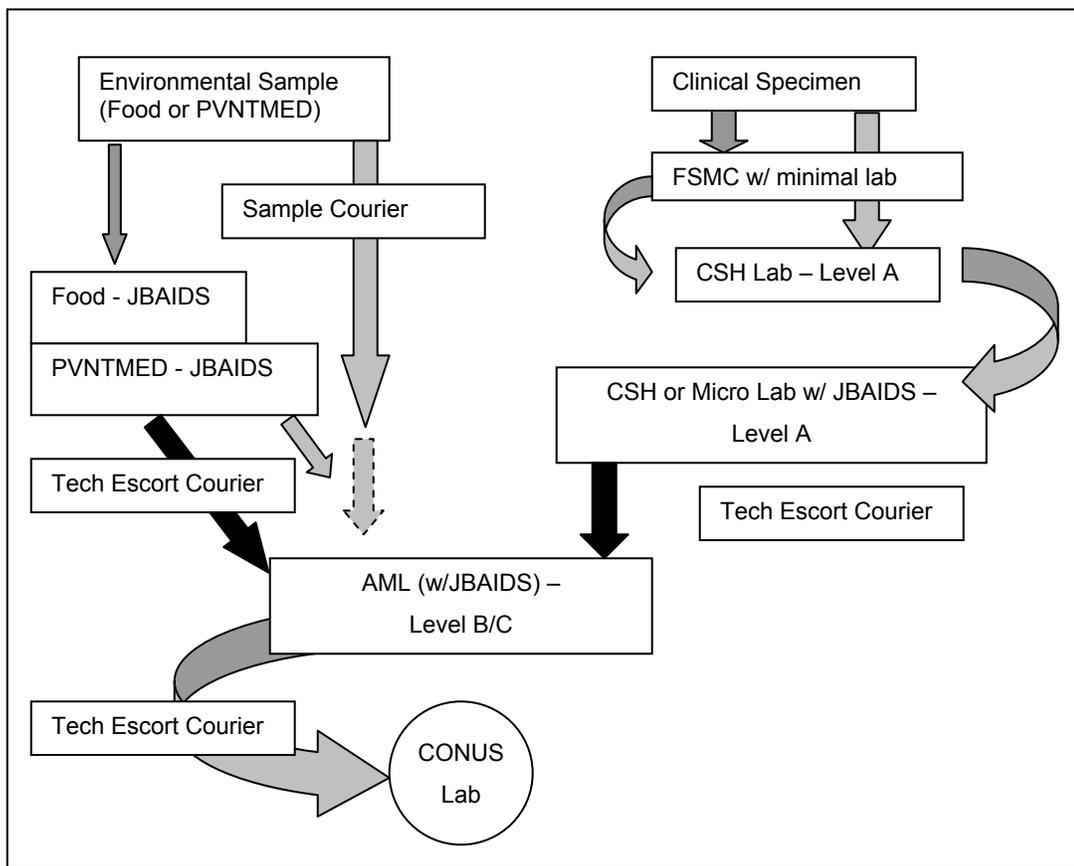


Figure B-1. Field Confirmatory Testing

5. Laboratory Response Network for Biological Terrorism

The LRN is a multi-level system (see Figure B-2) in CONUS designed to link front-line hospital and state public health microbiology laboratories with federal and military reference laboratories supporting advanced capabilities in testing human, veterinary, food, and environmental samples. Laboratories participating in the LRN employ common SOPs and reagents to process and identify potential BW threat agents. Upon obtaining a presumptive identification, lower-level laboratories (e.g., Level A) send the samples/microorganisms to higher-level laboratories (e.g., Level C) for confirmatory identification. Upon confirmation of the identification at Levels B/C laboratories, other appropriate laboratories are employed for forensic testing.

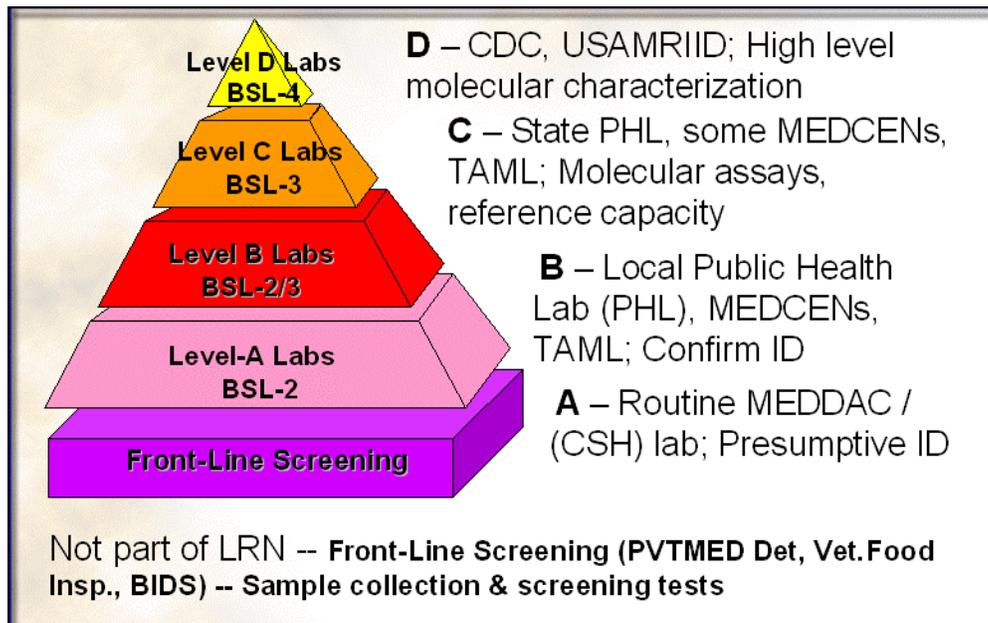


Figure B-2. LRN Structure

Appendix C

BIOLOGICAL COLLECTION AND DETECTION CAPABILITIES AND LIMITATIONS

1. Background

Biological point detection and collection capabilities provide commanders with critical SA information. This appendix provides information on detector and sampling capabilities.

2. Joint Portal Shield

a. The JPS provides a capability to alert, collect, identify, and warn commanders and site populace of biological attacks. Upon detection, the system provides automatic warning to active and passive command post (CP) computers.

b. The JPS system is typically a suite of approximately 10 to 24 detectors placed with hardwire electricity and communications with radio frequency (RF) backup. The JPS consists of a particle counter (aerodynamic particle sizer) and cyclone sampler. The suite of components includes the following:

- Global positioning system (GPS) and weather station.
- Central processing unit (CPU)/radio modem data management. The CPU controls the hardware associated with the system and compiles and stores historical data from the detector.
- Automated warning and reporting and downwind hazard prediction—JPS is capable of providing automated warning of a biological agent release directly to the computer in the OPCEN.
- Environmental control unit (ECU). An ECU is designed to keep the components, to include the internal computer, cool.
- Computer control component. The computer is a standard, commercial off-the-shelf (COTS) high-speed personal computer (PC) with dedicated monitor and printer. The computer contains JPS system-unique software that will generate system status and alarm data (visual and audible) on the monitor. The system software is also ATP-45 compatible and can automatically prepare properly formatted NBC reports.

(1) The number of sensors employed at each site will depend largely upon the size of the installation and the shape of its perimeter. The sensors will be positioned at stationary, pre-surveyed locations around an AB or seaport perimeter. JPS allows the operator to configure the network by selectively activating only those sensors that are appropriate for the current BW threat. Additionally, individual sensors designated by the operator to be part of the network can be further programmed to operate in either an

unarmed mode or an armed mode. Unarmed sensors only monitor the atmosphere for a rise in the particle count. If an airborne particle rise is detected, the sensor will not collect a wet sample. Unarmed sensors will not collect wet samples and will not inject a portion of the wet sample for testing. Armed sensors perform surveillance and wet sample collection functions and, when conditions warrant, they will accept a command from the computer to inject and test the wet sample.

(2) Tailoring the network is highly suited for accommodating changes in the threat between operations during daylight and periods of darkness. Since BW attacks are less likely to occur during daylight hours, the network may be configured to include most upwind sensors—half of them armed with the remaining half unarmed—and some downwind sensors, most in the unarmed mode. Because BW attacks are more likely during hours of darkness, the number of active and armed sensors on the upwind and downwind sides of the perimeter should be increased. The ability to tailor the net and operating status of each sensor extends component life, minimizes operator maintenance requirements, and reduces the consumption of expendable materials.

(3) Three network operating logic modes are available. They are the smart mode, random mode, and manual mode. The computer logic that dictates sensor activity in the smart and random modes is related to MET conditions and is intended for use during high and low threat periods, respectively. The network logic should be set to the smart mode when wind conditions are favorable for a BW attack. When in the smart mode, all sensors that are designated as part of the network should be armed. The random mode is desirable for periods when the wind speed is unfavorable or marginal for a BW attack. In the manual mode, the operator initiates the sampling sequence. Because of the reduced threat of a BW attack, some active sensors may be unarmed.

c. The JPS is capable of monitoring the local atmosphere and testing samples for the presence of eight different biological agents simultaneously. The eight agents that the system is set to monitor and test for are selectable from a larger menu of possible agents (the list of specific agents that can be detected is classified). The specific biological agents selected for monitoring is a command decision and will be based on threat information for the AOR that is provided to the installation commander by the medical and operational intelligence communities.

d. The JPS accomplishes biological detection by injecting a small amount of a wet sample that is suspected of containing BW agent onto its immunoassay optical ticket reader. The sensor contains immunoassay tickets that react to BW agents. The JPS sensor also incorporates a computer and a built-in communications capability. All active sensors continuously report their status and activities to the CP computer. The computer continuously analyzes all reported data received from the sensors. Once the system has advanced to the network activation stage, the computer will direct all triggered sensors to initiate wet sample testing for the presence of BW agents.

e. The JPS alerting, sampling, identifying, and reporting process parallels the process used by the BIDS (see Appendix I).

3. Biological Integrated Detection System

a. The BIDS provides the capability to alert, detect, collect, and identify BW agents. It is a biological detection asset designed for defense against a long-line-source BW attack. BIDS units are operational level-of-war assets. The unit is optimally deployed as a company-size asset; however, platoon sized deployments (with supporting CSS, including CLS) can be planned and executed. BIDS units can be placed throughout the AO to create a wide-area sensor array/network. Any presumptive identification is reported directly to the operational-level commander. The commander and staff then determine if, in fact, a BW attack has taken place (as opposed to the single system alert being due to local fluctuations—a false positive). If the determination is that an attack has occurred, then appropriate warning and postattack actions are executed. The BIDS functions are described in Appendix I.

b. The BIDS consists of a shelter (S-788 Lightweight Multipurpose Shelter [LMS]) mounted on a dedicated vehicle (high mobility multipurpose wheeled vehicle [HMMWV]). It is equipped with a biological detection suite employing complementary technologies to detect large-area biological attacks.

(1) The system includes its own capability to generate electrical power. To ensure uninterrupted operation for at least 3 days, the complete BIDS system also includes a second HMMWV that is used as a support vehicle (to carry additional spares and repairs and to courier suspect samples to a collection point). It also carries two of the BIDS' four-man crew.

(2) While each individual BIDS system is very robust in itself, the fact that so few systems are used to monitor such large areas means that localized, point BW attacks may go undetected. Of course, several of the BIDS can be employed at a single high-priority site to provide coverage of that site. There are currently three versions of BIDS in the USA inventory: the M31, M31A1, and M31A2.

c. See Appendix I for a description of system capabilities.

d. See Appendix I for a description of system operations.

e. The BIDS detection process includes monitoring, alerting, sampling, collecting, identifying, and reporting (see Table C-1 [page C-4]).

Table C-1. BIDS Comparison

	Monitoring	Alerting	Sampling	Identifying	Reporting
M31A2	Determines increase in the number of particles within a certain size range.	Determines if aerosol particles contain biological material; detection based on single component, rather than multiple components as in the M31/M31A1.	Automatic activation of sample collector.	Determines presumptive identification of up to 10 preselected BW agents.	Time range for reporting of presumptive identification: 18 minutes; automated data recording and display, automatic formatting to NBC report.
M31A1	Determines whether biological mass is present within aerosol particles of a certain size range.	Determines with greater sensitivity than M31 if aerosol particles contain biological material—cells, spores, and toxins.	Automatic activation of biological and liquid sampler.	Determines presumptive identification of up to 8 preselected BW agents.	Time range for reporting of presumptive identification: 18-25 minutes; automated recording and display of data.
M31	Determines increase in the number of particles within a certain size range.	Determines if aerosol particles contain biological material—cells, spores.	Requires manual activation of biological and liquid sampler.	Determines presumptive identification of 4-8 BW agents.	Time range of reporting of presumptive identification: 30-40 minutes. Requires manual recording of data.

4. Joint Biological Point Detection System, Fixed Site/Trailer-Mounted Version

The trailer-mounted JBPDS provides the capability to provide an alert, collection, and identification capability. A designated prime mover tows the two-wheeled trailer. It can be transported by the landing craft air cushion (LCAC). The trailer has the following components mounted on its platform: Basic Biological Suite Unit (BBSU), ECU, 2 kilowatt (kW) tactical quiet generator, two 20-liter diesel fuel cans, stowage boxes, and a ladder. Power is supplied to the system by the generator. Public utility power can also be used to supply power to the system. The experimental model (XM) 102 is essentially an XM96 that has been modified for trailer mounting. The XM102 is mounted on a modified M116A3 trailer chassis. The fully integrated system (XM102, shock isolators, government-furnished equipment [GFE] components, cabling, and integration hardware mounted on the M116A3 chassis) is designated as the XM103.

5. Long-Range Biological Standoff Detection System

a. The LRBSDS capabilities include being able to discriminate between manmade and naturally occurring clouds in the atmosphere. See Appendix H for further information on the LRBSDS description capabilities, system operations, and the detection process.

b. Just as many military systems employ the concept of defense-in-depth, biological detection can be viewed as providing detection at different physical and operational levels. In this context, the LRBSDS performs at the outer edge of the detection environment, providing perhaps the earliest detection of a possible biological attack. As an

operational-level asset, the LRBSDS is flown as close to the forward line of own troops (FLOT) as is safe and practical—the system is designed to be flown in a utility helicopter (UH); specifically, the UH-60. The long range of the system (30 kilometers or more) allows detection of long-line source attacks before the suspected agent has reached and affected US forces, preventing what could be a substantial negation of US military capability.

c. The LRBSDS does not discriminate biological material; it can only warn that it detected a manmade aerosol cloud. Other systems, such as the BIDS, will be required to actually determine that there is an agent present once the cloud reaches US forces.

6. Maritime Biological Agent Detection Capabilities

a. The shipboard JBPDS provides a capability to alert, collect, and identify biological agents to support maritime operations. The first two monitoring systems continuously monitor the air for a significant rise in particulate concentrations and/or biological mass. If a significant rise over background is detected, the instruments will automatically collect an aerosol sample, and alert the ship's damage control center (DCC) of the need to collect the sample and screen it using HHAs for a possible presumptive identification. Positive presumptive identification results from the IBADS and/or JBPDS providing a high-confidence result.

b. The maritime JBPDS detects and identifies BW agents. It contains or connects to navigation, MET, and communications equipment that are used to identify the location and sense the conditions under which the agent was detected. The maritime JBPDS has the ability to detect and identify up to ten BW agents (e.g., bacteria, rickettsia, viruses, and toxins) during a mission. BW agent identification is limited only by the available agent reactive assay strips housed within the identifier. It provides the ability to collect and save BW agent samples for later laboratory analysis. The JBPDS consists of the BBSU and a power pack.

c. The maritime JBPDS provides the capability to monitor the ambient air for the presence of BW agents; is employed to provide a presumptive identification support to the commander and provides alert, collection, identification, and a reporting capability.

7. Dry Filter Unit

a. The DFU 2000 provides the commander with a capability for biological sampling. This system is complemented by the HHAs, providing the command with a manual presumptive identification capability for the analysis of the samples. See Table C-2 (page C-6) for a summary of DFU 2000 functions.

Table C-2. DFU 2000 Functions

	Collecting	Identifying	Reporting
DFU 2000 ¹	Collection of a sample at a prescribed interval.	Determines presumptive identification based on manual HHA.	Time range for reporting of presumptive identification: 18 to 20 minutes; following collection of the sample.
Note 1: The DFU has no trigger.			

b. The DFU 2000 consists of a DFU 1000 air sampler, outer shelter, and pre-separator. The system uses commercial power but comes equipped with a generator with automatic-start capability to change power sources in case of a commercial power failure.

c. The DFU provides the following capabilities:

- Biological air sampling.
- Collection and concentration biological particulates from ambient air.
- Collection time: 1 to 8 hours.
- Presumptive identification of BW agents. Filter placed into buffer solution, shaken to extract particles, and analyzed using the HHA.
- Simple to operate and maintain.
- Contained within a shelter for use in harsh exterior climates.
- Exclusion of large particles and rain from the filters (via pre-separator).

d. The DFU 2000 collects particles from the ambient air for analysis. It is a continuous sampler that collects/traps airborne particles onto a filter for later extraction and analysis. Testing may be performed through antibody-antigen analysis, such as HHAs. The DFU 2000 requires minimal training and maintenance. Operations are simple and require very little time. When deployed with HHAs and DFU consumable kits, the DFU 2000 becomes both a biological sampling and presumptive identification system.

e. The DFU sampling and identification process (capabilities) consists of: collection, manual presumptive identification, reporting, and sample packaging and evacuation (initial preparation is done before testing) (see Table C-3).

Table C-3. DFU 2000 Biological Detection Process

Mission Essential Task	Product(s)
Collection	Physical sample for analysis
Identifying	Presumptive identification
Reporting	Incident report
Evacuating	Confirmatory identification

(1) Collection. The decision to conduct DFU 2000 sampling operations is made by the commander with input from his NBC, intelligence, medical, and FP staff.

(2) Manual Presumptive Identification. Presumptive identification using HHAs and samples collected by the DFU 2000 is conducted at intervals established by the commander or his designated representative (e.g., FP officer).

(3) Reporting. The DFU 2000 provides information based on the results from the HHA testing. The DFU 2000 is deployed within an installation and communications linkages between the operators conducting the HHA testing and the installation OPCEN allows critical BW agent identification information to support the commanders SA.

(4) Evacuating the Sample. Following presumptive identification, the installation provides a FRAGORD, when applicable, for sample evacuation. This FRAGORD directs when to evacuate the collected sample or samples, the STP location, specific identification of the receiving courier team, and a not-later-than (NLT) time to link up with the escort team at the STP.

8. Department of Defense Biological Sampling Kit

a. The DOD biological sampling kit capability provides a presumptive identification capability for areas suspected of being contaminated with BW agents. The kits include all components necessary to acquire a sample and provide presumptive identification. The kit's basic functions include: collecting, identifying, and reporting.

b. The DOD biological sampling kit is a single-use package containing the HHA's sampling panel and all the supporting supplies to collect and process suspect samples. Each kit holds up to 8 HHAs, phosphate buffered saline (PBS) solution in a dropper bottle, 2 sterile cotton-tipped swabs, directions for use, and a blue-capped 50-milliliter (ml) conical tube.

c. The DOD biological sampling kit provides a capability to test areas suspected of being contaminated with BW agents on a surface that is conducive to testing. The HHAs are designed to identify a limited list of biological agents from relatively clean, nonporous surfaces. The HHA is not designed for soil, skin, wood, food, or water sampling and is not for diagnostic use.

d. The DOD biological sampling kit and its associated HHAs are employed for—

- Field screening of suspect munitions.
- Munitions fragments.
- Suspicious liquids.
- Powders (or suspensions).
- Terrorist laboratories or weapons materials that might be associated with the manufacture or delivery of BW agents.
- Reconnaissance of indoor or outdoor surfaces where it is suspected that BW agents were released in fairly high concentrations.

f. The DOD biological sampling kit's sampling and identification process consists of sampling, manual presumptive identification, reporting, and sample packaging and evacuation.

(1) Sampling. The decision to conduct sampling is made by the commander with input from the NBC intelligence, medical, and NBC reconnaissance teams, or explosive ordnance disposal (EOD) teams.

(2) Manual Presumptive Identification. The sampling team conducts manual presumptive identification upon completion of the sampling.

(3) Reporting. The results of the presumptive identification process are reported by the sampling team to the controlling OPCEN (e.g., NBCCC).

(4) Evacuating the Sample. Following a presumptive identification, the installation provides a FRAGORD, when applicable, for sample evacuation. The FRAGORD directs when and where to evacuate the sample.

9. Common Limitation

a. Each of the systems and the kit described in this appendix use immunoassay technology to presumptively identify BW agents. HHAs use immunoassay technology, and as with testing for BW agents, there are limitations. HHAs are not designed to be the sole method of identification, but part of a layered defense capability utilizing follow-on laboratory assets to perform definitive or confirmatory identification of the agent. HHA limitations include—

(1) HHAs should not be used where there might be extremely high concentrations of the agents. Clogging may occur during the assay and lead to an inconclusive result.

(2) HHAs should not be removed from their foil packaging until just prior to the assay. Additionally, do not use the HHA if the packaging has been breached prior to testing. The HHA membrane can absorb humidity from the air and lead to an inconclusive test result.

(3) BW aerosol concentrations might be below detectable limits for the HHA, yet be above the infectious dosage. This could lead to false negative results. Due to the limitations of the HHA, additional testing is always necessary to assess an area as contamination-free for that BW agent.

b. The HHA allows for presumptive identification only. Like all assays, the HHA has a threshold—if below this concentration, the assay will not detect the agent. Although the HHA is sensitive, the infective dose for most pathogens is far lower than the sensitivity of the HHA ticket. The use of the HHA leads to presumptive identification only (whether negative or positive) and must be confirmed by additional testing at a laboratory using multiple microbiological methodologies.

Appendix D

BIOLOGICAL DETECTION CONTRACTED LOGISTIC SUPPORT

1. Background

Biological detection assets use standard military support for supply and maintenance; however, biological detection assets often require the use of CLS as an integrated element of their support and deployment package. Integrated, validated OPLANs/OPORDs outlining the biological detection logistics support concept and CLS must be integrated into contingency planning. Logistics support planning must address CLS considerations during mobilization, employment, and deployment. Planning also addresses the contingency that multiple mission requirements will split biological detection operations into different theaters of operation, increasing risk and degrading CLS support (e.g., dilution of limited CLS assets).

2. Principles

The use of CLS for military operations is governed by principles that emphasize ensuring that a plan is executable from both an operational and logistics perspective. The following principles provide a framework for use of CLS.

a. **Risk Assessment.** Commanders must assess risk and evaluate factors such as the impact of the threat on contractor safety and determine where CLS can safely operate. The risk assessment also identifies the survival training and equipment (e.g., IPE) that CLS will require during the assigned mission.

b. **Force Structure Augmentation.** CLS is an integral support requirement for many biological detection assets. CLS provides a force structure augmentation for biological detection units that may not be part of the military's core capabilities (e.g., a military unit is not available to perform the required maintenance on biological detection suite components).

c. **METT-TC.** METT-TC considerations assist commanders and staff planners in evaluating when and where to use CLS. For example, the commander must consider the time required for CLS to repair a component at a centrally located facility versus using forward deployed maintenance contact teams. Additionally, commanders must consider other factors such as the enemy threat to operations involving the low-density, highly skilled CLS technicians.

d. **Integrated Planning.** CLS leaders must participate in the logistics planning process. CLS representatives must be present at planning sessions upon receipt of alert directives or OPLAN/OPORD. CLS representatives can provide useful input on the logistics feasibility of COAs and on preparation of the administrative/logistics annex to the plan or order.

e. Support to the Customer. Links between the biological detection unit and CLS must not place additional burdens or requirements on the supported unit. CLS can use whatever internal systems or procedures they choose; however, they must use the military systems and procedures when interfacing with the military.

f. International Agreements. International agreements and HN laws that apply to the AO directly affect the use of CLS. Use of CLS may incur legal obligations to the HN such as customs, taxes, vehicle registration and licensing, communications, support, passports or restrictions, and inter- or intra-country travel. These agreements must be considered when preparing contracts and OPLAN/OPORDs.

g. Habitual Relationships. A habitual relationship is a long-term relationship between CLS and the biological detection asset. The nature of this relationship is established through the terms and conditions of a contract and extends beyond that of the organization to include the individual contractor, employee, and supported unit.

3. Contracted Logistic Support Planning Considerations

Planning for CLS support is integral to any operation. Planning for an operation involves several critical decisions concerning the integration of CLS capabilities. Key CLS planning considerations are addressed in the following paragraphs.

a. Responsibilities. Unit planning responsibilities ensure that the right resources are deployed for support of a mission (e.g., CLS deploys with the biological detection unit).

b. OPLAN. The CSS sections of applicable OPLANs address the concept of use and employment of CLS. The level of detail in the OPLAN will vary depending on the level of command.

c. Risk Assessment. Risk assessment evaluates the ability of CLS to support missions during the transition from peace to conflict. As mission requirements increase, CLS must still respond with the same required support.

d. Responsiveness of Support. The nature of the operational environment (i.e., operations in multiple AOs and theaters of operation) may input the ability of CLS to support deployed assets; however, uninterrupted sustainment support is still required. CLS must be prepared to task-organize its assets to meet unanticipated requirements.

e. Transition From Peace To War. The risk of using CLS during peacetime is normally low, increasing as operations transition from peace to war. The supported force must protect CLS personnel in hostile areas, and the CLS contractor and his employees must be trained and ready to operate and survive in an NBC environment.

f. Communicating Requirements. The CLS contract describes the scope of CLS support, and the contractor is not legally obligated to meet any requirement not in the contract. Without a requirement specified in the contract, the government has no basis for directing or requiring any contractor action. All requirements for CLS are communicated to the contractor through the contract.

g. Coordination.

(1) Requirements. Coordinated planning occurs between the supporting COCOM, the gaining COCOM, the biological detection unit, and CLS. CLS planning and coordination must also address the chain of command's responsibility to feed, house, and protect contractor employees operating on the battlefield. It must also include predeployment training and integrated time-phased force deployment planning.

(2) Within the scope of the existing contract, the major command (e.g., United States Army Forces Command [FORSCOM]) contracting office should appoint a task monitor. The appointed task monitor must be familiar with CLS operations. Additionally, a CLS appointment letter will outline the task monitor's responsibilities. See Paragraph 5 for information on task monitor responsibilities. Further, the task monitor must also be familiar with biological detection operations.

(3) CLS must be attached to a military support element for functions such as life support and personnel accountability. For example, the United States Army Materiel Command (USAMC) logistic support element (LSE) would coordinate day-to-day life-support services for the CLS team; however, the LSE may not be within the AOR initially. In the absence of the LSE, a designated unit such as a biological detection company (BDC) or a C² HQ element will coordinate the required life-support efforts for CLS personnel. The actual life-support services could also be furnished by a HN, another service, or another Army unit.

(4) Effective coordination and deployment planning ensures that deploying CLS teams receive notification of deployment (concurrent with notification of biological detection assets) to allow CLS to prepare for movement.

4. Employment

Employment considerations include—

a. Obtaining information on the safety zone requirements. The safety zone is an FP control measure for CLS operations. The boundaries are determined by the COCOM based on threat and mission considerations.

b. Locating CLS near the biological detection assets C² element.

c. Informing the gaining command of CLS facility requirements and conducting coordination to ensure required assets are furnished.

d. Locating CLS near main supply routes (MSRs), airfields, or ports of debarkation (PODs) (air or sea) to facilitate the movement of supplies and equipment.

e. Recognizing the requirement for permits or authorizations to move CLS teams across international borders.

5. Responsibilities

a. General. Managing and maintaining visibility over CLS requires the involvement of commanders and their staffs at all levels. In planning and execution, the responsibilities for integration of CLS ranges from the strategic to tactical level, and it is necessary to ensure that CLS is integrated into the decision-making process.

b. Supporting COCOM (force provider). The supporting combatant commander's responsibilities may include—

- (1) Providing the contracting officer (KO) for the CLS support effort.
- (2) Validating force requirements to support an OPLAN (ensure OPLANS address CLS requirements).
- (3) Preparing forces for commitment in support of OPLAN execution.
- (4) Coordinating movement with and deploying forces as scheduled by United States Transportation Command (USTRANSCOM).
- (5) Coordinating deployment changes with the supported COCOM and USTRANSCOM.
- (6) Coordinating and supporting deployment requirements for biological detection and CLS assets.
- (7) Notifying the CLS KO at the area contracting center on deployment notification.
- (8) Designating installations (e.g., Fort Benning, Georgia [GA]) as a mobilization station (MS) for execution of the mobilization mission (i.e., receiving, processing, training, equipping, validating, and deploying CLS personnel).

c. Installation. Installation responsibilities can include supporting deployment operations or supporting other personnel, medical, or logistics issues.

(1) For deployment, installations such as Fort Benning, GA or Fort Polk, Louisiana (LA) may be designated as MSs and aerial ports of embarkation (APOEs). The primary responsibilities of the MSs are to receive, house, command, support, share assets, train, validate, and deploy biological detection units and CLS.

(2) Support from the installation can range from personnel, to medical, to logistics issues. For example, the installation transportation officer may provide guidance and help units prepare, maintain, and execute movement plans. They also coordinate and monitor unit movement, provide assistance to units within or traversing the installation support area, and coordinate commercial transportation support. They prepare movement reports, process convoy clearances and special hauling permits, and approve unit movement plans and associated data. Installation staffs should also be responsible for physically processing military units and supporting biological detection CLS elements for deployment

in accordance with according to their readiness SOP. This support includes conducting military and civilian readiness processing verification. This process can include medical and dental processing, and chemical defense equipment issue, and organizational clothing and individual equipment (OCIE) issue.

d. CONUS Replacement Center (CRC).

(1) The CRC responsibility includes receiving, processing, training, equipping, validating, and deploying reserve soldiers and contract civilians, and providing theater-specific equipment. The CRC coordinates equipping, transporting, training, validating, and staging personnel for movement to a theater of operation. The CRC can also become a CONUS demobilization center upon redeployment. It receives, out-processes, and accounts for individuals returning from the theater, to include soldiers and civilians. Further, a military installation staff (supporting the CRC) will physically process the military and civilian personnel. This includes functions such as administration, soldier and civilian readiness processing, billeting, communications, medical and dental support, OCIE issue, and training.

(2) CRCs have responsibility for the following critical tasks:

- (a) Certify military personnel/civilian contractor readiness processing qualifications.
- (b) Coordinate installation-processing requirements, when needed.
- (c) Coordinate equipping military personnel, government civilians, and contract civilians.
- (d) Coordinate theater-specific briefings and training requirements.
- (e) Coordinate movement around the installation and to the port of embarkation (POE).
- (f) Create and provide manifests.
- (g) Coordinate out-processing procedures with the installation.

e. Gaining Combatant Command Responsibilities. The supported geographic COCOM accomplishes key tasks that include—

(1) Preparing operational plans that address CLS requirements. The OPLAN has the time-phased force and deployment data (TPFDD), non-unit-related cargo and personnel data, and movement data for the OPLAN. The TPFDD includes integrated information for both the biological detection and CLS assets.

(2) Providing facilities to support CLS requirements.

(3) Requesting CLS capabilities and approving TPFDD requirements for biological detection unit and their supporting CLS assets.

(4) Ensuring the reception, staging, onward movement, and integration (RSOI) of CLS assets.

f. Service Component Commander (SCC). COCOMs may be forward stationed or CONUS based. The service component develops the TPFDD and ensures the supporting plans are consistent with the unified commander's OPLAN. The service component is responsible for the following:

- (1) Developing supporting plans for OPLANs.
- (2) Training and preparing its assigned forces for deployment.
- (3) Maintaining accurate unit movement data (UMD) for its assigned units.
- (4) Prescribing procedures, requirements, and responsibilities for deployment planning and execution.
- (5) Coordinating deployment activities as scheduled by USTRANSCOM.
- (6) Planning and preparing to receive and support forces if deployed to its AOs.

g. Senior Theater Logistics Command. The senior theater logistics command is responsible for synchronizing logistics and support operations, and for integrating CLS into the overall support structure. The senior logistics command in the AOR assumes responsibility for visibility of the CLS element in the theater, and maintains visibility over who is in the theater, where they are operating, what support functions they are performing, and when they provide support. The functions performed by the logistics command are not related to contract compliance.

h. Biological Detection Assets. The biological detection asset's responsibilities can include—

- (1) Coordinating FP for CLS assets.
- (2) Employing CLS capabilities.
- (3) Providing integrated unit and CLS movement data for submission to support the TPFDD.
- (4) Coordinating required life support for CLS during deployments.
- (5) Integrating CLS into readiness processing.
- (6) Offering training, as required.
- (7) Integrating CLS considerations and CLS team leaders into the contingency planning process.

i. USTRANSCOM. The major player in the movement of CLS equipment, and supplies is USTRANSCOM and its transportation component commands—Military Traffic

Management Command (MTMC), Military Sealift Command (MSC), and the Air Mobility Command (AMC). USTRANSCOM provides strategic air, land, and sea transportation for biological detection and CLS resources. USTRANSCOM provides centralized global transportation management to ensure in-transit asset visibility. USTRANSCOM assets support the biological detection CLS effort through movement of CLS personnel and equipment, furnishing transportation assets for resupply of consumables and line replacement units, and transporting CLS assets between areas of responsibility, if required.

j. Military Departments. Service departments support the geographic COCOMs/JFCs through ensuring administrative and logistics support for its forces.

k. CLS Responsibilities.

(1) The CLS team provides system support for systems such as BIDS, JPS, JBPDS, and the LRBSDS. The CLS project manager supervises CLS team activities and ensures readiness of CLS elements to support biodetection unit requirements.

(2) The CLS team has the overall responsibility for each aspect of the support activity. These responsibilities include, but are not limited to the following:

(a) Providing CLS planning for the supported unit.

(b) Providing CLS load planning data to the supported unit and establishing priorities for work accomplished.

(c) Reviewing work and supply requests from the supply unit.

(d) Managing and ensuring that CLS team personnel remain ready for deployment (e.g., monitoring training, and medical dental requirements)

l. Contracting Officer Representative (COR)/Task Monitor.

(1) The COR or task monitor is the contracting officer's designated representative who assists in the technical monitoring and administration of a contract. The COR is the supported unit's link to the contractor using the contract administration and management process. This task monitor is designated in writing to perform the duties and responsibilities delegated by the KO.

(2) The COR, administrative contracting officer's representative (ACOR) or task monitor gives specific duties and responsibilities that are delegated in writing by the contracting officer. Typically, a COR will be responsible for assisting the KO in the following areas:

(a) Maintaining liaison and direct communications with both the contractor and the KO.

(b) Monitoring the contractor's performance, notifying the KO of deficiencies observed during surveillance, and recommending appropriate corrective action.

(c) Verifying that the contractor has performed the technical and management requirements of the contract.

(d) Performing all necessary inspections.

(e) Verifying that the contractor has corrected all correctable deficiencies.

(f) Performing acceptance (for the government) of supplies and services received.

(3) Although the CORs provide a vital link between the military and the contractor, there are certain limits to their authority. The COR/ACOR/task monitor is prohibited from—

(a) Making any agreement with the contractor requiring the obligation of public funds.

(b) Making any commitments or changes that affect price, quality, quantity, delivery, or other terms and conditions of the contract.

(c) Discouraging the contractor by words, actions, or a failure to act to undertake new work or an extension of existing work beyond the contract period.

(d) Authorizing a contractor to obtain property for use under a contract.

(e) Interfering with the contractor's management prerogative by "supervising" contractor employees or otherwise directing their work efforts.

(f) Modifying the tour of duty or hours.

(4) Task monitor responsibilities include—

(a) Monitoring contract performance, and notifying the COR of deficiencies observed during surveillance (i.e., recommendations).

(b) Receiving feedback from the biological detection and CLS leaders on sustainment operations.

(c) Coordinating with the CLS contractor on any changes in contract requirements, if directed by the KO/COR.

6. Contracted Logistic Support Capabilities and Constraints

CLS requirements may include biological detection systems-specific maintenance and/or supply support as required by the applicable contract. CLS requirements may also include operating biological detection equipment.

7. Contracted Logistic Support Team Assessment

It is especially critical that CLS teams are responsive to short-notice deployment requirements, and the KO/COR may assess the preparedness of CLS to respond.

a. Upon receipt of notification of a requirement to deploy CLS, negotiation between the CLS contractor and KO results in agreement/certification that the contractor will fulfill required contractual requirements.

b. Additionally, the COR receives reports or assessments from task monitors on CLS team preparation for deployment. The task monitor coordinates with activities such as the onsite CLS team, the biological detection element, and applicable installation level POCs. Examples of key information that the task monitor may report during deployment processing includes—

(1) Satisfactory completion of readiness processing by CLS personnel, to include required training.

(2) Results of technical inspections of CLS vehicles.

(3) Receipt of required organizational clothing and equipment (i.e., protective masks, overgarments).

(4) Completed packing of specified line replacement units, consumables, spare parts, etc. are packed.

(5) Responsiveness of CLS.

8. Control of Contracted Logistic Support

Planning for CLS addresses military responsibility to feed, house, equip, and protect contractor employees operating on the battlefield. It also includes predeployment training and time-phased, force-deployment planning. Overall, the CLS planning effort must address the considerations that follow.

a. C². When coordinating CLS, the applicable contract addresses the relationship between the CLS team and its support as a system contractor to the military. This is a crucial point since commanders cannot order contractors to provide services; they must use the COR to direct work within the scope of the existing contract. Additionally, the government's CLS KO can appoint (in writing) a military unit commander or his designated representative as a task monitor. The task monitor would then have the authority to monitor CLS operations. He would provide general guidance and furnish missions and priorities to the supporting CLS team. The appointed task monitor should be familiar with biological detection CLS operations.

b. Deployment of CLS Personnel. The CLS personnel will deploy in support of biological detection unit operations. These deploying CLS teams require early notification of deployment to allow adequate preparation for movement to become an integral part of the deployment package.

c. Location on the battlefield. Site determination of a CLS team requires consideration of several factors. Some of these include—

(1) Geographical limits of the contractor's safety zone and physical-security requirements. The safety zone is an FP control measure for CLS operations. The boundaries are determined by the COCOM based on threat and mission considerations.

(2) Location of CLS teams near the biological detection asset for responsiveness, access to communications and biological detection asset logistics information, and daily coordination.

(3) Facilities that support CLS supply and maintenance requirements (refrigeration support for selected supplies, power sources, and a relatively dust-free environment).

(4) Location of CLS teams near MSRs or PODs (air or sea) to expedite the receipt or transport of supplies, components, or CLS teams to other locations within or outside the theater.

(5) Requirements to move CLS teams across international borders and the corresponding requirements for permits and authorizations.

9. Contracted Logistics Support Concept

a. Concept. CLS could range from maintenance and supply operations to providing equipment operators for biological detection systems.

b. Maintenance Support.

(1) In general, military units are responsible for requesting, maintaining, and turning in standard military issue equipment such as generators, gas particulate filter units (GPFUs), vehicles, and radios.

(2) Military biological detection asset leadership carefully analyzes maintenance requirements with respect to movement and maintenance times for repair versus replacement and evacuation of components. Unit leaders consider actions such as establishing forward fixing points and weigh the travel and repair time for a contact team at a forward fixing site versus the travel and repair times at a centralized location. The biological detection unit considers maintenance that may include repair by replacement or repair forward.

(a) Repair By Replacement. After troubleshooting fails to resolve the problem, the biological detection unit may request maintenance support. For example, the biological detection unit can remove the line replacement unit (LRU) (enclosed in a carrying case) for transport to the maintenance collection point or for a one-for-one, onsite swap with a unit contact team. Alternatively, a military unit support crew could bring the LRU (with carrying case) to the detection site location and replace the LRU onsite. Multiple options are available for execution of repair by replacement. Additionally, operational readiness floats (ORFs) may be used when down time would degrade overall operational readiness to an unacceptable level and/or when repair would exceed a specific time frame. Specific ORF procedures for issue and turn-in of components or systems will be outlined in unit SOPs. Repair by replacement is generally the preferred option.

(b) Repair Forward. The biological detection unit, in coordination with supporting CSS and CLS elements, designates forward fixing sites that are within the safe zone and are secure. The forward fixing site is an intermediate point between the biological detection site and support elements for repair and/or exchange of systems, components, or consumables. Based on assessment of the repair requirements, a CSS maintenance team may recommend repair of the component at the CSS main logistics support base.

c. Supply Concept.

(1) Biological detection teams (BDTs) require common, as well as unique supplies to execute their missions. The unit requisitions unique supply items from the CLS supply team based on standardized, onboard stockage levels and projected consumption rates for current operations. The biological detection unit in conjunction with the CLS contractor, carefully plans and establishes CLS reorder points based on anticipated supply transit times.

(2) Based on coordination between the CLS team leader and the biological detection unit, key leadership remains informed of key CLS logistics issues. To ensure responsiveness, CLS prepares supply push packages. Daily coordination also helps identify critical supply items that may require the biological detection unit to establish controlled supply rates. Alerting CLS rear to critical supply issues allows direct coordination with the vendor for issue resolution.

(3) Resupply can be executed either on a centralized or decentralized basis depending on METT-TC considerations. The biological detection unit can pickup supplies from a central supply point or supplies could be delivered to biological detection assets individually. Multiple factors will influence what resupply concept is used. Factors to be considered include location of the biodetection element, location of CLS supply points, urgency of a resupply requirement, and transporting supplies across international borders.

d. System Operators. CLS may be required to provide operators for biological detection systems. The system operators are responsive to the supported unit. Factors that are especially critical to CLS system operations include (but are not limited to)—

- Ensuring requisite survival training and equipping (based on risk assessment).
- Ensuring uninterrupted continuity of operations.
- Ensuring maintenance of operator training proficiency.

Appendix E

BIOLOGICAL COLLECTION AND DETECTION SYSTEM EMPLOYMENT

1. Background

Biological detectors provide the commander with a BW collection, sampling and presumptive identification capability. The detectors provide a sample for presumptive identification and follow-on analysis at higher-level laboratories. Biological detectors provide the commander a means of supporting the commander's SA and provide information that can be used to support detect-to-treat decisions (e.g., presumptive identification).

2. Mission

Biological collectors and detectors are used to provide biological detecting, collection, and a presumptive identification capability.

3. Concept of Operations

The employment of biological collection and detection system, is directly impacted by the supported commander's CONOPS.

a. CONOPS. Biological detectors should be used, operated, maintained, and redeployed using a phased operation. The duration and implementation of each of these phases is on order and therefore dependent on METT-TC considerations.

b. Preattack. The biological surveillance CONOPS begins with the receipt of the mission and guidance (see Figure E-1 [page E-3]). METT-TC considerations play a vital role in establishing the CONOPS for biological surveillance. They are used throughout the planning and development of the biological surveillance plan. The preattack CONOPS includes:

- Conducting a BW threat analysis. The BW threat analysis is a continual process of compiling and examining all available threat BW information in order to identify the BW threat. This is done using the IPB process. The BW threat analysis uses the best available information; however there will be gaps in the overall intelligence and MEDSURV SA. The complete picture (i.e., did a BW attack occur or not occur) is a composite of information from multiple sources.

- Conducting a BW vulnerability analysis. The BW vulnerability analysis is a continual process of compiling and examining information on the BW protective posture of a force or facility. It assesses the BW defense strengths and weaknesses of a force or facility's BW protective posture. The NBC and medical planner analyze the friendly force's BW defense preparedness to include the adequacy of individual and collective protection

(COLPRO), detection, medical, and decontamination resources against possible BW releases.

- Conducting BW vulnerability assessment (VA). The BW threat analysis is compared with the BW vulnerability analysis to create the NBC VA. The process compares the BW threat against the force or facility's ability to protect against and/or to mitigate the threat of BW attacks. For example, if the BW vulnerability assessment is assessed as low, the biological surveillance plan may direct that detectors conduct collection operations in a standard mode (and thereby conserve resources). Conversely, a high BW vulnerability assessment will likely increase the number of detectors used and lengthen the monitoring periods.

- Preparing the biological surveillance plan (including BW response planning). See paragraph 4 for information elements that should be included in the plan.

c. During and postattack. The biological surveillance CONOPS for conducting during and postattack biological surveillance operations (see Figure E-2 [page E-5]) includes:

- Executing the biological surveillance plan.
- Maintaining SA.
- Reassessing and adjusting as necessary.

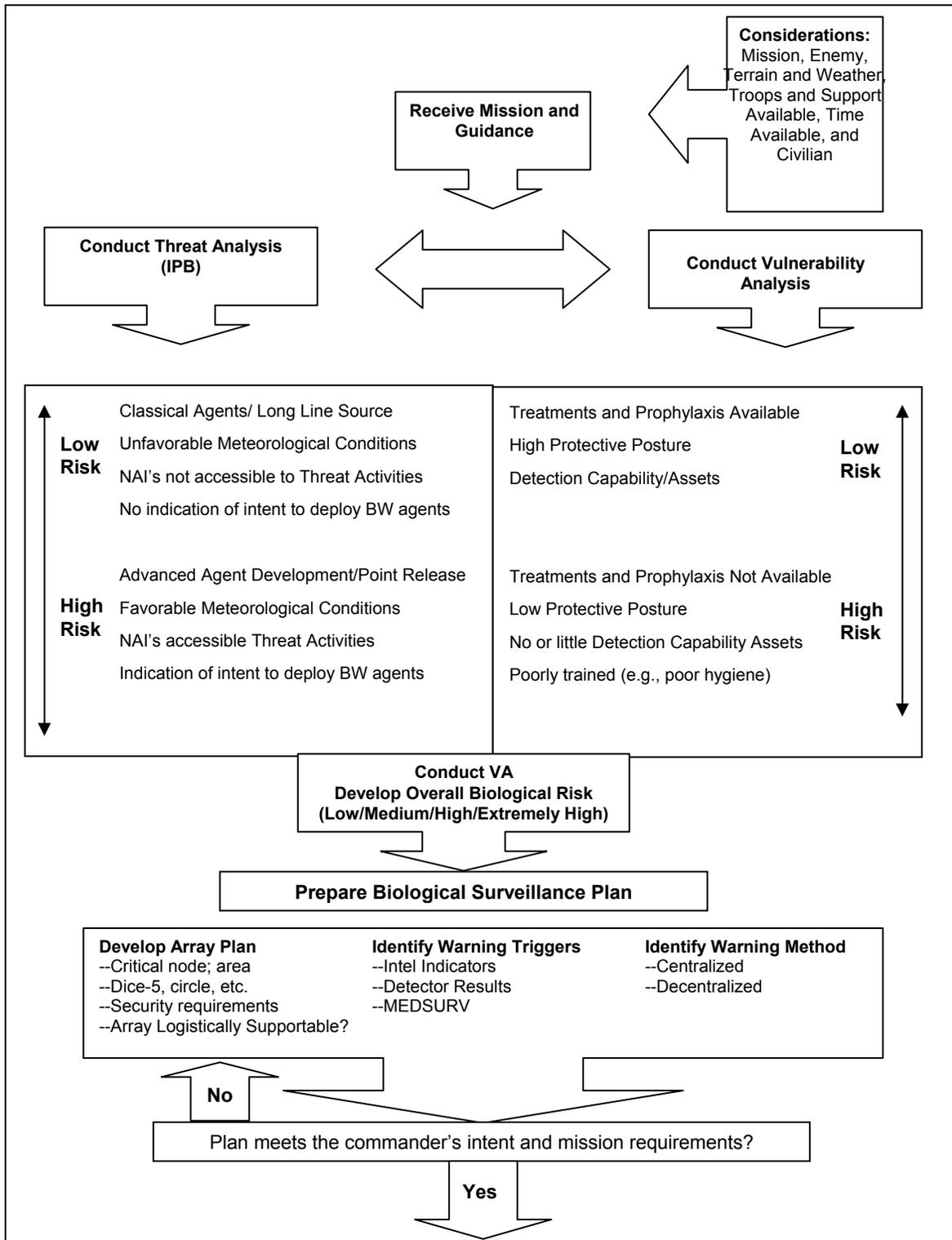


Figure E-1. Biological Surveillance Mission Planning - Preattack

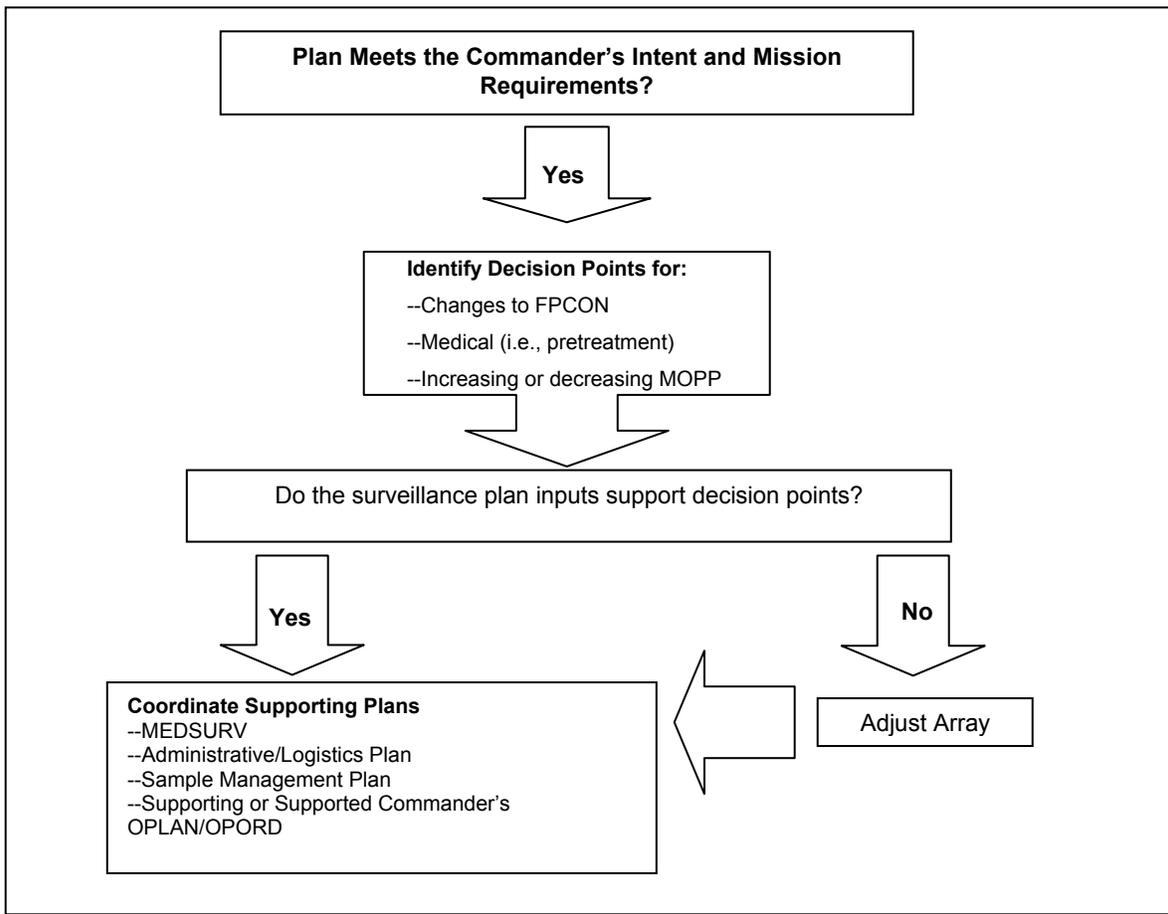


Figure E-1. Biological Surveillance Mission Planning – Preattack (Continued)

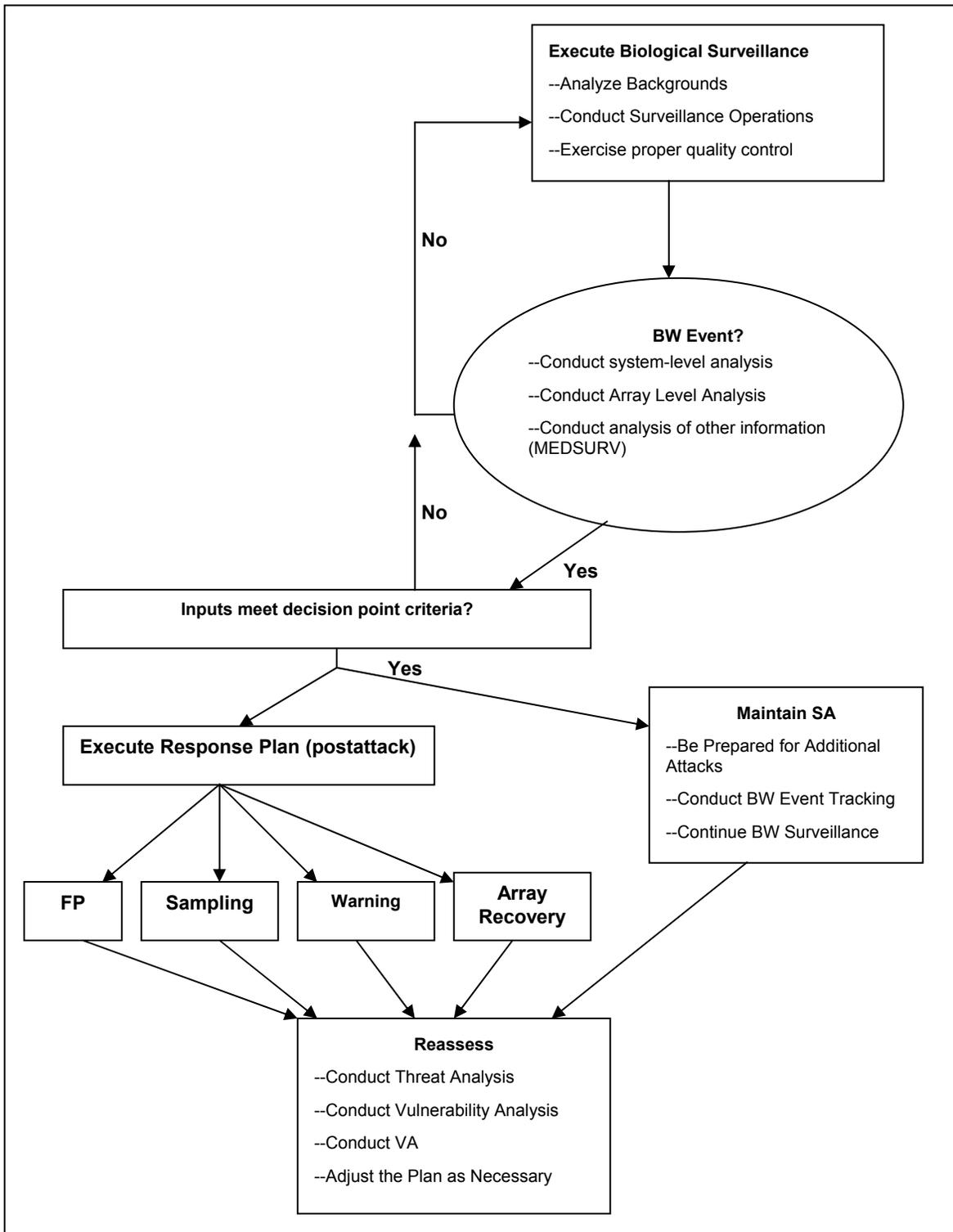


Figure E-2. Biological Surveillance Mission Planning – Attack and Postattack

4. Employment Considerations

Although some biological detectors provide the commander with the capability to alert, sample, and even provide a presumptive identification capacity, not all deployed systems have these functions. DFUs, for example, just sample the particles present in the nearby air and do not have an alerting capability. It is a continuous collector that collects/traps airborne particles onto a filter at pre-established intervals for the conduct of presumptive identification manually.

a. Biological detectors such as the JBPDS, JPS, and BIDS have both a monitoring and alert capability. These detectors collect particles from the ambient air for analysis following an alert. Following collection of the sample, these systems begin the presumptive identification process.

b. The operational envelope for use of biological detectors (i.e., determining when or where to use detectors/collectors) is dependent on factors such as the system's capabilities. As outlined in Chapter II, the operational envelope of some systems is only applicable to fixed-site operations (e.g., JPS, JBPDS [man-portable or trailer version], or DFU), while other systems can be used for support of maneuver land/maritime forces (e.g., BIDS, maritime JBPDS). BIDS units can be used for fixed site or for support maneuver forces. METT-TC factors will also impact where and how detection and collection devices are used.

(1) Mission. Mission requirements will dictate where the detectors will be employed.

(2) Enemy. Planners must consider enemy capabilities such as the type of BW agents that could be used and the method of dissemination (line or point source).

(a) Line Source—agent disseminated along a line perpendicular to the wind and upwind of the target. Example delivery systems include track-mounted sprayers, aircraft sprayers, tanks, agricultural sprayers, or releases from ships.

(b) Point Source—agents disseminated from single or multiple fixed points. Example delivery systems include bombs, unitary missile warheads, submunitions, fixed generators, or back sprayers.

(3) Terrain and Weather Considerations. Planners remain aware that terrain and weather conditions can impact biological detection operations. A dirty environment may adversely impact detector or sampler operations (e.g., false positives on HHAs from non-specific binding [NSB], or the detector filter becomes clogged). Additionally, areas with high organic content in the ambient air may cause false positives during the presumptive identification process. Other conditions such as sandstorms could also degrade biological detection operations (i.e., shutdown of alerting devices to prevent damage to components).

(4) Troops and Support Available. The availability of a supporting lab, sample courier assets, and CLS are critical assets for support of biological detector and sampling systems. Additionally, the use of systems such as the DFU, JPS, and JBPDS require deploying units to provide manpower and resources to conduct filter collection and HHA testing.

(5) Time Available. Planners must consider time when employing detectors and samplers. Detect-to-treat information may be especially critical if a fixed site has a high throughput population. The fixed site may be an APOE or seaport of embarkation (SPOE) or APOD/SPOD with a highly transient population. In this situation, the frequency of sampling may need to be increased in order to limit the potential spread of a biological agent by exposed personnel.

(6) Civilian. Planners consider and plan for the availability of civilian assets such as CLS or the possibility of laboratory support from a civilian source (i.e., other government agency).

c. For biological detection surveillance support for critical nodes or area arrays, the METT-TC factors are applied to achieve the tradeoffs that are necessary to optimize the probability of detection.

(1) During planning for biological surveillance operations, information such as the following are used: the commander's guidance, weather and terrain, intelligence information (i.e., agent types and type of release), and the size of the base or activity or the area(s) that require support. This information is used to produce the biological surveillance plan.

(2) The surveillance plan should include:

- The BW surveillance vulnerability analysis.
- The MET assessment.
- The recommended duration of operation for detectors and/or collectors.
- The recommended mode of operation.
- The separation distance between detectors and/or collectors.
- The number of detectors required.
- The detector array employment tactic (i.e., dice-five, line) and the plan for siting of systems (i.e., distance from the perimeter [critical node] or downwind distance from an estimated release point (RP) for a biological agent [area array]).
- The mission and the commander's guidance and priorities (i.e., what biological detection array confidence result [medium or high] would serve as input for the triggering of the commander's decision).

(3) The commander approves the biological surveillance plan. See paragraphs 5, 6, and 7 for information that can be used to support preparation of the biological surveillance plan. However, modifications to the plan may be required based on changes in weather, the operational situation, or resource issues (i.e., equipment, supply, or operator issues). There is risk associated with the implementation of a plan. The commander uses other information sources (i.e., MEDSURV, intelligence information) to maintain SA and to

increase the confidence in an operational assessment (i.e., to confirm or deny that a BW attack has occurred).

5. Biological Warfare Threat Analysis (Intelligence Preparation of the Battlespace)

It is important to be aware of how the operational environment and MET conditions affect biological surveillance operations. The operational environment (biological threat) and MET conditions will affect how often and how long biological detection and sampling operations are conducted.

a. BW threat analysis is conducted to determine a recommended biological threat risk status—low, medium, or high (Figure E-3). The risk assessments are qualitative. The intelligence estimates are derived from the best available information, and will likely not definitely answer intelligence IRs that may be on a checklist.

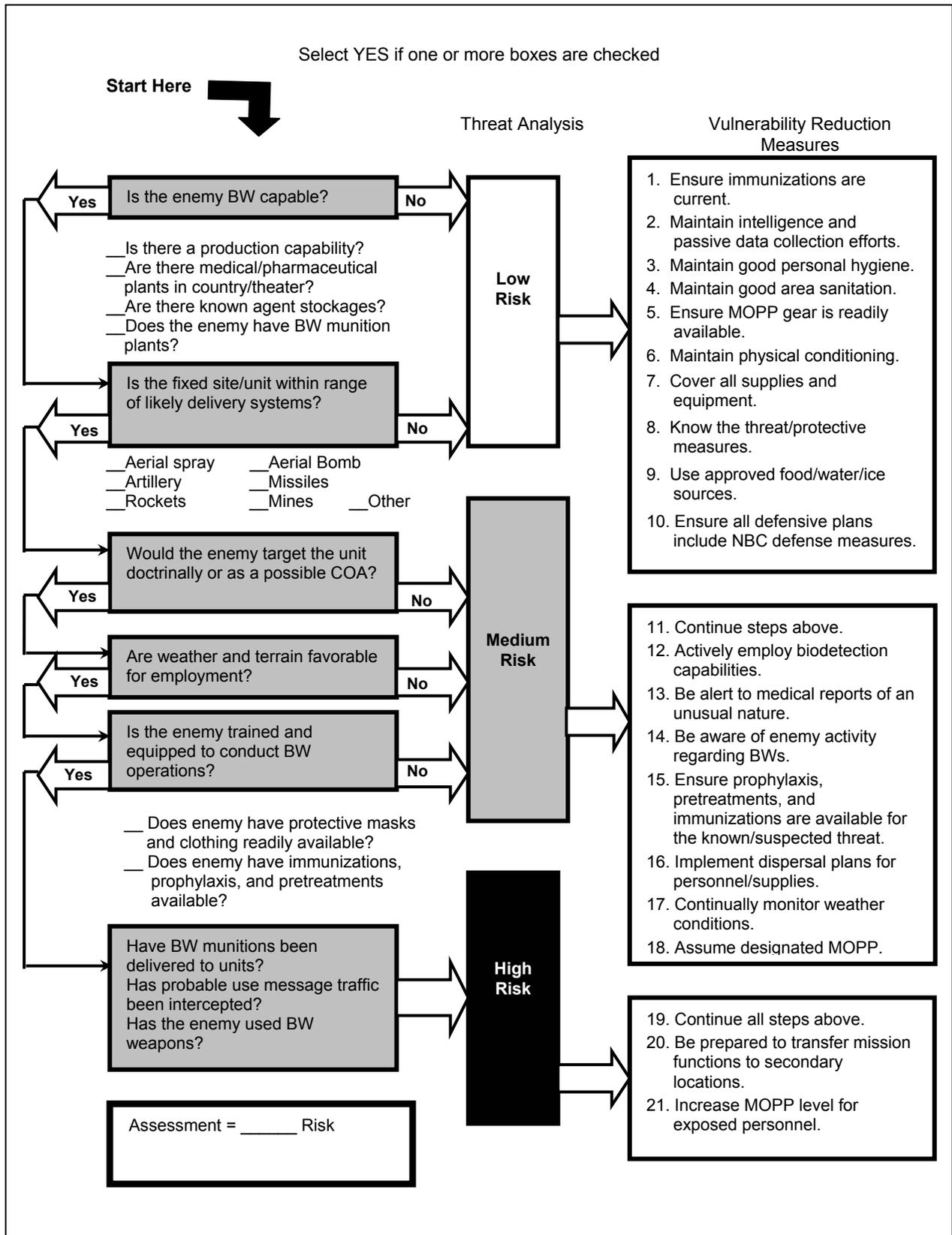


Figure E-3. Conducting BW Threat Analysis (IPB)

b. Next, MET conditions are assessed.

(1) Table E-1 provides information on favorable, marginal, and unfavorable conditions for BW line-source releases. Favorable conditions for line-source releases generally include the presence of stable MET conditions. Stable conditions with accompanying winds support the wide-area dissemination of a BW aerosol.

Table E-1. Favorable, Marginal, or Unfavorable MET Conditions for BW Line-Source Release

Meteorological Conditions	Favorable for BW Use	Marginal for BW Use	Unfavorable for BW Use
Wind speed at heights below 16 meters	9-15 kph	15-32 kph	Less than 9 or greater than 32 kph
Stability	Stable	Neutral	Unstable
Temperature	1-20°C	Less than 0 or 21-29°C	More than 30°C
Precipitation	None to very light	Light	Moderate to Heavy

Note: Point dissemination can still be effective in less than favorable conditions.

(2) Unstable MET conditions are more effective for dispersal of a BW aerosol for a point attack. Unstable conditions provide the agitation that allows for a wider dissemination of a BW agent on a target such as a fixed site. Conversely, stable conditions during a BW attack would likely lead to thin, “cigar shaped” cloud formations.

(3) Additionally, terrain features and manmade structures will cause a BW aerosol to break up and increase the heterogeneous nature of the cloud

6. Duration and Modes of Operation for Biological Detection

The biological surveillance plan should address the duration of operation for the detection and/or collection assets in the array. The surveillance plan will also indicate the recommended mode of operation for the array.

a. Comparison of threat and MET information provides input that can be used to recommend the duration of collection and/or detection intervals. For example, during favorable conditions for enemy BW use and high BW risk conditions, the commander may decide to conduct detection operations 24 hours per day, 7 days per week (see Table E-2).

(1) The recommended detection and/or collection intervals can be tailored for specific locations and situations. For example, based on a low VA (i.e., peacetime threat, FPCON Alpha or Bravo), the commander may decide to use collection system capabilities (i.e., DFUs) and conserve resources (i.e., biological detection systems) that require more resources to operate.

Table E-2. Sample Duration Intervals for Biological Detection System or Collector Operations

	Low Risk (Enemy has the capability to employ BW agents – Peacetime Threat- FPCON Alpha or Bravo)	Medium Risk (Intelligence reports indicate an increase in the threat– FPCON Charlie or Delta)	High Risk Wartime/Conflict (Hostilities have begun)
MET Conditions	Day/Night	Day/Night	Day/Night
Favorable for BW Use	8 hours ³ /8 hours ³	8 hours ³ /12 hours ¹	12 hours ¹ /12 hours ¹
Marginal for BW Use	4 hours ³ / 8 hours ³	8 hours ³ /8 hours ³	8 hours ¹ /12 hours ¹
Unfavorable for BW Use	See Note 2	See Note 2/12 hours ³	4 hours ³ /12 hours ³
<p>Note 1. The biological detection system operates in Standard Mode. Note 2. The array's biological detectors operate in Standby Mode; based on notification that an attack is imminent, the array's biological detectors could be changed to Standard Mode. Note 3. The array's biological detectors or collectors operate with a 4-hour collection interval.</p>			

(2) Risk is taken when BW detection and collection operations are not conducted. However, the commander's common operational pictures (COPs) (i.e., IPB, weather and terrain assessments) provide the basis for directing detection and collection intervals.

b. The tailoring of the biological surveillance can also be applied to the array's mode of operation (i.e., standard mode, single sample, collection only, standby). System level technical publications (i.e., TO, TM) provide detailed information on the mode of operation for the different detectors. The biological detectors mode of operation can be tailored based on the operational situation. The modes of operation for a biological detection system could be adapted as follows:

(1) Use single-sample mode of operation to support specific requirements such as taking a background sample to support environmental characterization.

(2) Use a detectors collection capability during low-risk situations and save considerable amounts of resources (i.e., consumables) that otherwise would have been used during a standard mode of operation.

(3) Use a periodic sampling mode based on an imminent threat (enemy missile is inbound or a BW cloud is expected to arrive at a certain time).

7. Biological Detection and/or Collector Employment Tactics

The NBC staff recommends employment of biological surveillance assets. Many factors impact employment and the plan may be adjusted based on changes in the weather, threat and available assets. However, no employment tactic may be 100-percent successful in detecting and identifying a BW agent. For example, a terrorist could employ a single-point source BW munition without the release being detected by a biological detection array. Factors that are considered in the employment of biological surveillance assets include:

- Estimating separation distances between detectors and/or collectors at critical nodes.

- Estimating separation distances between detectors and/or collectors in array arrays.
 - Recommending employment tactics for the arrays detectors and/or collectors.
- a. Critical Node Separation Distances Between Collectors and/or Detectors.

Estimating Fixed-Site Separation Distances for Samplers/Detectors. The estimated separation distance between detectors or samplers will vary depending on terrain and weather considerations; however, the following provides suggested separation distances.

(1) For on-target or near-point-source releases, the preferred distance between detector/samplers is 200 to 400 meters. A 200 to 400-meter separation distance is a general rule-of-thumb for the approximate cloud radius after cloud dissemination.

(2) For line-source releases, the distances between detectors and samplers should not exceed 800 meters. An 800-meter separation is a general rule of thumb for line-source releases.

- b. Array Array Separation Distances for Collectors and/or Detectors.

(1) Estimating Line-Source Separation Distances for Biological Detectors in an Area Array. The estimate associated with the separation distances considers the size (in width) of the area to be protected, an estimate of the length of the line source, and the number of detectors that should be in the cloud path to support BW event tracking. For example, if the width of the area to be protected equals approximately 60 kilometers (km), the estimated length of a BW line source is 20 km, and the commander determines that he wants two detectors intersecting with the cloud, a total of 7 detectors would be required.

$$\left[\frac{\text{width of sector being protected}}{\text{estimated length of line source}} \times \begin{array}{l} \text{number of} \\ \text{detectors} \\ \text{intersecting with} \\ \text{the cloud} \end{array} \right] + 1 = \begin{array}{l} \text{number of} \\ \text{detectors} \\ \text{required} \end{array}$$

$$\left[\frac{60 \text{ km}}{20 \text{ km}} \times 2 \right] + 1 = 7 \text{ detectors}$$

(2) Locating Biological Detection Arrays Downwind of the Point of Release of a BW Agent. As a general rule-of-thumb, a biological detection array should be located within 20 to 25 km of the estimated RP of a BW agent to enable detection of this agent. Additionally, an aerielly delivered BW agent aerosol may not reach near ground level for 1 to 5 km. The distance depends on the height of release, type of aircraft, and wind speed. Also, a ground BW point source will require 1 to 2 km before the aerosol begins to coalesce into an organized cloud.

c. Biological Detector Employment Tactics. The NBC staff will recommend a BW detector and collection employment plan. The employment tactic for detectors and collectors will be based on the capabilities and COE for the systems. For example, detectors

and collectors like the JPS, JBPDS (man-portable or trailer version), or DFU are well suited for employment as point detectors or collectors or a critical node array at a fixed site. The specific employment tactics that may be used will vary based on factors such as:

- The BW risk assessment and IPB (i.e., delivery system and tactics for delivery).
- Terrain and weather conditions.
- The location and size of assigned NAIs.
- The number of detection and/or collection assets that are available.
- The commander's guidance.
- The desired confidence level to be achieved from the biological detection array.

(1) Dice Five. The dice five pattern of deployment refers to the deployment of detectors or samplers in the pattern that the number 5 is portrayed on a die. The following example (Figure E-4 [page E-14]) is well suited for employing a detector or collector on an APOD/SPOD (i.e., one detector for each cardinal direction—north, south, east, west). Detectors or collectors could be shifted based on out-of-service detectors or weather pattern shifts or other METT-TC factors. The dice-five tactic provides the most flexibility and is particularly applicable for support of critical node (fixed site) or area array operations. The dice-five tactic is also adaptable to a varying number of detectors or samplers (e.g., seven or nine detectors or samplers). This tactic provides depth to an array (i.e., if an aerosol cloud misses one detector, another detection deeper in the array should detect the cloud). A dice-five tactic is a preferred tactic because in depth features should increase the probability of detection.

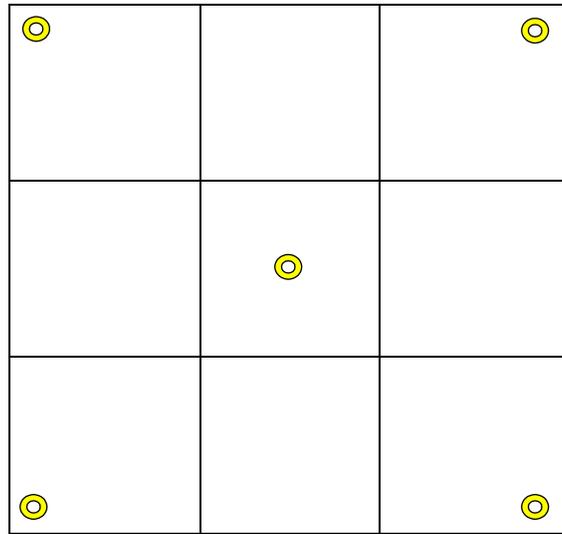


Figure E-4. Dice-Five Array

(2) Circle. Employment of detectors or samplers in a circle configuration provides 360-degree coverage. This tactic is effective when wind directions are constantly changing. Figure E-5 provides an example of a circle employment of samplers or detectors. The circle tactic is particularly applicable to critical node operations. However, this tactic could be resource-intensive (based on the size of the base) and does not provide the depth of coverage provided by other tactics.

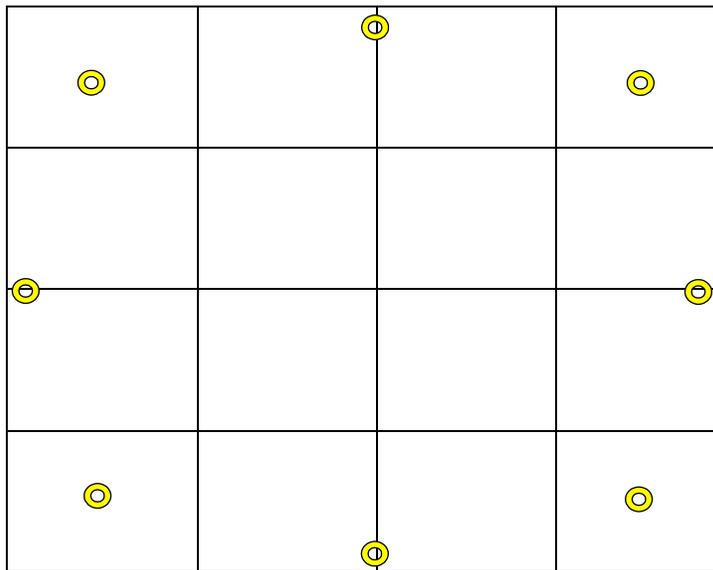


Figure E-5. Circle Employment

(3) Picket Line. The picket line is designed to capture a BW aerosol attack coming from a specific direction. Ideally it is placed upwind of friendly positions to capture a line source attack. Figure E-6 indicates an example of a picket-line employment of

detectors and collectors. The picket-line tactic would be particularly applicable for support of a maneuver land force; however, biological detectors may require relocation if the wind direction shifts. This employment tactic provides no depth to the array and has a limited application.

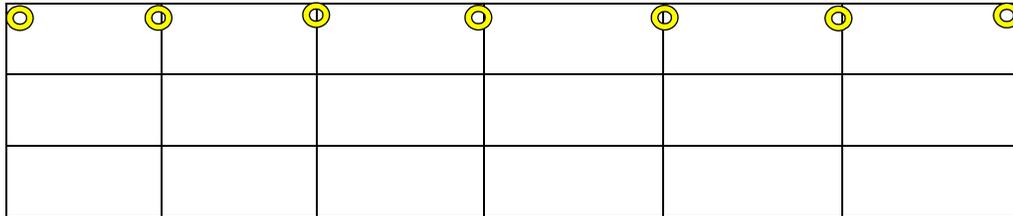


Figure E-6. Picket Line Employment

(4) Semi-Circle. The semi-circle employment of detectors and samplers provides approximately 180-degree coverage. It is still directional in that it protects from an upwind line-source release, yet gives more coverage than a picket line and provides for moderate wind direction changes. Figure E-7 indicates an example of a semicircle employment of detectors and collectors. The semi-circle tactic could be used for support of fixed site or maneuver forces; however, this tactic does not provide detectors in depth.

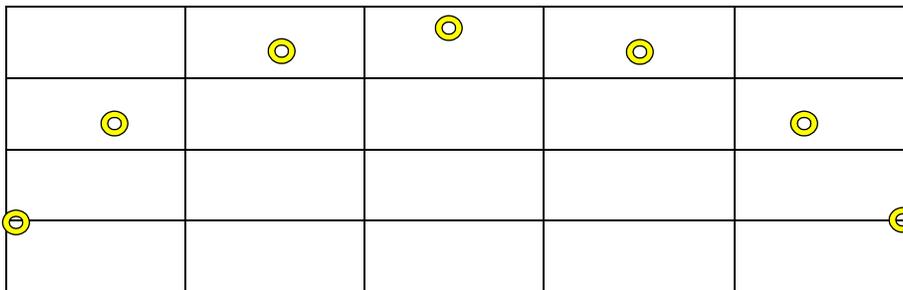


Figure E-7. Semi-Circle Employment

(5) Dense Picket. The dense-picket employment of detectors and collectors provides higher density coverage against line and point source attacks than the other employment strategies. It is resource intensive and requires large amounts of detectors and sensors. Figure E-8 (page E-16) provides an example of a dense picket employment of detectors and collectors. The dense-picket tactic could be used for support of fixed site or maneuver forces.

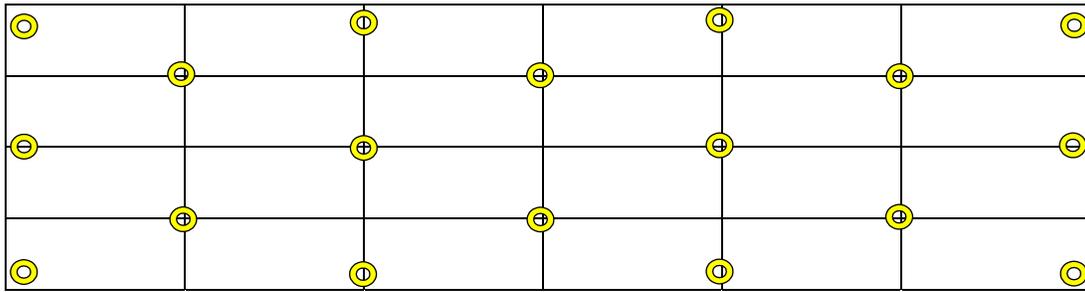


Figure E-8. Example Uniform Detector Array (Dense Picket)

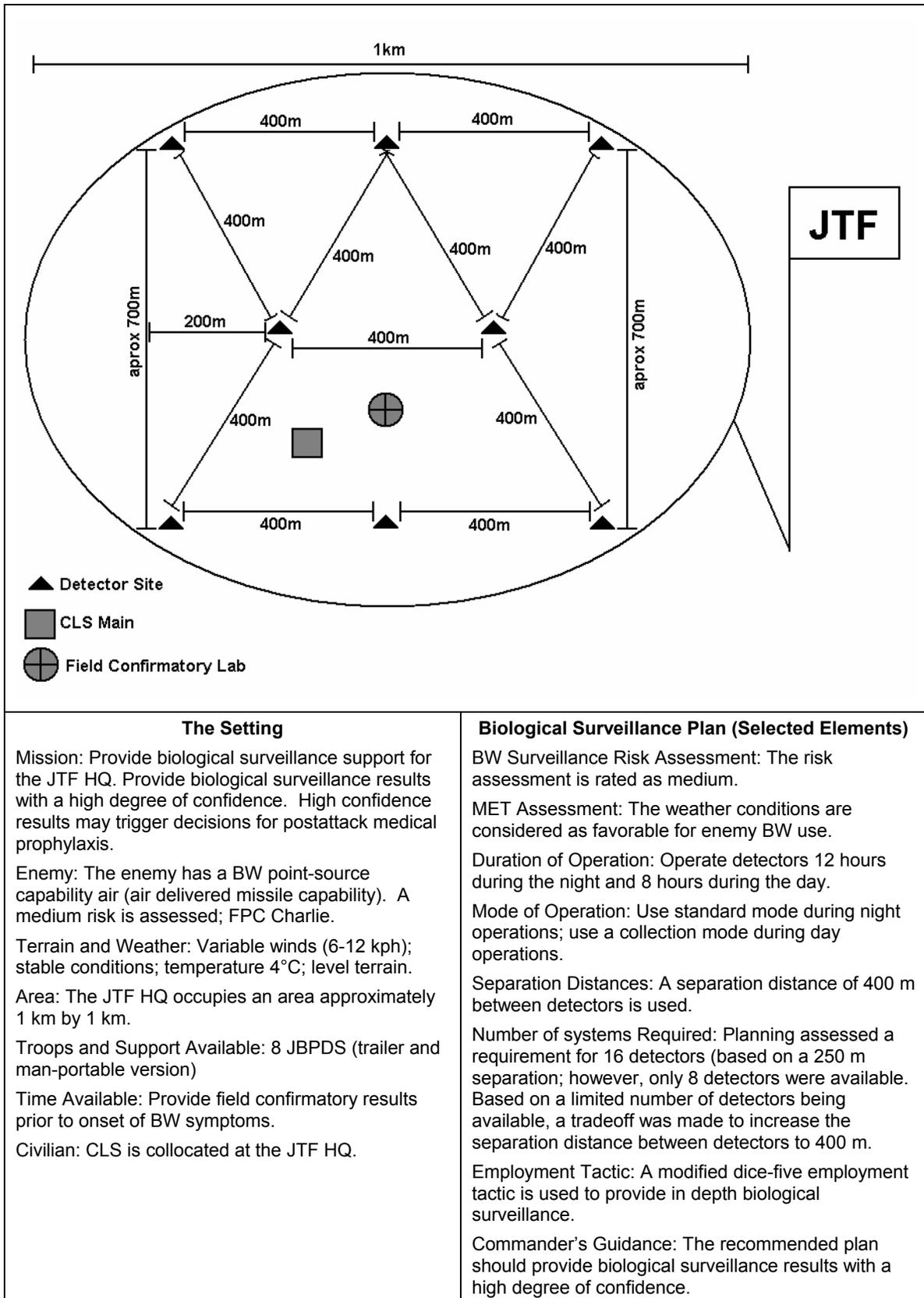
8. Preparing a Biological Surveillance Plan (Sample)

This paragraph provides two brief descriptions of sample biological surveillance plans. Figures E-9 and E-10 (pages E-17 and E-19) provide sample illustrations of a critical node and area array, respectively. The NBC staff has only limited information for the two sample scenarios. The sample scenarios indicate what tradeoffs were among METT-TC factors to increase the probability of detection.

a. Figure E-9 provides a notional setting for a JTF HQ in Northeast Asia. Based on this setting, the NBC staff must prepare a biological surveillance plan. The NBC staff uses available information to proceed through the planning process.

(1) The risk assessment for this OCONUS is rated as medium (see Figure E-3 [page E-9]).

- The enemy is BW capable.
- The JTF HQ is within range of enemy delivery systems.
- The weather and terrain are favorable for BW employment.



The Setting

Mission: Provide biological surveillance support for the JTF HQ. Provide biological surveillance results with a high degree of confidence. High confidence results may trigger decisions for postattack medical prophylaxis.

Enemy: The enemy has a BW point-source capability air (air delivered missile capability). A medium risk is assessed; FPC Charlie.

Terrain and Weather: Variable winds (6-12 kph); stable conditions; temperature 4°C; level terrain.

Area: The JTF HQ occupies an area approximately 1 km by 1 km.

Troops and Support Available: 8 JBPDS (trailer and man-portable version)

Time Available: Provide field confirmatory results prior to onset of BW symptoms.

Civilian: CLS is collocated at the JTF HQ.

Biological Surveillance Plan (Selected Elements)

BW Surveillance Risk Assessment: The risk assessment is rated as medium.

MET Assessment: The weather conditions are considered as favorable for enemy BW use.

Duration of Operation: Operate detectors 12 hours during the night and 8 hours during the day.

Mode of Operation: Use standard mode during night operations; use a collection mode during day operations.

Separation Distances: A separation distance of 400 m between detectors is used.

Number of systems Required: Planning assessed a requirement for 16 detectors (based on a 250 m separation; however, only 8 detectors were available. Based on a limited number of detectors being available, a tradeoff was made to increase the separation distance between detectors to 400 m.

Employment Tactic: A modified dice-five employment tactic is used to provide in depth biological surveillance.

Commander's Guidance: The recommended plan should provide biological surveillance results with a high degree of confidence.

Figure E-9. Critical Node Array

(2) Weather conditions are assessed as favorable for enemy BW use (see Table E-1 [page E-10]).

(3) The schedule for biological detection array operations establishes a duration of 12 hours of monitoring during the night and 8 hours of monitoring during the day (see Table E-2 [page E-11]).

(4) A standard mode of operation is used during night operations and a collection mode is used during the day.

(5) An estimated separation distance of 400 meters between detectors is used based on the enemy point source capability (see paragraph 7a).

(6) The NBC staff initially estimates a requirement for 16 biological detectors (based on a separation distance of 250 meters); however, only 8 JBPDS are available (see paragraph 7a).

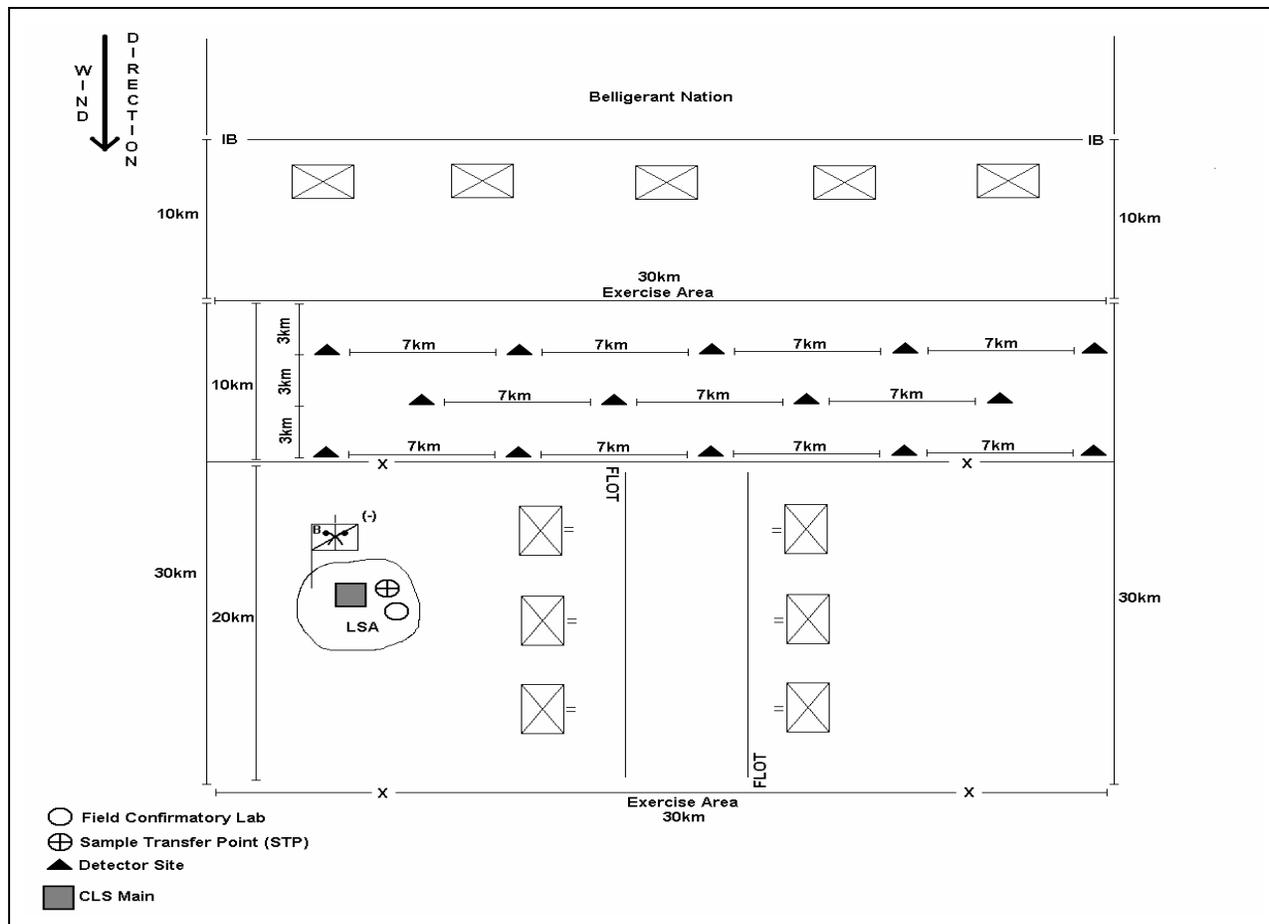
(7) A modified dice-five employment tactic is recommended based on the variable winds and the requirement for depth within the array.

(a) Based on the 8 detectors being available, the separation distance between systems is increased to 400m. The array in depth will also be ready if there is a change in wind direction (see paragraph 7a).

(b) The modified dice-five array provides an in depth detection capability. If a heterogeneous BW aerosol cloud misses one detector, another detector should detect the cloud. If only one detector provides a presumptive identification, other operational intelligence, and MEDSURV information would be assessed. Additionally, if an upwind detector periodic monitoring will be directed (see Chapter V, paragraph 6).

(8) The NBC staff reviews the biological surveillance plan to ensure the commander's guidance is met. The commander wants a high-level of confidence in the biological surveillance plan. Based on the tradeoffs that are made among the METT-TC factors, the biological surveillance plan is recommended for approval.

b. Figure E-10 provides a notional setting for a US land force conducting a combined arms exercise with a friendly nation. The combined forces operate in an exercise area (20 km by 30 km) with an east and west orientation. The international border (IB) is approximately 20 km to the north. A belligerent nation with a BW line source capability lies to the north. The friendly nations land forces are deployed near their northern border. One USA chemical company (biological detection), a company HQ and two platoons (14 BIDS total), is assigned a mission of providing biological surveillance for the land forces operating within the exercise area. Based on this setting, the NBC staff uses this limited information to prepare a biological surveillance plan.



The Setting

Mission: Provide biological surveillance support for maneuver forces conducting combined arms exercises. Based on the threat, the commander wants a high degree of confidence in the biological detection array's results.

Enemy: The enemy has a ground point and line source to employ spore forming BW agents.

Terrain and Weather: Winds from the north (8-10 kph); stable conditions; temperature 15°C; terrain is grassy with gently rolling hills. MET conditions are generally stable during the night and unstable to marginal during the day. The exercise area is approximately 20 km by 30 km. It is approximately 20 km from the IB to the exercise area.

Troops and Support Available: 2 USA biological detection platoons (14 BIDS total) and the company HQ (M31A2 equipped).

Time Available: Provide field confirmatory results from the lab prior to the anticipated onset of agent symptoms.

Civilian: CLS assets have movement restrictions. Based on the FP situation, CLS must operate from the LSA.

Biological Surveillance Plan (Selected Elements)

BW Surveillance Risk Assessment: The risk assessment is rated as medium.

MET Assessment: The weather conditions are assessed as favorable for enemy BW use.

Duration of Operation: The schedule indicates detectors should be operated 12 hours during the day and 12 hours during the night.

Mode of Operation: A standard mode of operation is used during night operations. A collection mode is used during day operations.

Separation Distances: A separation distance of 7 km between detectors is established.

Number of Systems Required: The NBC staff recommends that all 14 detectors be employed within the array.

Employment Tactic: A modified dice-five employment tactic is used to provide in depth biological surveillance.

Commander's Guidance: The plan should provide the commander biological surveillance with a high level of confidence.

Figure E-10. Area Array Support

(1) The risk assessment for this OCONUS situation is assessed as medium (see Figure E-3 [page E-9]).

- The enemy is BW capable.
- Exercise land forces are within the potential downwind path of a BW aerosol cloud.
- The weather and terrain are favorable for enemy BW employment.

(2) Weather conditions are assessed as favorable for enemy BW use (see Table E-1 [page E-10]).

(3) The schedule for biological detection array operations establishes a duration of 12 hours of monitoring during the night and 12 hours of monitoring during the day (see Table E-2 [page E-11]). Based on the risk assessment and weather conditions, the extended schedule (24 hours per day) of operation is recommended.

(4) A standard mode of operation is used during night operations and a collection mode is used during the day. Samples are collected twice (i.e., 6-hour intervals) during the day.

(5) Separation Distances.

(a) To estimate the separation distance that will be used between biological detectors, the NBC staff determines the width of the area to be protected (30 km). Coordination between the NBC and intelligence staff estimates that the possible length of an enemy BW line source could range from 5 to 10 km. To establish a high degree of confidence in system-level results, the commander wants a minimum of two detectors intersecting with the cloud.

$$\left[\frac{\text{width of sector being protected}}{\text{estimated length of line source}} \times \begin{array}{l} \text{number of} \\ \text{detectors} \\ \text{intersecting with} \\ \text{the cloud} \end{array} \right] + 1 = \text{detectors required}$$
$$\left[\frac{60 \text{ km}}{20 \text{ km}} \right] + 1 = 7 \text{ detectors}$$

Based on a 5 or 10 km BW line source distance, 7 or 4 detectors, respectively would be required. A third calculation using a line source distance of 7 km indicates 5 detectors would be required. To provide depth to the array, the NBC planning uses an approximate 3 km separation between systems (see paragraph 7b).

(b) The biological detection array is placed within 20 to 25 km of the estimated RP for an enemy BW agent line source release.

(6) Changes to the operational situation or the commander's guidance could increase or decrease the numbers of detectors required (i.e., the commander wants a minimum of three detectors intersecting with a BW cloud to increase the level of

confidence). However, based on the current situation, the NBC staff recommends using 14 detectors.

(7) A modified dice-five employment tactic provides an in depth biological detection capability. If a heterogeneous BW aerosol cloud misses one detector, another detector should detect the cloud. Coordination between the intelligence and NBC staff assessed that an enemy BW line source attack would likely be a minimum of 5 to 10 km in length. Based on this assessment, two or more detectors should be in the path of a BW aerosol.

(8) The NBC staff reviews the biological surveillance plan to ensure the commander's guidance is met. Based on an assessment of METT-TC factor tradeoffs, it is assessed that the plan meets the commander's guidance. The area array characteristics are as follows:

- A modified dice-five employment tactic is used for the two platoons (14 BIDS).
- East to west separation distances of 7 km between systems and north to south separation distances of 3 km.
- The two platoons are arrayed approximately 10 to 20 km from the IB.
- The commander's guidance for high confidence results should be attained by placing BIDS assets in depth.
- The biological detection array uses a standard mode of operation during night operations (i.e., MET conditions) and a collection mode of operation during day operations (i.e., unstable to marginal MET conditions).

9. Maritime Biological Detection/Collection Employment Tactics

The operational envelope for USN employment of JBPDS detectors and DFU collectors includes their use on surface ships. USN ships spend approximately 20 percent of their total deployment in port for liberty and/or uploading of supplies. These ships are vulnerable to covertly released BW agent aerosols due to their static position and geographical location (e.g., Middle East or Mediterranean)

a. The use of detectors and collectors in conjunction with HHAs provide a biological air collector and presumptive identification ability.

c. The CONOPS for collectors and detectors is to operate them in high-threat areas using scheduled intervals (i.e., 12-hour sample collection time and 24-hours/day sampling during a high-threat condition).

(1) The number of samplers or detectors utilized is dependent on ship class. Staggered sample retrieval times will provide a periodic series of test of results. For example, if a ship is in port by itself for 3 days and is operating 2 collectors with an 8-hour collection time, the time of resolution is 4 hours. Therefore, if operations turn on all both at 0000, check unit number 1 at 0400, check unit number 2 at 0800, check unit number one at 1200, etc. Timely detection information could be obtained in 4-hour increments for the entire 3-day visit.

(2) Multiple ships and coordination between them will yield even lower time resolutions. Collectors may also be used to sample air in the event of intelligence threats or indications of an environmental release. Positive results using HHAs will be presumed to be positive presumptive identification and samples will be properly packaged and shipped to a medical laboratory that will be housed on large-deck surface ships. Samplers will probably be positioned on deck and/or dirty side of ventilation systems for collective protection system ships.

c. During in-port operations or underway (e.g., chokepoints, amphibious operations, at sea release) DFUs should be placed in locations where there may be a high concentration of agents in the event of an attack.

d. Internal sampling by DFUs could be conducted in compartments receiving outside supplies or mission critical spaces at 1 to 8-hour collection intervals.

e. The collection interval established by the commander will vary depending on the threat (e.g., 4 - 6 hour collection interval if a BW attack is probable or imminent).

10. Common Detection Site Selection Criteria for Biological Detection Systems

There are common site selection criteria that can be used for biological detection systems.

a. Reconnaissance. Reconnaissance is a fundamental step in site selection. Begin with a map reconnaissance. Use the map reconnaissance to determine initial surveillance areas that support the employment tactic, then select primary, alternate, and supplemental surveillance sites within each surveillance area. Some rules of thumb for the reconnaissance include the following.

(1) Reconnoiter the detection areas and potential sites first-hand if at all possible.

(2) Coordinate the reconnaissance with the owner of the terrain before conducting the reconnaissance.

b. Site Selection. Factors that may affect site selection include the following:

- Trafficability.
- Security.
- Communications.
- Location of friendly activities.
- Down-valley or up-valley winds.

c. Selection of Exterior Deployment Area.

(1) Deployment areas are planning tools that give biodetection asset leaders a frame of reference for selecting detection sites that are mutually supporting and meet the requirement for FP. The rules of thumb for detection areas are as follows.

- 1-km diameter for detection systems such as the BIDs.
- 150-meter radius for collection and detection systems.
- Upwind of a fixed site or supported unit. Do not select deployment areas immediately downwind of areas/facilities that might generate interferants (for example, forward arming and refueling points [FARPs], or farms).

(2) When assigning deployment area numbers, use a five-digit alphanumeric code for deployment areas and six digits for detection sites as follows.

- The first two characters designate either deployment or detection areas: DA is the deployment area and DS is the detection site.
 - The third character is the unit designation (e.g., biodetection platoon).
 - The fourth character is the team designation (e.g., BIDS team).
 - The fifth character is the primary (P), alternate (A), or supplemental area (S).
 - The sixth character is the sequence number for the detection site.
- (3) Figure E-11 provides an example of a deployment area for a BIDS unit.

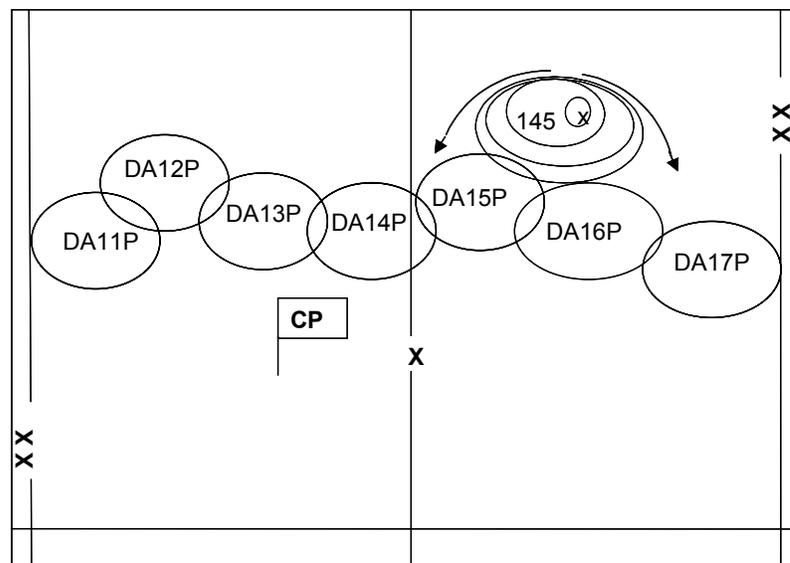


Figure E-11. BIDS Deployment Areas

d. Selection of Detection Sites. Detection sites are the actual biological detection positions. Leaders at all levels must deconflict site selection to reduce vulnerability to

fratricide and ensure coverage is within unit capabilities. Some rules of thumb in selecting detection sites are as follows:

- 100-meter radius.
- Should permit maximum airflow of possible hazards.
- Minimal overhead cover. This will be very difficult for tactical commanders to accept. However, without minimal overhead cover, various detectors will not get maximum airflow over the collector-concentrators.
- Upwind of supported unit or critical node.
- Should permit rapid ingress and egress.
- Protected from enemy direct fire. Depressions that do not exceed 4 meters in depth are ideal for protection; yet do not canalize steering winds away from the site. The object is to not allow the BDT to be exposed to direct fire hazards.
- Concealed and camouflaged.
- Out of enemy mortar and artillery range, if possible.
- Should permit effective communications.

e. **Outdoor Site Selection Considerations.** Several considerations must be taken into account when positioning individual biological detection systems. Of major concern will be ensuring that the site allows for the greatest probability of detecting a biological cloud. To understand how the biological cloud behavior impacts on your site selection process, consider—

- Effects of environment, terrain, and weather on BW agents.
- Biological agent cloud behavior.
- Methods of dissemination.

f. **Biological Detection and Collection Operations in Unusual Conditions.**

(1) **Cold Weather Operations.** BW in the arctic is a possibility. It has been found that the survival of microorganisms increased significantly at temperatures below freezing. Temperature inversions that exist over snowfields tend to prolong the integrity of an aerosolized biological cloud. It disperses more slowly and remains a threat for a longer period. If an attack with these agents occurs, most likely it will be delivered by covert means.

(2) **Desert Operations.** During daylight, most aerosolized live biological agents are short-lived. An exception is spore-forming biological agents. This is a result of low humidity and the UV radiation of direct sunlight and atmospheric disturbance. But at night, favorable conditions could occur. Effectiveness of the live biological agent, however,

would quickly diminish during the daytime. Toxins are more resistant to this harsh environment and could still be effectively employed.

(3) **Jungle Operations.** Jungles provide excellent conditions for use of biological agents and toxins. Warm temperatures, high humidity, and protection from sunlight all aid survivability of disease-causing microorganisms. Low wind speeds and jungle growth limit downwind hazards.

(4) **Mountain Operations.** Detection of live biological agents in mountains has the same problems as in lower areas; that is, the effects of the terrain on the agent cloud.

(5) **Urban Terrain Operations.** Operations in an urban environment present special problems for detecting biological agents. Just as with rough terrain, wind turbulence caused by structures influences the dispersion of BW agents by reducing agent effectiveness and area coverage. In addition, pollutant gases can interfere with detection of BW agent and have been found to decrease the survival of many pathogens.

g. **Communications.** Communications may affect site selection. To plan properly for site selection, selected communications considerations include—

- The type of operation, the units involved, and the support requirements.
- The physical characteristics of the AO and probable weather conditions.
- The capabilities of the organic radio assets.
- Alternate means of relaying information (never rely on a single means of communication).

11. Indoor Site Selection for Biological Detectors or Collectors

Conducting biological detection and sample collection operations indoors present some unique challenges and considerations in detector emplacement. The following considerations affect biological detector or sampler emplacement:

- Coverage required (size of building versus number of detectors required).
- Type of release to be protected against (exterior versus interior release).
- Interior airflow.
- Building air inlets (location and number).
- Building air exhausts (location and number).
- Air handling systems (HVAC systems).
- Traffic throughout the building.
- Critical infrastructure.

- Entrances and exits.
- High-value targets (HVTs), high-risk billets, and high-risk personnel.
- Detector or sample collector limitations, capabilities, and requirements (sensitivity, size and power).
- Type of building (single versus multi-level, height and standoff).
 - a. Coverage required (size of building versus number of detectors required). The size of the building will impact the number of detectors required to properly provide coverage. Although size alone is not the determining factor, it is a contributing factor when determining the number of detectors and sample collectors required.
 - b. Type of release to be protected against (exterior versus interior release). The type of release to be protected against may determine the placement of detectors.
 - (1) Exterior Release. If the building provides for adequate security controls and measures, the threat of an interior release is probably decreased. Thus, the threat will most likely come from an exterior release. In this instance the placement of detectors/collectors in the interior of the building should emphasize capturing air coming into the building through air inlets, entrances, and exits. This method is somewhat likened to setting up a perimeter defense. In such instances, detectors placed on the exterior of the building will also provide a much-needed layer of protection outside of your perimeter.
 - (2) Interior Release. Providing detector coverage against the threat of an interior release will greatly influence the placement of detectors. When providing coverage against an interior release, the method of providing a perimeter of detectors does not work effectively. Detector/collector locations throughout the building to be covered should include air exhausts, HVAC systems, HVTs within the building, high population areas, areas of congregation, high-risk billets, and high-risk personnel.
 - c. Interior Airflow. The flow of air throughout a building will affect the number and placement of detectors. Some buildings can be highly segregated in nature especially newer larger buildings—while others can be very open in terms of airflow. The more segregated the building and its HVAC system, the less likely the chance of the spread of biological contamination.
 - d. Building Air Exhausts (location and number). Building air exhausts can provide the best payback in providing coverage of large buildings. In comparison to building air inlets, there tend to be less building air exhausts. The laws of physics and common sense say that in order to provide equilibrium, whatever air enters the system must exit through an air exhaust somewhere. These points of exhaust will contain air that has passed through the building and may contain samples of biological agent that have circulated within the building.
 - e. Air Handling Systems (HVAC systems). Air handling systems provide fresh air from the exterior of a building and recirculate interior air. Detectors placed in air handling systems or other means of obtaining air from air handling systems also provide an

indication of a biological agent release within a building. They also can further the spread of contamination by moving air around different parts of the building. Care should be taken when emplacing detectors to sample air from air handling systems. If there is adequate detector coverage outside the building and the detector is meant to protect against an interior release, then ensure the detector is sampling the air that is circulating/recirculating within the building and not air entering from the outside.

f. Traffic throughout the building. High-volume traffic throughout a building or in certain areas of a building is another factor that should be considered. The movement of air in these areas as compared to areas of less movement (small office spaces) may present a target of opportunity to capture an agent release within a building.

g. Critical Infrastructure. Some buildings may contain critical infrastructure that present lucrative targets for a biological release. C² nodes and areas critical to the health and safety of an operation (e.g., clinics and hospitals) may receive detector coverage.

h. HVTs, high-risk billets, and high-risk personnel. HVTs, high-risk billets, and high-risk personnel may require biological detection coverage depending on their “worth” to an operation. HVTs could be lucrative targets for an enemy in disseminating an agent. Examples of targets may include cafeterias, conference/meeting rooms and centers, waiting areas, elevator areas and shafts, underground transportation building connections, and areas of congregation (e.g., large office spaces, theaters, and entertainment areas).

i. Detector limitations, capabilities, and requirements (sensitivity, size and power). A detector’s characteristics may determine its placement. Its ability to sample large volumes of air, its size and capabilities to draw air from small spaces (e.g., inside air ducts), and the power it requires to operate for extended durations may affect its placement.

j. Building Characteristics. Every building is different. Each is a mini-environment, with some being microcosms of mini-environments. Some are very “porous,” letting air in and out from numerous locations throughout. Some are very “secure” in terms of airflow, with the air circulating throughout easily monitored. Prior to developing a detector plan for a building, as much information about it should be obtained as possible, such as:

- HVAC plans.
- Areas not covered by HVAC systems.
- Architectural and engineering plans (e.g., sewage and water diagrams).
- Security plans.
- Organization and distribution of population within.
- Local weather around the building.

k. Coordination. Placement of systems within the interior of a building requires coordination with building engineers and management. Placement within HVAC and air handling spaces such as inlets and outlets may need modification requests for both

insertions of the equipment and power requirements. Systems that use additional tubing to bring air to a sampler should also be checked following placement using accurate equipment to ensure the intent of the air movement was met and flow levels have not been compromised. This may require consultation with the manufacturer or testing to verify that the equipment has been installed in a manner that best contributes to capture of the intended aerosol.

Appendix F

BIOLOGICAL WARFARE ATTACK WARNING

1. Background

a. The decision to disseminate a BW attack warning, with its requirement to assume a protective posture, is an important one on the part of the force commander. The commander must minimize the occurrence of false alarms while ensuring the warning process is carried out as rapidly as possible to minimize exposure and maximize opportunities for medical treatments.

b. The results from a single component in a biological detection suite, a single biological sensor, or the results from a single biological detection suite, are not necessarily sufficient to decide to warn. This decision must be made considering all the evidence available: detection, intelligence, MET, and medical. The analysis of the information will then provide the basis for the decision to warn. The totality of information required for the warning decision comes together best at the JTF/corps level.

c. Due to the dynamics of many BW agents, centralized analysis prior to issuing a BW warning to the threatened force is generally preferred. Decentralized warning may be ordered for specific phases of the operation or to units in the suspected immediate hazard area.

d. Intelligence, NBC, and medical officers analyze initial detection reports in light of the current situation. They will evaluate each piece of data to determine if it is consistent with that of a BW attack. Based on the commander's decision and his guidance on warning and protection criteria, the unit may execute its BW warning/reporting procedures in one of two ways. It may warn (1) without a biological detection and identification capability, or (2) with a biological detection and identification capability.

2. Warning Without a Biological Detection Capability

a. Without a biological detection capability in the theater of operations, determining a BW attack has occurred will be difficult. Units are generally unable to distinguish a biological attack from a chemical attack. The method of attack (spray, bomb, projectile, etc.) could be the same for BW and chemical warfare (CW). If a unit observes a possible chemical and biological (CB) attack, but is unable to confirm it as a CW attack (e.g., automatic chemical agent detector and alarm [ACADA] not sounding or negative results on M8/M9 paper or M256A1 detectors), the unit should send an NBC-1 Report—Agent Unknown.

b. If the IPB is inconclusive for either CW or BW, a downwind hazard prediction with the largest suspected hazard area should be disseminated in order to warn affected units. The NBCCC generates and disseminates an NBC-3 (chemical or biological) to warn the force.

3. Warning with a Biological Detection/Identification Capability

When a biological collector or detector is employed in the AO, a more reliable asset is available to assess the possibility of a BW attack (i.e., a presumptive identification capability). The results of the process are reported through the warning and reporting network. This reported information, along with other intelligence and medical data, provides the chain of command with the capability to assess whether a BW attack has occurred.

4. Centralized Versus Decentralized Warning

An operational-level HQ is in a position to assess whether a BW attack has occurred. As a general rule, any HQ receiving information indicating that a BW attack occurred must produce and disseminate warnings. The protection afforded by assuming at least a mask only mission-oriented protective posture (MOPP) level can significantly reduce numbers of BW attack casualties. The commander owning the biological detection assets must decide on what method of warning to employ. His decision should take into account all the advantages and disadvantages of each method—centralized and decentralized.

a. **Centralized Warning and Reporting.** The centralized warning and reporting system is used when the operational level HQ makes the determination on when, who, and where to issue the warning and appropriate protective measures (see Table F-1). A centralized warning system will likely be used to support an area array. The operational level HQ will have access to multiple information resources (i.e., battlespace intelligence, MEDSURV). The biological detection unit's reports contribute to the operational HQ SA, and assessments (i.e., did an enemy BW attack occur?). For example, in a biological detection unit, incident reports flow up to the controlling HQ where they are reviewed, consolidated, and analyzed by the NBCCC in coordination with the unit surgeon. While the biological detection asset may be physically located in a major subordinate command (MSC) AO, the reports do not go through the subordinate units. Since the controlling HQ makes the warning determination in the centralized option, then speed is of the essence and the reports need to be transmitted as rapidly as possible to the controlling HQ. The operational level of war controlling HQ has access to additional possible BW attack intelligence indicators that may not be available to lower HQ. The results from the biological detection asset should not be considered 100 percent accurate; therefore, other attack indicators must be evaluated before arriving at the conclusion a BW attack has actually occurred. By having the controlling HQ make the warning determination, false alarms should be kept to a minimum. Upon determination that an actual BW attack has occurred, the appropriate warning is issued to the affected commands with a directive to assume a higher protective posture. A simplified biological hazard prediction is performed followed by an NBC-3 biological report.

Table F-1. Pros and Cons of the Centralized Warning System

<p>Advantages</p> <ul style="list-style-type: none">• Reduces false alarms to a minimum. False alarms have the potential to cause subordinate units to continually raise then lower the protective posture that can significantly affect OPTEMPO.• Ties together other indicators that may not be available to subordinate commanders.• Provides the ability to rapidly assess the situation with other corps staff sections before making a recommendation to the corps commander to warn. <p>Disadvantages</p> <ul style="list-style-type: none">• Potentially slows down the warning time that could result in increased casualties throughout the corps AO.• MSCs do not receive any biological detection information and are kept in the dark while the BW cloud is moving over their units. Analysis of the data would not happen below corps level.

b. Decentralized Warning and Reporting. The decentralized warning and reporting system delegates the warning to MSCs (see Table F-2). A decentralized warning system will likely be used to support fixed site operations. The fixed site (e.g., an AB or port) may have strategic- or operational-level significance. The biological detection unit's reports contribute to the fixed site's HQ SA and assessments (i.e., did an enemy BW attack occur?).

Table F-2. Pros and Cons of Decentralized Warning System

<p>Advantages</p> <ul style="list-style-type: none">• Allows for faster warning to personnel for actual BW attacks since reports go directly to MSCs.• Faster warning equals fewer casualties.• Mask-only MOPP is available to MSCs, which could minimize heat stress degradation. <p>Disadvantages</p> <ul style="list-style-type: none">• Requiring biological detection units to send reports through normal command channels as well as MSCs adds an additional report requirement to biological detection unit operations.• MSCs do not always have access to all the other attack (intelligence) indicators. Decisions to warn by MSCs could be based on incomplete data.
--

(1) In the decentralized warning system, the biological detection unit will send a summary of detection reports to the appropriate command delegated to receive the warnings. The summary information should include the following data as a minimum:

- Location of each biological detection asset showing positive results.
- Micro-MET of each biological detection asset showing positive results.
- Agent identified.
- Confidence level: very high, high, medium, or low (if applicable).

(2) The delegated command makes the warning determination based on the information reported on whether to warn and raise the protective posture. A simplified biological hazard prediction is then performed, followed by an NBC-3 biological report being sent to lower, higher, and adjacent commands.

Appendix G

BIOLOGICAL WARFARE SAMPLE EVACUATION PLANNING, SAMPLE HANDLING, AND CHAIN OF CUSTODY

1. Background

Samples are collected and initially packaged by the unit obtaining the sample. The sample is properly labeled, double-bagged, and prepared for evacuation. The sample is evacuated—ensuring chain of custody is maintained—to an STP for further evacuation, or possibly to a ship-based medical laboratory for field confirmatory identification. If an STP is used, a sample courier receives the sample for transport to an in-theatre medical laboratory or ship-based laboratory (SBL) for field confirmatory identification to support any appropriate treatment decisions. If there is an in-theater AML, the sample can be split for in-theater field confirmatory analysis and evacuation to CONUS for analysis and definitive identification. A portion of the initial sample will ultimately be evacuated to CONUS for definitive identification. If background samples are requested by an in theater laboratory or SBL, for whatever reason, evacuation will be conducted in the same manner ensuring chain of custody is maintained throughout the evacuation process.

Note: Precautions should be taken to protect the sample collector from potential BW agents. At a minimum, respiratory protection, goggles, and protective gloves must be worn. Additional care must be taken when collecting samples to prevent cross contamination. Sample containers and packaging should be decontaminated with a 0.5 percent hypochlorite solution to protect those who handle the package.

2. Sample Evacuation Planning and Execution

As indicated in Chapter IV, detailed planning and coordination by higher-level units (JTF or HQ), units possessing biological detection assets (i.e., BIDS, Portal Shield, or DFU/HHA)—hereafter referred to as biological detection units, NBC unit HQ elements (such as a NBCCC), medical units, and supporting sample courier assets (such as a TEU) are required for supporting successful sample operations.

a. The supported unit prepares required OPLANs/OPORDs to support the sample evacuation process. Plans and orders have previously alerted and identified the assets needed to support the sample evacuation (i.e., transportation and communication assets). Biological detection units, escorts, and medical activities form three of the basic elements of the evacuation process.

b. Biological detection units begin the process by collecting a liquid sample and initiating the required chain of custody. The courier element provides safe handling and security by appropriately trained personnel for shipment of the sample. Courier personnel know key technical information (such as agent effects and characteristics) and how to respond to emergencies. The supporting AML has the capability to furnish in-theater sample analysis for field confirmatory identification. This analysis can support joint force medical-treatment decisions. The supporting medical lab also provides feedback to the biological detection unit and the supported unit (JTF) on sample analysis from background monitoring and suspected BW events. If an AML or SBL is not present, custody samples may be forwarded to CONUS by the courier element to a CONUS reference laboratory for

definitive identification. Advanced arrangements must be made with the reference lab if at all possible. Also, coordination must be made with HN when transporting samples through HN territories. This coordination may involve the State Department.

c. The following are examples of the types of planning and operations conducted by the supporting unit.

(1) The supported unit requests the deployment of biological detection unit, sample courier, and medical laboratory assets. There is also follow-up and coordination to ensure the availability of biological detection, courier, and medical assets to support the sample evacuation process.

(2) The commander and staff outline multiple options for the retrograde of sample evacuation packages to CONUS for definitive identification. Resources are requested to accomplish the requisite biological detection, courier, transport, and medical procedures. The commander prioritizes the use of available assets to help ensure that the samples are moved within the required timeframes.

(3) The command prepares and coordinate sample evacuation plans with the applicable JTF component (Army forces [ARFOR] or Navy forces [NAVFOR] medical lab activities) elements to support the option of in-theater laboratory analysis, to ensure asset visibility throughout the evacuation process. Planning must identify the use of all available designated laboratories such as Navy laboratories either afloat or ashore, other service labs, or other agency labs within the region designated by the COCOM. For example, Navy confirmatory labs are located both afloat and ashore, including NEPMUS, FDPUMs, selected aircraft carriers and amphibious ships, and selected medical facilities. These laboratories also have a reach-back capability with a definitive lab for consultation.

(4) The supported unit ensures that coordination is conducted between sample courier and biological detection units for the designation of potential STPs.

(5) The command requests and designates alternate sample courier assets if TEU assets are not available.

(6) The supported commander requests that the supporting biodetection, escort, and medical lab assets be provided with the requisite communications capability if they lack an organic capability.

(7) The supported commander plans for the receipt of biological-sample analyses (results) from the supporting AML.

d. The following provide examples of the type of planning and operations that should be conducted by the biological detection unit.

(1) Deploy an advance element to coordinate sample evacuation activities with the supported unit and other key activities (such as sample courier elements and AML/SBL elements).

(2) Establish (in coordination with the supported unit and courier assets) STPs, routes, and local security for moving escort elements to STPs.

(3) Ensure proper handling and storage of liquid samples.

(4) Rehearse sample evacuation and the chain of custody.

(5) Use the supported unit's sample evacuation plan to prepare a unit OPLAN/OPORD (e.g., STP locations, courier, security, and identification requirements).

(6) Plan for receipt of results from supporting medical laboratory analyses.

(7) Train sample courier teams on topics such as the preparation, packaging, safe handling of samples; use of IPE; emergency procedures; decontamination requirements; maintaining security of the sample; completing sample documentation; and conducting sample transfer procedures.

(8) Conduct preparation to handle multiple samples concurrently based on several detections within a short time frame (i.e., 12 to 24 hours).

e. Executing sample evacuation.

(1) The commander's NBCCC must be prepared to coordinate evacuation of samples from the subordinate units to an STP or directly to a supporting laboratory. Samples to be evacuated will not only be suspected BW samples, but also routine background samples when directed by higher HQ. The sample evacuation order should include the following:

(a) Transportation requirements and taskings.

(b) Sample courier qualification and training requirements.

(c) Travel clearances.

(d) Identification of sample destination (laboratory).

(e) Communications.

(2) The command's NBCCC must ensure they understand where samples are being taken. Communications with the laboratory are established so that the laboratory knows samples are being shipped to them. Communications from the supporting laboratory to the supported NBCCC are of key importance. An NBCCC must be proactive in establishing these communications to ensure a timely report of samples' confirmatory or definitive identification and status.

(3) Following presumptive identification, the NBCCC provides instructions for sample evacuation. These instructions direct when to evacuate the collected sample or samples, the STP location, specific identification of the receiving escort team, and NLT time to link up with the escort team at the STP.

(4) Coordination should be conducted with the receiving laboratory when the tactical situation or mission permits. The coordination facilities advance notification that a sample will be forwarded.

(5) All samples will be evacuated to a laboratory for analysis. Laboratories will prioritize sample analysis, and the number and type of samples analyzed will be determined by the laboratory commander.

3. Sample Evacuation Logistics Requirements

To properly prepare a sample and its accompanying documentation for transport specific materials are required. The following are examples of some of the key items used to properly package the sample.

- a. STC. A sample transfer case will be used to transfer samples. STCs can provide temporary storage for samples pending evacuation and should have an internal visual temperature monitoring capability. Samples should be kept at 1 to 4 degrees C during storage and transportation.
- b. Sample Containers. Sample containers such as vials and bottles are provided as part of each system and their associated sampling kits. The specific size of a container will vary depending on the system that is providing the sample.
- c. Clear Plastic Bags. The requirement is to double-bag collection items.
- d. Tamper-Resistant Tape.
- e. Laboratory Film.

NOTE: Specific step-by-step procedures for the packaging of the samples collected for systems such as the BIDS or portal shield will vary but still follow the basic steps indicated in this appendix. System-level sample packaging instructions are provided in system level service guides, technical manuals (TMs), and other reference publications.

4. Preparing the Chain of Custody Document

a. The chain of custody form establishes the biological sample as official government evidence and is a critical document. This document identifies “Who collected the sample,” “Who has maintained custody of the sample,” and “What has been done with the sample.” A chain of custody must be maintained for every sample collected. The chain of custody document must accompany the sample during transport from the point of collection to the final receiving laboratory.

b. Whenever samples are transferred from one person to another, a custody transfer occurs. For example, sample transfer occurs when the operator who packaged the sample transfers the sample package to a sample courier. A custody transfer also occurs whenever supervision of the sample changes, such as when an operator changes shifts. All sample transfers or custody changes will be documented on this form. Figures G-1, G-2, and G-3 (pages G-5 to G-7) provide an example of a completed chain of custody form.

Note: This form is not reproducible. Unless no other option is available in the field, use only original or computer-generated chain of custody forms.

- (1) Step 1. Receiving Activity. Enter your unit designation.
- (2) Step 2. Location. Enter address, code, or coordinates of the collecting organization according to SOP.
- (3) Step 3. Name, Grade, and Title Of Person and Unit From Whom Received. Enter the name, grade, and title of the operator. The title could be either “Operator” or the “Maintainer.” Always mark the OTHER block with an X.
- (4) Step 4. Address. If applicable, enter the nearest large city and the country. Include mailing address—(Army Post office (APO), Fleet Post Office (FPO), and the zip code.

(5) Step 5. Location From Where Obtained. Enter address/code/or coordinates according to SOP for the location where the sample was collected (e.g., 16SEC127731500).

(6) Step 6. Reason Obtained. Enter “Operational Biodetection.”

(7) Step 7. Time/Date Obtained. Enter the date/time group (DTG) in Zulu time (Z) of the sampling period. Obtain this information from the biological event log. For a sampler such as the DFU, include the time sampling began, the time sampling stopped, and the time of presumptive identification (HHA testing).

Note: For a detection system such as the BIDS or portal shield, the operator enters the DTG for the time that the system alerted.

RECEIVING ACTIVITY HQ Co, 3rd BN 8th MAR		LOCATION FN 12177 31500
NAME, GRADE AND TITLE OF PERSON FROM WHOM RECEIVED <input type="checkbox"/> OWNER Rogers, C. C. <input checked="" type="checkbox"/> OTHER CWO4, NBCDOIC		ADDRESS (Include Zip Code) Camp Lejune, NC 28542, USA
LOCATION FROM WHERE OBTAINED FN 12177 31500	REASON OBTAINED Operational Biodetection	TIME/DATE OBTAINED 0600 / 19 AUG 01

Figure G-1. Chain of Custody Header Information (Sample)

(8) Step 8. Item Number. Enter and itemize each package being evacuated.

(9) Step 9. Quantity. Quantity will be always be “1” or greater.

Note: Finish the entries with an initialed line and the words “Nothing Follows.”

Note: If item(s) description will not fit in the description block, continue the description on a plain sheet of paper, remembering to close out with initials and the words “Nothing Follows.”

(10) Step 10. Description of Articles. Example descriptive information for evacuation items follows.

(a) Sample Vial Package. Sample vial, containing less than 10 ml of sample, wrapped with lab film, sealed with tamper-resistant tape, placed into a 50-ml tube, with absorbent material, in double clear plastic bags. Sample vial and clear plastic bags individually labeled US010902001WAAZZZ1A.

(b) Sample bottle (SB). SB less than 50 ml of sample, wrapped with lab film, sealed with tamper-resistant tape, with absorbent material, in double clear plastic bags. SB and clear plastic bags individually labeled US010902001WAAZZZ1A. (Note: A SB may contain fluid from multiple BW events. The alert time recorded on the chain of custody form should be the first alert time associated with the fluid that is in the SB. A DFU record should indicate the estimated time period for the material (in the SB) that was sampled from Time “A” to Time “B”.

(c) Cold Weather Sample. Sample extraction bottle (SEB) containing a cold weather filter, placed in less than 40 ml of collection fluid, wrapped with lab film, sealed with tamper-resistant tape, with absorbent material, in double clear plastic bags. The SB and clear bags individually labeled.

(d) Supporting documents. Sealed disk mailer containing paper copies of key information (i.e., one each biological event log and one each incident report) individually labeled in accordance with Table G-2 (page G-10) (e.g., US010902001WAAZZZ1A).

Item No.	Quantity	Description of Articles (Include model, serial number, condition, and unusual marks or scratches)
1	1	Sample vial containing less than 10 ml of sample, wrapped with lab film, sealed with tamper-resistant tape, placed into a 50-ml tube, with absorbent material, in double clear plastic bags. Sample vial and clear plastic bags individually labeled US010902001WAAZZZ1A.
1	1	<p style="text-align: center;">OR</p> SB less than 50 ml of sample, wrapped with lab film, sealed with tamper-resistant tape, with absorbent material, in double clear plastic bags. SB and clear plastic bags individually labeled US010902001WAAZZZ1A
1	1	<p style="text-align: center;">OR</p> 50-ml conical tube, containing a cold weather filter, placed in less than 40 ml of collection fluid, wrapped with lab film, sealed with tamper-resistant tape, in double clear plastic bags. Designated container and clear plastic bags individually labeled US010902001WAAZZZ1A.
2	1	Sealed Disk Mailer, containing 1 biological event log and 1 incident report individually labeled US010902001WAAZZZ1A.
Nothing Follows	<u> JC </u>	Nothing Follows <u> JC </u>

Figure G-2. Chain of Custody Form Description of Articles (Example)

(11) Step 11. Chain Of Custody. Item Number. Applies to each item number (see Step 8) entered on the form. If a separate action is done with only one of the items on the list, then a separate entry for that action and item must be entered.

(a) Date. Date of transaction entered as (yymmdd).

(b) Released By. Enter the name of the person currently responsible for the custody of the item number.

(c) Received By. Enter the name of the person assuming responsibility for the items described by the item number.

(d) Purpose of Change of Custody. Enter a brief, accurate explanation of why the custody of the article was transferred. The following are some examples.

- Released for shift change.

- Released for evacuation.
- Released for escort to STP or laboratory.
- Released 5-ml (example amount) for in-theater field confirmatory analysis.
- Released for escort to final destination.

Chain Of Custody				
Item Number	Date	Released By	Received By	Purpose of Change of Custody
All	010819	Signature Jeffrey Curry	Signature Curt Rogers	NBCCC Shift Change
		Name, Grade or Title Curry, Jeffrey NBCDO	Name, Grade or Title Rogers, Curt CWO4 NBCDO	
All	010819	Signature Curt Rogers	Signature Ann Gossage	Released for Packaging and Evacuation
		Name, Grade or Title Rogers, Curt CWO4 NBCDO	Name, Grade or Title Gossage, Ann MGySgt NBCD SNCOIC	
All	010819	Signature Ann Gossage	Signature Keith Bradfield	Released for Escort to Lab
		NAME, GRADE OR TITLE Gossage, Ann MgySgt NBCD SNCOIC	Name, Grade or Title Bradfield, Keith Technical Escort	
		Signature	Signature	
		Name, Grade or Title	Name, Grade or Title	

Figure G-3. Chain of Custody Form Signature/Purpose of Change (Example)

5. Packaging Biological Samples

a. All samples must be packaged in three layers of containment to meet air transport regulations (the sample container, a primary container, and a secondary container). Do this by using specialist transport media that comply with the United Nations (UN) handling regulations, consisting of a primary container, held in absorbent material within a secondary container, which is carried within an outer container; or by double-wrapping or double-bagging of the primary container for less hazardous samples. For double-bagging or double-wrapping, the plastic bags or plastic container containing the sample should be placed into a second bag. Excess air pockets should be removed. The sample bags should be carried within an outer container packed with absorbent material. Any breakable containers should be placed in more rigid containers to protect them from puncture or breakage. Commercially manufactured packs specifically designed for the transport of dangerous pathogens, approved by International Air Transport Association (IATA), are widely available.

(1) Volume not exceeding 50 ml. Material shall be placed in a securely closed, watertight container (primary container—wet collector, vial, etc.), which shall be enclosed in a second, durable, watertight container (secondary container). Several primary containers may be enclosed in a single secondary container, if the total volume of all the primary containers enclosed does not exceed 50 ml. The space at the top, bottom, and sides between the primary and secondary containers shall contain sufficient nonparticulate absorbent material (e.g., paper towel) to absorb the contents of the primary container(s) in case of breakage or leakage. Each set of primary and secondary containers shall then be

enclosed in an outer shipping container (i.e., STC) constructed of corrugated fiberboard, cardboard, wood, or other material of equivalent strength.

(2) Volume greater than 50 ml. Packaging of material in volumes of 50 ml or more shall comply with requirements specified in paragraph (5a) of this section. In addition, a shock-absorbent material, in volume at least equal to that of the absorbent material between the primary and secondary containers, shall be placed at the top, bottom, and sides between the secondary container and the outer shipping container. Single primary containers shall not contain more than 1,000 ml of material. However, two or more primary containers whose combined volumes do not exceed 1,000 ml may be placed in a single secondary container. The maximum amount of etiologic agent that may be enclosed within a single outer shipping container shall not exceed 4,000 ml.

b. When handling the sample, eye protection, respiratory protection, and gloves must be worn. See applicable system-level TMs or technical orders (TOs) for specific instructions on packaging liquid samples such as sample vials or SBs. See Table G-1 (page G-10) for specific instructions on preparing unique items such as the DFU filter pad for evacuation.

6. Assigning a Sample Identification Number

a. The minimum essential information that must be addressed in the sample identification number include the following (see Table G-2).

- Country code (2 digits).
- Year, month, and day sample collected (6 digits; yymmdd).
- Daily sequence number (3 digits).
- Unit identification code (6 digits).
- Identification of unit collecting the sample down to team or detachment level (2 digits).

b. If a shift change occurs prior to evacuation notice, the stored sample must be released to a new shift leader using the chain of custody form.

Table G-1. Preparing a DFU Filter for Shipment

Cold Weather Preparation Procedures		
✓	Item	Instructions
	1	Obtain the capped cold weather sample tube containing the cold weather filter suspended in collection fluid or the tube that contains the DFU filter.
	2	Place an adhesive label containing the sample identification number on the cold weather tube.
	3	Seal the tube first with lab film and then with tamper-resistant tape. Apply two strips of tape across the cap in an “x” pattern ensuring the tape reaches down both sides of the tube. Ensure that the tape covers a portion of the label on the tube, but does not cover the sample identification number. ¹
	4	Place the tube inside a plastic bag or IATA container containing absorbent material. If using a plastic bag, remove excess air and twist the neck of the bag until it forms a tight coil with the bag snug around the tube, and seal it with a strip bag tie.
	5	Place an adhesive label containing the sample identification number on the IATA container or plastic bag. ¹
	6	Place the tube inside a second bag or an IATA container. If using a plastic bag, remove excess air and twist the neck of the second bag until it forms a tight coil, and seal it with a strip bag tie.
	7	Place an adhesive label containing the sample ID number on the outer packaging. ¹
	8	Place the package inside the STC.
	9	Complete the chain of custody document. Ensure initial signature is signed immediately by the operator handling the sample.
<p>Note 1. After Steps 3, 5, and 7, spray and wipe with a 0.5 percent bleach solution.</p>		

Table G-2. Sample Identification Numbers

Example Sample Identification Number: LA010115002WAAZZZ2D					
LA	010115	002	WAAZZZ	2	D
Country Code	Date (YYMMDD)	Daily Sequence Number	UIC	Detachment	Team
Identified in the unit OPORD.	The date the sample was collected. Given as Year, Month, and Day.	The first sample collected each day starts with 001 and following samples are numbered in sequence.	The company UIC. This identifies the specific company that collected the sample. This number is unique for a unit.	This number identifies the detachment that collected the sample. It is only unique when combined with the UIC.	This number identifies the team that collected the sample. It is only unique when combined with the UIC.
This sample was collected in Laos.	This sample was collected in 2001, January 15 th .	This was the second sample collected on January 15 th .	This is a fictional UIC for company Z. If you do not know your UIC, ask your team leader.	This sample was collected by a member.	More precisely, this sample was collected by an individual assigned to Team D.
Note: If this sample is a background sample, it should also include the word "Background" below the sample ID number.					

7. Packaging Supporting Documentation

The documents that support the evacuated sample are integral components of the evacuation package and must accompany the sample. Table G-3 provides representative instructions for packaging this material.

Table G-3. Packing Supporting Documents for Evacuation

Packaging Supporting Documents		
✓	Item	Instructions
	1	Provide two copies of the biological event log and incident report. Label each log sheet and report with the sample identification number (JBPDS or DFU).
	2	Place one copy of the log inside the disk mailer. Maintain the second copy of the log (JBPDS or DFU) and incident report.
	3	Place an adhesive label containing the sample identification number on the disk mailer (JBPDS or DFU).
	4	Seal the disk mailer (JBPDS or DFU).
	5	Place tamper-resistant tape over all sealed edges of the disk mail sealer. Do not cover the sample identification number with the tape. (JBPDS or DFU). Place sealed disk mailer into a plastic bag so that it does not get wet.
	6	Place the supporting documents package in the STC. (JBPDS or DFU).
	7	Complete the chain of custody document. Ensure initial signature is signed immediately by the operator handling the sample (JBPDS or DFU).

Note: In the event that additional mailers are used, each one must have a separate item description on the corresponding chain of custody form.

8. The Completed Evacuation Package

Each completed sample evacuation package is composed of the following items.

- a. Sealed and packaged sample container (i.e., vial or bottle).
- b. Sealed disk mailer.
- c. The completed chain of custody form will be hand-carried by the sample courier.

There will be one complete sample evacuation package for each sample.

9. Sample Evacuation Planning Considerations

Once samples are collected they must be evacuated in a timely manner. Specifically, samples should arrive at an in-theater laboratory within 6 hours of collection. The samples should be delivered to a CONUS laboratory within 24 to 48 hours.

Note: The time planning factors serve as guidelines. Samples should still be evacuated even when mission constraints delay evacuation. Sample evacuation planning and operations require close coordination between the installation and the supporting lab. Samples should be kept at 1 to 4 degrees C during shipment.

Note: Biological samples should be first delivered to the supporting laboratory in the AO for in-theater confirmatory analysis before they are transported out of the AO. The supporting laboratory is responsible for providing confirmatory identification in the AO.

10. Evacuation of a Background Sample

Depending on ambient background conditions, samples are collected for an evaluation of background conditions. This could result in a sample being forwarded to the supporting medical lab for analysis under chain of custody. As required, the supporting laboratory may maintain on hand negative samples for historical record purposes.

Appendix H

LONG RANGE BIOLOGICAL STANDOFF DETECTION SYSTEM OPERATIONS

1. Background

a. This appendix addresses long-range biological-agent detection using the USA BDCs LRBSDS, which is a corps/echelons above corps (EAC) asset. The LRBSDS assists in providing early warning to maintain a COP and to enhance FP. It employs a laser system mounted in a helicopter to scan a designated area of interest (AOI) and find large, manmade aerosols suspected of containing BW agents.

b. The LRBSDS teams obtain detection data and use the helicopter radios to submit incident reports to a biological detection unit (i.e., biological detection company). The biological detection unit uses the information to alert the ground-based biological detection assets and to work with the corps NBC officer to analyze data and determine if a biological attack has occurred. When a potential BW attack is detected, the NBCC can predict the hazards. The corps NBC officer, along with other battle-staff members, integrates the operational indicators from the LRBSDS with biosurveillance data from biological detection assets (i.e., BIDS), other intelligence, and other staff input. The staff analyzes and evaluates all available indicators to ascertain if a biological attack has occurred and to determine the appropriate recommendations for the force commander.

2. Mission

The LRBSDS provides long-range biological-detection information to the designated HQ (i.e., BDC). The crew uses the LRBSDS mounted in a UH-60 helicopter to scan the designated AOIs to detect, range, and track large-area aerosols disseminated on the ground or in the air. Based on the LRBSDS outputs and operator assessment, the team interprets the data presented and forwards an LRBSDS incident report according to the instructions provided in the higher HQ OPORD. Although the LRBSDS is configured for aerial-based surveillance, the system cannot be configured for use on other small or medium rotary-winged aircraft. An LRBSDS mission can be divided into the following three phases: pre-operations, biological surveillance, and post-operations. These three operations are discussed later in this appendix.

3. Capabilities

a. The LRBSDS provides the operational-level commander with multiple capabilities. These capabilities include—

- (1) Cueing BW point detectors about incoming manmade aerosols.
- (2) Providing early warning for forces on the move.

(3) Providing a limited capability to detect manmade aerosols in an economy-of-force role (for example, with a limited number of point detectors, the LRBSDS can supplement the other detection systems).

(4) Enhancing the biological detection surveillance array's probability of detection (specifically, the LRBSDS may detect manmade aerosols that miss point detectors because of gaps in the cloud or low aerosol concentration).

b. The LRBSDS's capabilities enable it to detect aerosol clouds and classify them as manmade or naturally occurring. Therefore, depending on multiple METT-TC factors (such as the available flight time and the assigned mission), commanders may instruct the LRBSDS team to conduct the following tasks.

(1) Detection and mapping of a manmade aerosol. The team uses this technique to map the cloud's left and right limits and estimate its downwind drift (direction and speed). This technique requires about 30 to 45 minutes and can support the warning of specific areas.

(2) Detection and tracking of an aerosol. The team uses this technique to estimate downwind cloud drift and classify the aerosol as naturally occurring or manmade. This technique does not determine the clouds left and right limits. It requires about 15 minutes.

(3) Detection and classification of an aerosol. The team uses this technique to classify an aerosol as naturally occurring or manmade. This technique requires about 5 minutes. For example, the LRBSDS's role could include detection and classification to enable cueing of downwind point detectors or detection and mapping or detection and tracking to support the tracking of an aerosol cloud. This information would support estimates on the size of the area that would need early warning.

4. Organization

a. LRBSDS Teams. A six-man element is organic to the biological detection company's HQ section. The element consists of three, two-man LRBSDS teams (one E6 and one E5). The LRBSDS noncommissioned officer in charge (NCOIC) is the senior operator. The teamwork of the LRBSDS team and flight crew is important for successful mission accomplishment.

b. Command and Support Relationships. Since the LRBSDS is organic to the BDC, the BDC commands the element, receives and analyzes LRBSDS reports, and provides administrative and logistic support. One or more LRBSDS teams are normally placed within operational control (OPCON) of an Army aviation unit (i.e., aviation brigade). The aviation brigade receives long-range detection missions from corps OPORDs/FRAGORDs, assists in planning, and controls mission execution. The aviation brigade provides mission helicopters from one of its aviation companies, trains the helicopter crews on LRBSDS missions, and provides logistical support as directed. The aviation brigade NBC officer/NCO plans and coordinates LRBSDS missions assigned to the brigade. If LRBSDS teams cannot communicate directly to the BDC, they radio their mission reports to the aviation brigade's tactical operations center (TOC) or other station for relay to the BDC's

CP where they are analyzed, acted upon, and/or passed to the corps NBCCC. If a biological detection capability is needed for an early-entry operation, the force package should include (as a minimum) a BDC consisting of a LRBSDS and BDT, elements of the BDC's HQ, and CLS teams. The BDC's expertise is required to analyze the information generated by the LRBSDS and the BIDS.

c. Organizational Functions. The key functions of each member of the LRBSDS teams are shown below.

(1) LRBSDS NCOIC (senior operator). The LRBSDS NCOIC is responsible for—

(a) Supervising and leading the LRBSDS teams.

(b) Providing input to the biological detection planning process, coordinating and preparing for LRBSDS missions, receiving LRBSDS missions from the aviation brigade (when OPCON or attached), monitoring the execution of missions, assisting in post-mission debriefings, and supervising custodial procedures for data tapes.

(c) Coordinating missions with the aviation brigade chemical officer and flight operations center. With the tasked aviation company, he directs and coordinates the movement and linkup with the aviation unit and ensures that mission aircrews are briefed on laser hazards.

(d) Obtaining MET data.

(e) Training teams, maintaining equipment, and ensuring that logistics, morale, and discipline are maintained.

(2) Operator. The LRBSDS operator is responsible for—

(a) Coordinating and preparing for missions.

(b) Receiving missions from the LRBSDS NCOIC.

(c) Transporting equipment to the staging area.

(d) Coordinating with pilots.

(e) Loading/unloading the LRBSDS and preparing it for operations.

(f) Operating the LRBSDS during missions, interpreting its data, and downloading data and maintaining the data tapes.

(g) Performing post-surveillance operations for the LRBSDS and support equipment.

(h) Conforming to safety procedures for the LRBSDS, the helicopter, the generator, and the forklift.

(i) Performing operator maintenance on LRBSDS and support equipment.

(3) Assistant operator. The assistant operator is responsible for—

(a) Assisting the operator with the functions shown above.

(b) Recording detection information (during missions) on the mission data sheet, obtaining flight information from the pilot, ensuring the completeness of reports, and transmitting the reports.

d. QM. BDC and LRBSDS unit leaders assure team proficiency. Team proficiency is maintained through measures such as periodic hands-on training that involves controlled and approved use of simulants to support system detection.

Note: The operator's and assistant operator's roles may alternate depending on factors such as mission length.

5. Employment Planning

a. LRBSDS planning will include information such as time and desired surveillance tracks to be flown and will identify the laser eye-safety risk to personnel and recommend measures to minimize that risk

b. To support LRBSDS, the corps aviation brigade normally will provide aircraft support for the surveillance mission. Specifically, Figure H-1, LRBSDS Employment Concept, provides a flow diagram of the LRBSDS employment concept.

c. LRBSDS operations will be planned to maximize the warning time of a large-scale line-source biological agent attack against US forces. The primary value of LRBSDS is to provide an early indicator of a possible line-source attack by determining the location and size of the suspect cloud. This allows time for cueing of ground-based biological detectors and casualty-avoidance measures.

d. For LRBSDS, the corps aviation brigade will conduct the surveillance mission according to the approved plan. The aviation officer will allocate the necessary aircraft and coordinate the airspace utilization with the AF tactical air control system or other airspace management authorities as appropriate. The aviation officer may adjust the planned aircraft flight route to minimize risk, and mission planning could include measures for suppression of enemy air defenses (SEAD).

e. A key to successful employment includes conducting routine environmental checks to acquire background aerosol data. Access to accurate MET forecasts, intelligence information on threat BW capabilities, and timely information on potential line-spray activities (surface or air) help support a quick response by the airborne LRBSDS team. For the LRBSDS to conduct detection of a biological attack, the aircraft should fly on a track parallel to the cloud with the appropriate standoff distance. Normally, the planned flight track will be perpendicular to the surface wind direction.

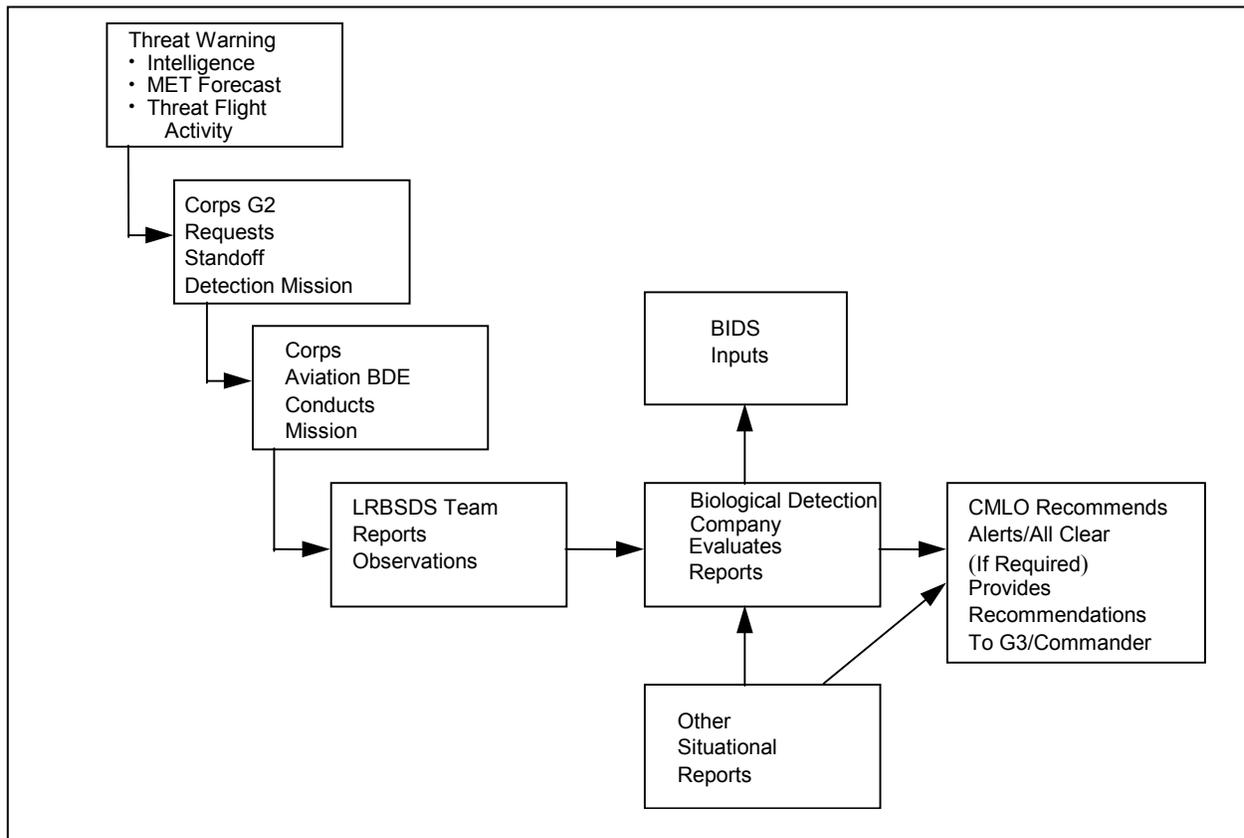


Figure H-1. LRBSDS Employment Concept

f. The effective use of the LRBSDS increases the overall probability of BW detection (i.e., detecting a manmade aerosol). Planners coordinate with intelligence and aviation personnel to analyze the air-defense threat to minimize risks to the crew and aircraft. Additionally, planners provide maximum flexibility in flight coordination measures because of the many variables that can impact the downwind drift (wind shift) of manmade aerosols.

g. The basic information provided from LRBSDS operations can help to answer the following questions:

- Is there a suspect aerosol?
- Where is the suspect aerosol and where is it traveling?
- How large is the suspect aerosol?

h. The force commander's R&S plan organizes the collection of information. The R&S plan will include specific biological surveillance requirements and the BDC and/or the aviation brigade's OPLAN/OPORD will integrate requirements for long-range biological detection missions. The LRBSDS element implements the OPORD and responds to

FRAGORDs.

i. Planners consider multiple factors when employing the LRBSDS, including the following:

- (1) What is the LRBSDS's mission?
- (2) What are the required actions (detection and mapping, detection and tracking, or detection and classification) to support the mission?
- (3) What friendly-force biological detection assets are available? Are planners using the LRBSDS and the BIDS in an integrated manner, or are they using the LRBSDS in an economy-of-force role (for example, is the LRBSDS operating without the BIDS)?
- (4) What is the size of the NAI? The NAI's size and location may cause modification of flight tactics.
- (5) What threat information is available? For example, the enemy is using an air release, the estimated length of the long line-source release is 50 km, and the enemy's air-defense threat dictates the use of the detection-and-classification technique.
- (6) What is the enemy's BW capability?
- (7) What are the airspace flight-coordination restrictions? Specifically, flight corridors/egress routes will vary depending on the operational situation.

6. Long Range Biological Standoff Detection System Employment

a. When employed, the LRBSDS is used to enhance the force commander's BW detection capability (e.g., BIDS, intelligence sources, and medical information). The LRBSDS can be used to provide large-area surveillance during any type of operation when there is a possibility of a BW aerosol threat. It is especially important to provide early warning during large force movement. The information from the LRBSDS supports the IPB process and directly supports ongoing and future operations.

b. The normal basis of issue for a corps will be three LRBSDS systems. The system should be retained as a corps asset. The area of concern for a mission, will be determined by the commander and the duration of the surveillance mission or the number of systems used will be based on factors such as—

- Beneficial MET conditions for BW employment.
- Force vulnerability (e.g., during movements).
- Indicators from intelligence sources.
- Size of the AO.

c. The options available for employing an LRBSDS team are shown in Table H-1. The LRBSDS is most efficient when three systems are used together; however, LRBSDS

teams could be split. For example, two LRBSDS teams could be staged at one airfield and the third LRBSDS team staged elsewhere.

Note: To split-base the teams, the supporting aviation unit will be required to furnish additional logistics assets such as a forklift. In selecting the employment option, planners consider NAI size (the area to be scanned), MET conditions, force vulnerability, the degree of the threat, the terrain within the LRBSDS scan area, the flight time required to detect or track an aerosol cloud, the availability of helicopters and LRBSDS, and logistics support.

d. Split-basing the LRBSDS offers advantages and disadvantages. One advantage is the ability to conduct additional aerial BW surveillance in a distant portion of the AO. Disadvantages include part-time rather than full-time coverage at two locations (i.e., decreased scanning time and periods of time with no LRBSDS coverage), decreased BDC flexibility during mission execution, and the need for additional operational planning and logistics support at the additional LRBSDS staging site.

Table H-1. LRBSDS Employment Options

Coverage Required	Number Of LRBSDS Used	Considerations
Full time (continuous coverage)	1	Breaks in coverage due to refueling the aircraft and changing aircrews may occur if assets are unavailable to put more LRBSDSs in the air.
	2 or 3	Can use two systems on station. Requires aircrew change for lengthy missions.
Part time (interrupted coverage)	1	Least resource-intensive. Least coverage per unit of time. Appropriate for low-threat conditions. Can use for background missions.
	2	Each system can cover one-half of the area or can alternate systems on station.
	3	Each system can cover one-third of the area or can rotate systems on station. Best option for long-duration missions.

e. LRBSDS employment techniques could include the following alternatives.

(1) Operate Three Systems Simultaneously.

(a) Each system would conduct surveillance on a portion of the corps AO. This option allows for maximum coverage and early warning potential. However, it is resource intensive and allows no reserve detectors. Additionally, coverage is limited or nonexistent during refueling/rearming operations. Operational work-arounds such as non-simultaneous refueling operations could mitigate this limitation.

(b) Each system can scan one-third of the AO for part-time coverage. Careful planning is required for aircrew changes and refueling operations. Using all three may be appropriate when the threat is high and MET conditions are favorable for BW employment. This option provides the fastest, most complete, most in-depth coverage of the NAI. It is also the most resource-intensive option.

(2) Operate Two Systems Simultaneously. Each system would be responsible for one-half of the surveillance area. The third system would be used to provide surveillance during refueling/rearming operations.

(3) Operate One System.

(a) The system would conduct surveillance of the entire AO. It is the least resource-intensive and provides a maximum reserve capability; however, it provides the least amount of coverage and limits early warning potential.

(b) It is possible to scan the AO with one LRBSDS; however, the helicopter must go off station to refuel and to change aircrews during long missions. This option is the least resource-intensive, provides the least amount of coverage per unit of time, and limits early-warning potential. The use of a single system could be appropriate for use when the threat is low or for background missions. This option could also be used in case LRBSDS teams are split-based—two at one location and a third at another staging site.

f. Planners may use any of the options during a given surveillance period. The LRBSDS is employed to detect and report suspected BW aerosols at distances of 5 to 30 km under various atmospheric conditions. The LRBSDS requires a clear line of sight (LOS) between the system and the aerosol. It cannot reliably detect point-source aerosols but can detect broken, long-line-source releases. The system is operated above friendly territory and out of range of effective enemy fire. A typical mission is illustrated in Figure H-2.

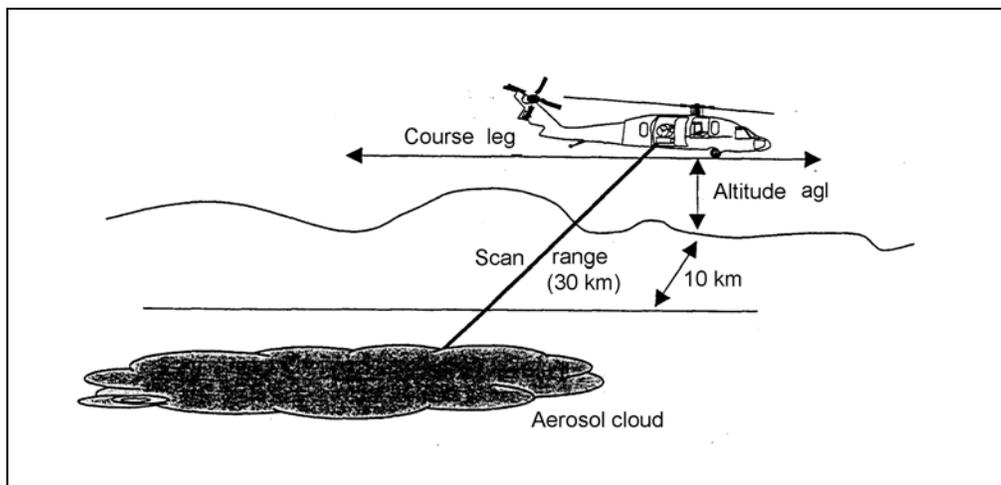


Figure H-2. Sample LRBSDS Mission

Note: Figure H-2 shows a mission being flown on a course leg at a given altitude, 10 km behind the FLOT, and scanning at a range of 30 km (20 km beyond the FLOT). However, the distance from the FLOT could range from 5 to 20 km, depending on the threat.

7. Long Range Biological Standoff Detection System Mission Profiles

The LRBSDS has two mission profiles—scheduled and preplanned. These missions are designed as follows.

a. Scheduled. This mission is normally conducted to obtain aerosol background information on the AO or to conduct other administrative missions. Scheduled missions are routinely conducted to acquire atmospheric environmental data in the AOs. The missions are planned and conducted as preplanned missions. The mission will appear in the air tasking order as biological surveillance missions.

b. Preplanned.

(1) This mission is normally conducted when the threat of a BW attack is high based upon threat information and MET conditions. During this type of mission, the LRBSDS team transports the system using assets organic to the aerial platform. Upon arrival, the system is installed. The aviation unit conducts all airspace coordination and route planning. Preflight checks are completed. The mission is executed at the prescribed time. Preplanned requests would require at least 24 hours advance notice for aircraft scheduling.

(2) Preplanned missions are designed to search for and detect biological attacks. These missions are normally performed during periods of high risk based on intelligence or MET forecasts. This mission category requires advance planning to coordinate aircraft availability, routes, and duration.

8. Mission Planning

A staff planning checklist is outlined in Table H-2 (page H-10).

a. The JTF/Corps NBC officer, assisted by the BDC operations officer, has the primary responsibility for LRBSDS mission planning. The corps OPORD will provide guidance to the aviation brigade and the BDC. Subsequent FRAGORDs will include—

(1) The LRBSDS mission to be performed (area to be scanned and mission times).

(2) Biological detection sectors to provide sufficient coverage of the target area to be scanned.

b. The aviation brigade NBC officer analyzes the LRBSDS mission. He coordinates with the BDCs CP or the Corps NBCCC to determine the following:

(1) The BW threat assessment, type of agent, enemy targets, and enemy intent.

(2) The ground and air defense area (ADA) threat situation.

(3) Current BW indicators and any estimates on potential windows (i.e., times) on when biological weapons may be employed.

(4) MET conditions for the duration of the mission (see the previous terrain and weather discussion).

(5) JTF/Corps commander's mission, intent, and CONOPS.

(6) NAIs.

(7) Aircraft decontamination.

Table H-2. Example of an LRBSDS Staff Planning Checklist

Requirements	√
Obtain commander's guidance	
Know friendly situation	
Know enemy situation	
Assist in preparation of IPB	
Develop concept for LRBSDS employment	
Provide input for R&S plan	
Consider command and support relationships	
Obtain approved NAIs for LRBSDS coverage	
Develop/update time line for LRBSDS mission execution	
Coordinate with aviation officer, biological detection company, and aviation unit to obtain, recommend, provide, conduct, and coordinate the following: <ul style="list-style-type: none"> • Weather for AOI • Obscurant situation for AOI • Map reconnaissance • Flight corridors (primary/alternate) • Ingress/egress routes • Flight tactics during LRBSDS scanning • Airspace control measures • Communications frequencies • Required reports/formats • NAI priorities • Alternate NAIs • Contingency plans • Input for air tasking order • Downwind drift war-gaming of biological agents • LRBSDS capabilities/laser-safety considerations • Required time on station • Provisions for SEAD • Risk management • Lost communications procedures • Status of LRBSDS teams/equipment • Threat update 	
Obtain update on LRBSDS's CLS status	
Review after-action report from previous LRBSDS mission	
Obtain update on evacuation procedures for LRBSDS topics/reports	
Anticipate and plan future missions	

c. The aviation brigade's operations staff officer (S3) performs the following functions:

- (1) Determines aircraft support requirements.
- (2) Determines and plots the designated biological detection sectors and course legs.
- (3) Selects the routes to and from the search area.
- (4) Recommends the flight profile to be employed during biological detection operations.
- (5) Determines refuel points and emergency landing zones (LZs).
- (6) Plans handoff procedures (times and locations) for primary and backup aircraft.
- (7) Plans for the SEAD.
- (8) Conducts airspace coordination.

d. Flight planning by the aviation unit includes the selection of the flight profile to be employed. The profile includes designating the routes to and from the biosurveillance target area, identifying the use of the designated course legs in the biosurveillance sectors, and prescribing the helicopter's altitude/speed. The flight profile's altitude above ground level (AGL) and standoff distance from the FLOT will vary. For example, the altitude can range from 200 to 5,000 feet AGL, and the standoff distances from the FLOT can be 5 to 20 km. Two general flight profile options are shown in Figure H-3 (page H-12).

e. Flight Profile.

(1) A straight-and-parallel (racetrack) flight profile involves the helicopter flying at a predetermined altitude and speed on a flight track downwind and parallel with the anticipated release line. For example, a general rule of thumb is that the LRBSDS should maintain a LOS with an aerosol cloud every 15 to 20 km during the flight leg. This equals about 1 minute of scan time for every 5 minutes of flight time at altitudes of 4,000 to 5,000 feet AGL. This flight profile could be used when hostilities have not commenced or the air defense artillery (ADA) threat is low. This technique provides the best probability of detection because more time is spent tracking.

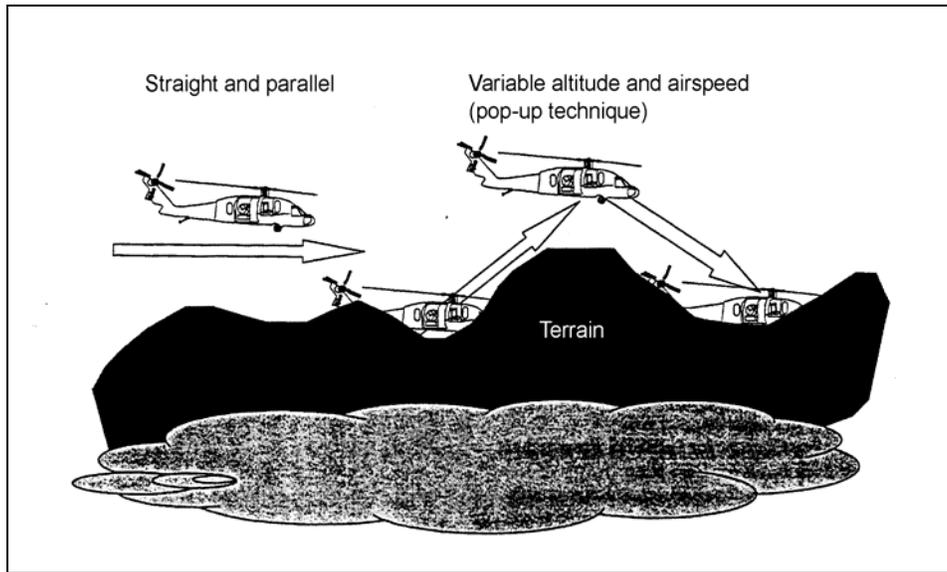


Figure H-3. Flight-Profile Examples For LRBSDS Missions

(2) A variation of this straight-and-parallel technique involves an effort to retrace the cloud. For example, after first contacting the cloud, contact with the cloud is lost. Subsequently, the aircraft turns around until it can reacquire the cloud. The goal is to map the ends of the cloud. The use of this technique depends on different factors, but especially on having the airspace authorization to spend additional time within a specific flight corridor.

(3) A variable-altitude-and-airspeed flight profile is used in moderate to high ADA threat environments. It allows the helicopter to fly alternately between masked and LOS altitudes (pop-up technique). For example, the flight/LRBSDS crew picks various points along a course leg. At those points, the helicopter flies at an altitude where operators could scan the NAI. The helicopter flies at that altitude for a given time period, then move to a lower masked altitude until the next LOS requirement. This profile has a lower probability of detection because less time is spent scanning for aerosol clouds. The variable-altitude and -airspeed flight profile may be used when—

(a) The detection-and-classification technique is employed (i.e., the limited time spent scanning the cloud will not provide enough information to track or map the cloud).

(b) The mission is to detect long line-source releases (100 km or more), point-source, or short line-source releases (less than 30 km long) where the variable flight profile will be of limited or no value.

(c) The ADA threat is moderate to high, SEAD fires are unavailable, and nap-of-the-earth (NOE) flying will not allow the LRBSDS to detect manmade aerosols.

f. LRBSDS planning will limit the time that the enemy's ADA can target the helicopter; however, the LRBSDS operator must see five consecutive scans of an aerosol

cloud to make a classification. Planners use this information as a basis for calculating the time required for LRBSDS scanning. Because the time required for five scans is different for various altitudes, the time is calculated for three different altitude ranges. When using a “sawtooth” flight profile, the following represents the minimum time the helicopter must remain at an altitude to give the operator a sufficient LOS to the NAI and allow scanning time to obtain sufficient returns:

- 1 minute for altitudes of 4,000 to 5,000 feet AGL.
- 45 seconds for altitudes between 2,000 to 4,000 feet AGL.
- 30 seconds for altitudes of 2,000 feet AGL or less.

g. The LRBSDS can maintain a specific amount of time on station—generally about 2 hours for most environments. Due to the limited time available for an LRBSDS to conduct scanning, additional systems may be required during detection and mapping missions. Conversely, limited on-station time and system availability may drive the use of the detection-and-classification missions. For example, if detection and mapping are required and the aerosol is greater than 25 km in length, the majority of the LRBSDS on-station time would be spent mapping one cloud.

h. Planners must be aware of factors that can impact the LRBSDS probability of detection. For example, atmospheric visibility, the cloud-particle backscatter, and the range to the target cloud will influence LRBSDS detection ability.

(1) Atmospheric visibility has the strongest effect on the LRBSDS’s ability to detect aerosol clouds. Visibility is essentially a measure of how dirty or clean the air is. The more particles there are in the air, the more they affect how well the laser’s energy transmits through the air and how well the signals reflecting from downrange targets (aerosol clouds) reach the LRBSDS. Good visibility means that there is less pollen, dust, and water (in the form of fog or haze) floating in the air. These particles greatly affect the minimal density of an aerosol cloud that the LRBSDS can detect and the range at which the LRBSDS can detect it.

(2) Particle backscatter is a measure (in terms of a percentage) of how much of the laser’s energy a specific particle reflects back to the receiving telescope. A higher particle backscatter means that a specific particle reflects more of the laser’s energy back to the receiving telescope than a particle with lower backscatter. If the LRBSDS is used to look at two clouds with the same density (particles per liter) and different particle backscatter, the cloud with higher particle backscatter will be more visible. In essence, the cloud with higher particle backscatter will be brighter to the LRBSDS and will be detectable at greater distances.

(3) The distance to the cloud determines how much of the laser’s energy intersects the cloud’s particles. As the distance between the laser and the cloud increases, the amount of the laser’s energy that reaches the cloud decreases. Applying more energy to the cloud by decreasing the distance means that it will appear brighter to the LRBSDS. Simply put, the closer the LRBSDS is to the target NAI, the better chance it has of detecting man-made aerosol clouds.

i. To support LRBSDS planning, Tables H-3 and H-4 provides estimates on how far away an LRBSDS can conduct detection and mapping, detection and tracking, or detection and classification operations.

(1) Tables H-3 and H-4 contain data based on the LRBSDS scanning a 1-kilogram (kg)-per-km initial release of a dry form of *Bacillus globigii*. The tables represent a worst-case threat using dry spores. Spores have a particle backscatter that is lower than other agents (such as vegetative bacteria, toxins, and viruses).

(2) The particle backscatter is higher for other types of agents—meaning that another threat cloud with the same number of particles as the spore cloud will appear brighter to the LRBSDS. While this implies that the helicopter can fly the LRBSDS farther from the NAI and still detect a threat cloud, the situation is not so simple because of the difficulty in anticipating the enemy’s selected agents and dissemination methods.

(3) Tables H-3 and H-4 also provide guidance on LRBSDS scanning ranges. The other factors in the tables address the helicopter’s altitude and visibility. Use Table H-3 if the helicopter’s flight altitude is 1,000 feet AGL or less, and use Table H-4 if its flight altitude is 1,001 to 5,000 feet AGL. For example, if a helicopter is flying at an altitude of 500 feet and visibility is at 80 km, planners estimate that detection and mapping can be conducted at a 5- to 40-km scanning range with the LRBSDS.

Table H-3. Helicopter NOE Altitude (150 to 1,000 Feet AGL)

LRBSDS RANGE (KM)	VISIBILITY (KM)			
	5	15	23	80
5	Detection and mapping	Detection and mapping	Detection and mapping	Detection and mapping
10	Detection and tracking	Detection and mapping	Detection and mapping	Detection and mapping
15	Detection and classification	Detection and mapping	Detection and mapping	Detection and mapping
20	Detection and classification	Detection and tracking	Detection and mapping	Detection and mapping
25			Detection and tracking	Detection and mapping
30			Detection and tracking	Detection and mapping
35			Detection and classification	Detection and mapping
40			Detection and classification	Detection and mapping
Detection and mapping – detect and map for 30 to 45 minutes after release Detection and tracking – detect and track for 15 minutes after release Detection and classification – detect up to 5 minutes after release				

j. BW threats can be disseminated in either wet or dry forms. The LRBSDS will see a wet dissemination (with the same concentration, at the same distance, and in the same visibility) twice as bright as a dry dissemination. Wet dissemination, however, is considerably less efficient than dry dissemination. Wet agents do not travel as far as a dry dissemination and do not have as many agent-containing particles that can infect personnel on the ground.

Table H-4. Helicopter NOE Altitude (1,001 to 5,000 Feet AGL)

LRBSDS RANGE (KM)	VISIBILITY (KM)			
	5	15	23	80
5	Detection and mapping	Detection and mapping	Detection and mapping	Detection and mapping
10	Detecting and mapping	Detection and mapping	Detection and mapping	Detection and mapping
15	Detection and classification	Detection and mapping	Detection and mapping	Detection and mapping
20	Detection and classification	Detection and tracking	Detection and mapping	Detection and mapping
25		Detection and tracking	Detection and tracking	Detection and mapping
30		Detection and classification	Detection and tracking	Detection and mapping
35		Detection and classification	Detection and tracking	Detection and mapping
40		Detection and classification	Detection and tracking	Detection and mapping
Detection and mapping – detect and map for 30 to 45 minutes after release Detection and tracking – detect and track for 15 minutes after release Detection and classification – detect up to 5 minutes after release				

k. To optimize LRBSDS performance when selecting a flight profile, planners consider the altitude, search angle, and airspeed. LRBSDS biodetection operations should be conducted at an altitude of 150 to 5,000 feet AGL at 75 to 100 knots. The type of flight profile selected will affect the system’s settings. The pilot must provide flight-profile information to the LRBSDS operators before commencing altitude changes.

(1) The distance from the helicopter to the NAI is also determined during preflight planning. Specifically, the LRBSDS is limited to a 12-km scan depth when flying at altitudes 2,000 feet and below. At lower altitudes, the LRBSDS can only fully cover a 12-km portion of the NAI. Planners must consider this when assigning the air corridor that the helicopter will fly. If the NAI’s depth cannot be reduced, then flying at an altitude above 2,000 feet AGL could be considered. At an altitude over 2,000 feet AGL, the LRBSDS operator can easily set the system to scan the full depth of the NAI (from 10 to 30 km).

(2) The flight profile selected is METT-TC dependent. For example, if the atmospheric visibility is below 5 km, the LRBSDS is not effective; it becomes more effective as the visibility increases. Flight profiles are used that take advantage of available terrain, especially when using a variable-altitude profile. METT-TC considerations that can impact flight profile selection include the following.

(a) Mission. The number of NAIs requiring LRBSDS support, the command and support relationships, reporting requirements, and the NAI size.

(b) Enemy. Enemy ADA capability, BW threat agent, and the threat’s BW intent and capability.

(c) Terrain. Terrain characteristics, the available LOS, the atmospheric visibility, and planning for fallback flight corridors to help preclude flying through a threat cloud.

(d) Troops. Number of LRBSDS available, CLS capability, BIDS-array availability and location, and the location of friendly forces.

(e) Time available. Estimated time required for the LRBSDS to be on station, the lead time required to obtain airspace clearance, the time to analyze LRBSDS detection reports, and the mission time frames.

(f) Civilian considerations. Civilian and HN assets within NAIs.

(3) To support the planning process, the LRBSDS NCOIC may use a mission-planning checklist (see Table H-5).

Table H-5. LRBSDS Mission Planning Checklist

Requirement	Actions Required
Plan for future missions	Perform maintenance and PMCS on equipment. Conduct operator training. Report any equipment/personnel problems. Obtain necessary supplies. Maintain current intelligence/operations status.
Obtain mission	Receive WARNORD, OPORD, or FRAGORD.
Analyze mission	Analyze using METT-TC factors.
Issue WARNORD	Determine which LRBSDS team is to perform the mission. Issue WARNORD to the team and clarify questions.
Perform coordination	Coordinate with the aviation brigade chemical officer, the LRBSDS team, and the supporting helicopter unit. Determine METT-TC information, logistics support, ground movement (if required), rehearsals, and communications. Obtain maintenance support (as required)
Make tentative plan	Plan ground movement (if required). Analyze biosurveillance requirements (sectors or legs). Plan necessary support.
Conduct map reconnaissance	Select route to and from airfield (if necessary to travel).
Complete plan	Refer to FM 101-5, Appendix H.

9. Long Range Biological Standoff Detection System Mission Phases

An LRBSDS mission is divided into three parts: preoperations, biological surveillance operations, and postoperations.

a. Preoperations Phase.

(1) Mission Factors. To ensure success, LRBSDS capabilities are matched to mission factors that include operational coverage needs, MET conditions, threat, and aircraft availability. The BDC operations officer and detachment NCOIC have primary responsibility for mission planning and reconnaissance. Initial planning will normally occur at the corps NBCC or at the BDC. The BDC operations officer and/or detachment NCOIC will coordinate with the corps or controlling HQ staff to obtain—

- Commander's intent and CONOPS.
- Aerial platform, number, usage windows, and location.
- MET conditions (e.g., wind information at various heights for the duration of the operation, stability categories, sunrise and sunset information, and other pertinent factors such as rain, snow, etc.
- Type of threat expected (ground, air, etc.).
- Duration of the mission.
- CONOPS for other BW detectors.

(2) Reconnaissance. Reconnaissance of the AO is conducted. If possible, the leader coordinates for an aerial reconnaissance; however, if this is not possible, the leader conducts a map reconnaissance to—

- (a) Determine surveillance sectors (it is best to select a primary and secondary to compensate for major changes in wind directions).
- (b) Primary and alternate traveling routes and times.
- (c) Surveillance leg distance/duration.

(3) Flight Profiles. Detailed planning determines what flight profile will be employed during surveillance operations. The flight profile is METT-TC dependent. When selecting a flight profile, the decision-maker will consider three major factors: the level of threat to the aircraft, location and size of the surveillance area, and LOS. Generally, there are two general flight profile options as follows:

- (a) Straight and Parallel. The platform flies at a predetermined altitude and speed scanning perpendicular to the wind. The key is to ensure LOS to the target. This flight profile could be used when hostilities have not commenced or the anti-air threat is very low.

(b) Variable Altitude and Airspeed. The platform flies alternately between a masked and LOS altitude. For example, the platform would rise to an LOS altitude, conduct surveillance for a certain amount of time, and then descend to masked altitude and fly until the next LOS rise.

(4) Other Planning Factors. Additional detailed planning requirements for the LRBSDS detachment include coordinating passage of lines, communication requirements, logistical support from the biological detector and supporting unit, locations of the supporting airfields and FARPs, and decontamination support enroute to supporting unit.

(a) Following the initial planning, the LRBSDS normally will be located with the HQ element of the biological detection company, host unit, or the supporting aviation unit. Upon notification of a mission, the detachment or BDC operations officer conducts initial coordination with the BDC commander, JTF, corps NBC officer, and/or the corps NBCCC. Initial information requirements includes determining—

intent.

- BW threat window and overall BW threat, type, direction, and

- Ground, anti-air, and threat situation.

- Current BW indicators.

- MET conditions for duration of the mission.

- Corps or JTF commander's mission, intent, and CONOPS.

- Current information.

- Key areas of concern (NAIs).

(b) The detachment NCOIC provides the warning order (WARNORD) to the teams and directs initiation of preoperational checks. The team leaders begin preoperational actions, and conduct PMCS of associated support items of equipment (ASIOE) and detectors.

(c) The detachment conducts movement to effect linkup with supporting operational platform (if required), and upon arrival, systems are installed onto the aerial platforms. The detachment teams conduct preoperational checks on the system and PMCS on ASIOE as appropriate, and the LRBSDS team and aerial platform crew conduct required briefings and coordination. Briefings presented to the aerial platform crew may include information as follows:

- System orientation to the crew—specifically LRBSDS safety features and eye safety parameters.

- Reporting procedures and formats are provided to the pilot and crew.

- Lasing instructions are reviewed with the pilot.

- Team receives flight path and type from the pilot (e.g., NOE, height above ground, speed, and flight duration).

(5) Final Mission Preparation.

(a) During final mission preparation, the LRBSDS detachment follows the checklist information found in Table H-6 (page H-20). The LRBSDS NCOIC (or the aviation brigade chemical officer/NCO) provides the WARNORD or the movement order to the team and directs the initiation of preoperational checks. Following the preparation of the WARNORD, many key factors are verified or researched. These factors could include planning estimates for the potential length and location of course legs that must be flown. War-gaming provides plots on estimated downwind distances for BW aerosols. This premission planning is conducted in coordination with the intelligence section (S2/G2) and is used to help determine the locations and lengths of the course legs for biological surveillance missions. Other input for this type of planning includes the threat's BW capabilities, weather data, NAI locations, and the length and location of the line source. During the final preplanning, aviation personnel and LRBSDS teams consider and confirm what tactics will be used for the missions. Map reconnaissance identifies any obstacles that could block the laser's scanning along a course leg.

(b) The LRBSDS NCOIC or aviation brigade NBC officer/NCO briefs the LRBSDS team's OPORD/FRAGORD. The team's OPORD/FRAGORD is oral or written. It outlines important elements that include routes to and from the biological detection mission (normally two entry and exit routes will be planned), flight corridors/course legs for LRBSDS scanning that include alternate course legs, the NAI's distance from the FLOT, and the NAI's depth. Coordinating instructions will also indicate that course legs crossing key boundaries (Corps or ARFOR/Marine Corps forces [MARFOR] boundaries) have been coordinated by the appropriate aviation airspace activities (the joint airspace control center [JACC]).

(c) If the LRBSDS team is not collocated at the supporting airfield, the team or the supporting helicopter moves to the designated staging area. Movement is reported according to the OPORD or SOP. On arrival, the team installs the LRBSDS equipment on the helicopter, conducts preflight operational checks on the system, and conducts PMCS on the equipment according to TM 3-6665-351-10.

(d) The LRBSDS team and helicopter crew conduct air mission briefings (see Table H-7 [page H-21]) and coordination. The team briefs the helicopter crew on the LRBSDS system (specifically LRBSDS safety features and eye safety), reporting requirements/ procedures, pilot clearance to lase, and details of the biological surveillance mission. Preflight instructions will indicate that during full- or part-time coverage, replacement LRBSDS units will receive an update on the mission situation from the supporting OPCEN (biological detection company's CP or aviation-unit OPCEN). Finally, the team receives a briefing from the pilot on safety, emergency operations, and flight information (such as the flight path, the height above the ground, the airspeed, and the flight's duration).

Table H-6. LRBSDS Mission Preparation Checklist

Preparation Required	LRBSDS Team Actions
----------------------	---------------------

Issue WARNORD/movement order	Prepared by the LRBSDS NCOIC or aviation brigade chemical officer.
Move to link up with helicopter (if required)	Load equipment. Conduct road march. Report movement per SOP.
Conduct preflight equipment checks	Conduct PMCS of equipment. Perform initial adjustments, checks, and self-test of LRBSDS. Conduct inspections.
Conduct rehearsals	Conduct rehearsals.
Issue team OPORD/FRAGO	Prepared by detachment NCOIC or aviation brigade chemical officer.
Install/check equipment	Install LRBSDS on helicopter. Conform to safety procedures. Perform preflight operational checks on LRBSDS. Perform troubleshooting on LRBSDS. Perform PMCS on generator. Use generator to warm laser.
Coordinate with aircrew	Conduct air mission briefing . Coordinate flight information. Conduct laser safety briefing.
Report status	Report per SOP.

Table H-7. Sample Air Mission Briefing Guide

Time.
Introduce team members.
General information.
Ground situation (S2/intelligence).
Weather.
Call signs.
Frequencies, communications net (all participants must monitor a common frequency).
Appropriate take-off times.
Flight route, altitude, time en route, airspace control measures, and egress routes.
Flight corridors (primary and backup).
Authentication procedures.
Abort codes.
Map datum.
Mission commander to LRBSDS team (airborne briefing sequence).
NAI's description.
NAI's location and elevation.
Terrain obstacles.
Required reports/SITREPs.
Communication nets and agencies.
Airspace coordination measures.
Restrictions.
Friendly troop locations.
Enemy ADA.

b. Biological surveillance Phase.

(1) LRBSDS Detection Process. The LRBSDS detection process is summarized in Table H-8. The steps are as follows:

(a) Detection. The LRBSDS detection is nonspecific. The system relies on operator experience and judgment to discriminate between natural and manmade aerosols. The experienced operator can reasonably determine if the suspected aerosol is manmade, but he cannot determine if it is a BW agent. When a biological agent is released, the LRBSDS will detect the aerosol as long as its concentration is sufficiently above background for the current MET conditions. This detection window lasts minutes to hours, depending on meteorology, the specific agent used, and the initial amount and method of agent dissemination.

(b) Reporting. The LRBSDS team uses the helicopter radio to report the detection of a possible biological aerosol by submitting a detection report. Planning identified (as a minimum) the following critical elements to support reporting requirements: call signs, frequencies, report formats, and content to ensure that the ground station and flight crew understand, required reports between the LRBSDS and flight crews or any in-flight coordination requirements between members of the LRBSDS crew.

Note: The helicopter could transmit reports via the following communication capabilities: FM secure with KY-58, very high frequency (VHF)-FM (nonsecure), or ultrahigh frequency (UHF) (nonsecure) with frequency hopping.

(c) Postoperations Analysis. Following an LRBSDS mission, the crew consolidates key information gathered during the mission. Specifically, the crew's records will include detection reports (if any), mission logs, and 8-millimeter (mm) data tapes from the LRBSDS. This information is safeguarded and, upon request, is forwarded to the BDC CP. If required by the BDC CP, chain of custody documentation will accompany the LRBSDS data tapes and documents.

Table H-8. LRBSDS Biological Detection Process

Tasks	Products	Required Components
Detect	Nonspecific alert	LRBSDS
Report	Detection report	Helicopter radio
Postoperations Analysis	AAR	Detection report, mission logs, and LRBSDS 8-mm

(2) Biosurveillance Execution.

(a) The LRBSDS team uses the information in Table H-9 as a sample checklist for executing a biological surveillance mission. At the beginning of a course leg and upon the pilot's order, the operator puts the laser into operation and scans the target area. The laser is turned off at the end of a course leg before the helicopter executes its turn. Next, the laser is turned back on when the pilot notifies the operator that the helicopter is at the beginning of the next leg. The operator begins tracking techniques upon detection of a suspicious aerosol. The assistant operator records information on the mission

data sheet and transmits incident reports. The laser operator ensures that the LRBSDS scan remains on the NAI and that ongoing communications with the flight crew are maintained to ensure that the scan is adjusted (as required) to remain within the NAI.

Table H-9. LRBSDS Biological Surveillance-Mission Execution Checklist (Sample)

Actions Required	LRBSDS Team Actions
Prepare to conduct biosurveillance mission	Check equipment. Set flight parameters. Conduct equipment function tests.
Conduct biosurveillance mission	Operate the LRBSDS. Scan along the course legs in the designated area. Analyze the display of any aerosol cloud detected. Record aerosol-cloud information and flight data.
Provide reports	Prepare detection report.
Complete biosurveillance mission	Download data onto data tapes, if required.

(b) The operator determines the aerosol cloud’s length. If multiple LRBSDS are used, each detector scans its own AO for the left and right limits of the aerosol. If an aerosol is discovered on a course leg and then lost, the team requests permission to backtrack along the same leg to reacquire the aerosol. If an aerosol is being tracked on a leg and it continues beyond the course leg or across the corps boundary, the team reports this and requests instructions. The helicopter does not deviate from the approved flight plan without authorization or coordination.

(c) If directed by the BDC, the operators will attempt to determine the length of the aerosol cloud. This is accomplished in two ways—

- The pilot hovers perpendicular to the cloud and the operator will manipulate the detector to scan for the ends of the cloud.
- Platform flies parallel to the cloud until the end of the cloud is reached. If multiple detectors are in the air, then each platform will scan its own AO for the left and right limits of the cloud.

(d) During LRBSDS operations, the operator determines the following information:

- The presence of a suspected biological aerosol using a monitor display of changes from the background.
- Whether the cloud is natural or manmade, based on aerosol characteristics.
- The cloud’s distance (range) from helicopter.
- The cloud’s height, length, and width.
- The cloud’s height above the ground.

- The relative aerosol concentration (high, medium, or low), which may be estimated from the intensity of the color and returned energy signal.

(e) During biological surveillance operations, the assistant operator uses a map to plot and track any aerosol clouds that were detected during the mission. By plotting both ends of the cloud and estimating its forward edge the cloud's movement can be estimated. Communications with the flight crew on the cloud's movement can also decrease the chances that the helicopter would inadvertently fly into a BW cloud.

(3) LRBSDS Flight Operations. The LRBSDS biological surveillance operations require synchronization of flight operations between LRBSDS operators, flight-crew personnel, and operations and planning sections. Operational factors that influence flight operations include flight profile selection, aerial releases, ground releases, elevation differences, altitude and flight profile considerations, data collection altitude for LRBSDS, LRBSDS detections, LRBSDS laser scanning, in-flight protocols, communications protocols, and reporting.

(a) Flight-Profile Selection. The profile considers the altitude, the search angle, and the airspeed that optimize the LRBSDS's performance. The LRBSDS can be flown from 150 to 5,000 feet AGL. Optimal airspeed is between 100 and 120 knots. Further, if the atmospheric visibility is less than 5 km, the system is marginally effective. Higher altitude AGLs increase the LRBSDS's scanning range and the probability of detecting aerially disseminated manmade clouds within designated NAIs. Straight-and-level rather than variable-flight profiles also increase the probability of detecting an aerosol cloud because of increased scanning time.

(b) Aerial Releases. It is better to fly higher (see Figure H-4) to detect aerial releases. The air at lower altitudes has more aerosol particles (dust, pollen, and smoke) that reduce the laser's power before it strikes the suspect cloud. Flying higher means that more laser energy hits the suspect cloud, thus giving the operator a stronger return signal. Flying at 4,000 to 5,000 feet AGL to scan the NAI provides an optimal vantage point for detecting an aerial release.

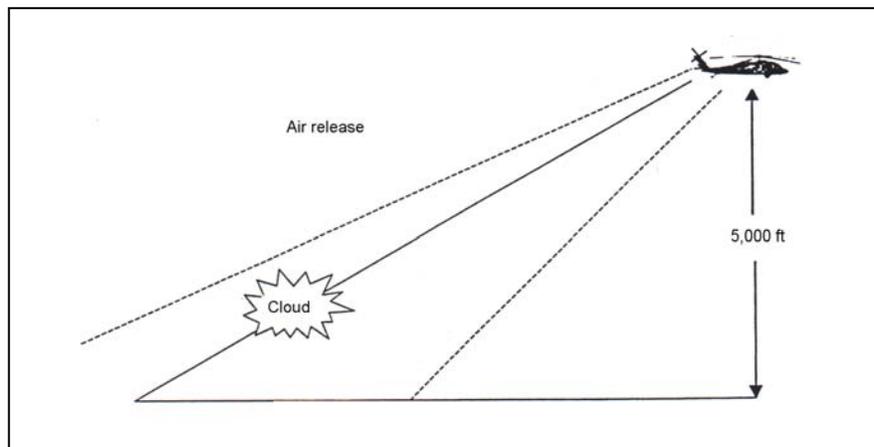


Figure H-4. Optimal Altitude for Air Release

(c) Ground Releases. Ground releases are more difficult to detect because the operator has to differentiate the suspect cloud from the ground. Although less laser energy hits the cloud, it is better to fly lower to reduce the angle at which the laser strikes the cloud (see Figure H-5). This shallower angle improves the operator's chances of differentiating between the cloud and the ground. The optimal altitude for detecting a ground release is 1,000 to 2,000 feet AGL.

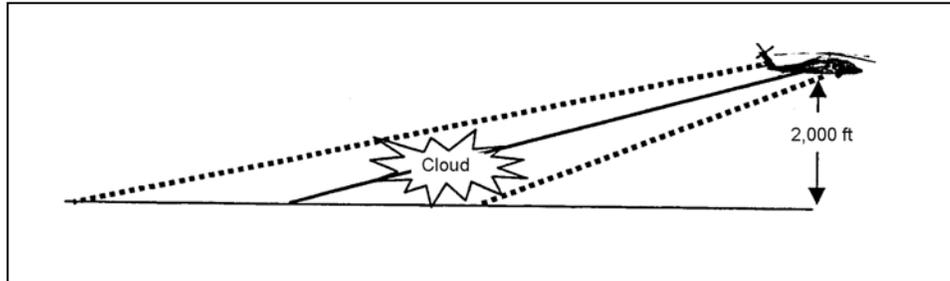


Figure H-5. Optimal Altitude for Ground Release

(d) Elevation Differences. The LRBSDS operators should note that the helicopter flight altitude AGL might be different from the NAI's elevation. For example, the helicopter could fly just above a mountain ridge and be at 300 feet AGL; however, the NAI being scanned could be 3,000 to 4,000 feet below the level of the helicopter (see Figure H-6). Before a mission, LRBSDS operators conduct a map reconnaissance of the NAI and the flight corridor to determine if an altitude/elevation difference exists. The operators note any changes in the NAI's elevation that would require changes to LRBSDS settings.

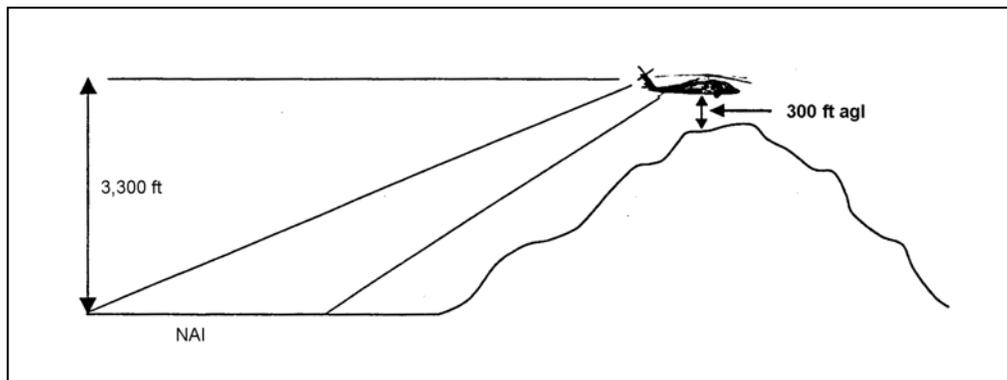


Figure H-6. Difference in Helicopter Altitude and NAI Elevation

(e) Altitude and Flight-Profile Considerations. At altitudes less than 2,000 feet AGL, the LRBSDS is limited to scanning only 12 km deep into the NAI (see Figure H-7 [page H-26]). If the NAI is deeper than 12 km, planners may consider using two LRBSDS to scan the entire NAI (see Figure H-8 [page H-26]). Other alternatives include scanning the front edge of the NAI using a checkerboard pattern (see Figure H-9 [page H-27]) or alternately scanning the NAI's near and far edges. Figure H-10 (page H-27) shows another technique for LRBSDS scanning an NAI that is more than 12 km deep at an AGL below 2,000 feet. During the flight leg, the LRBSDS initially scans the front edge of the

NAI, and then scans the rear portion of the NAI. To ensure adequate coverage, this alternative should only be used when the NAI's width is less than 60 km.

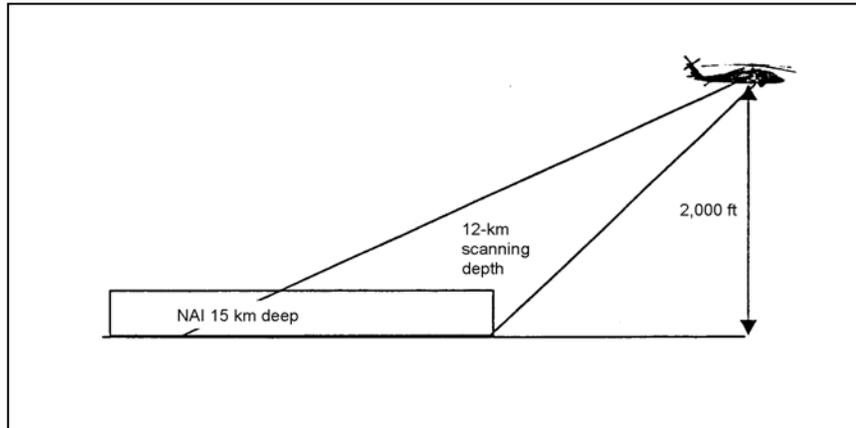


Figure H-7. Low Altitude Flight Profile Considerations

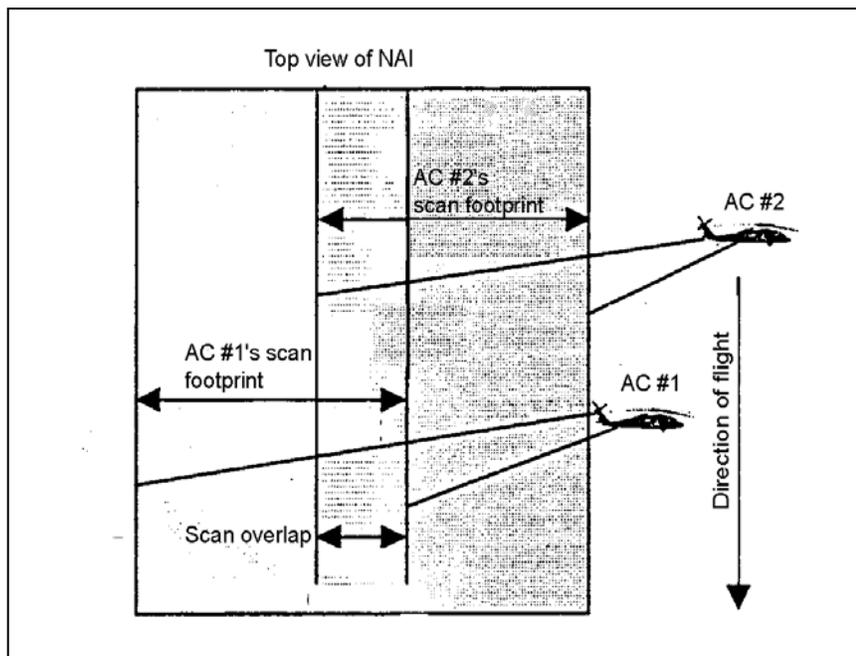


Figure H-8. Two LRBSDs Scanning an Entire NAI

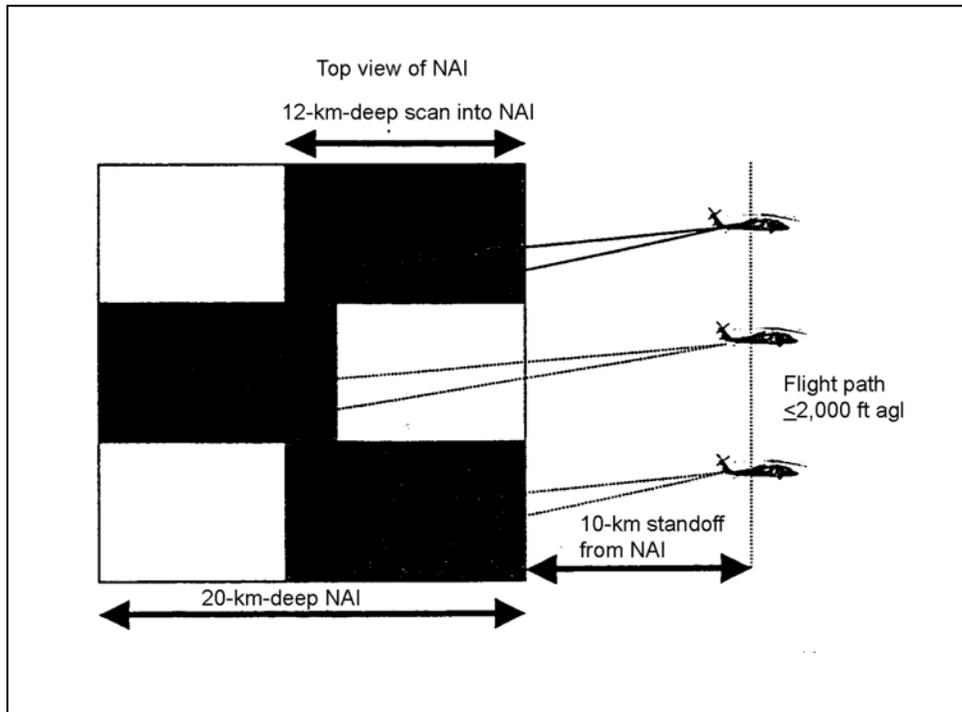


Figure H-9. An LRBSDS Scanning Checkerboard Pattern into an NAI

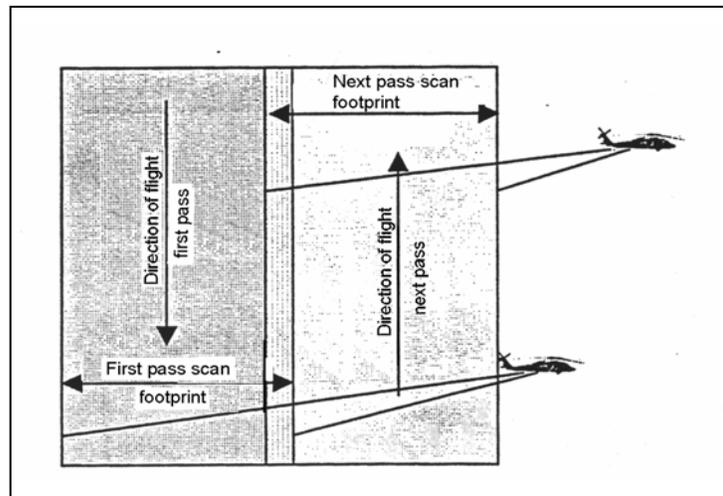


Figure H-10. An LRBSDS Scanning the Front and Rear Edges of an NAI

(f) **Optimizing Data Collection Altitude.** The LRBSDS aircraft operates at an altitude that should be an optimal data collection altitude for scanning the entire NAI in one pass. However, the aircraft may be within the enemy ADA LOS, creating a chance that the aircraft may be able to fly a major portion of the surveillance mission at the optimal collection altitude, then go to a safer—but less advantageous—altitude for that portion of the course leg where the ADA threat exists.

Note: See Figure H-11 for an example that indicates aircraft A could be at risk from enemy ADA threat capabilities.

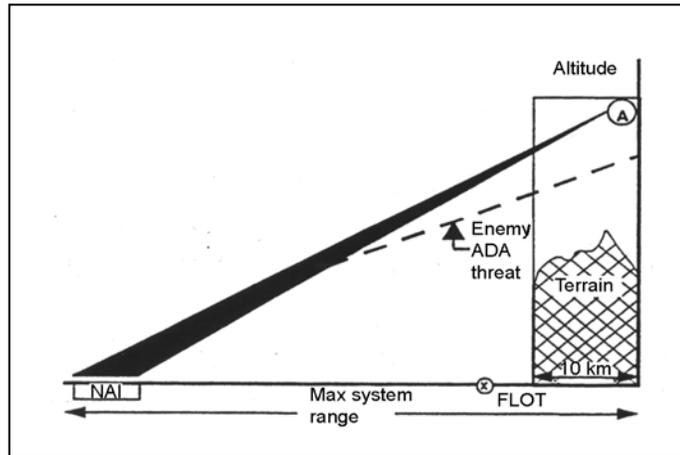


Figure H-11. Optimal Data-Collection Altitude

Note: In Figure H-12, aircraft B is at an altitude allowing single-pass NAI coverage; however, due to the reduced altitude, the LRBSDS operator may experience less data resolution and less aerosol discrimination. This qualitative degradation does not necessarily prevent the operator from identifying the cloud, but it may make the task more difficult depending on system alignment, range, moisture and background particulates in the air, and BW-agent concentration. Any one of these factors can prevent detection or discrimination. The more likely situation, however, is the cumulative impact of several factors. The NBC staff planner must appreciate these potential impacts and recommend altitudes that will permit detection and discrimination.

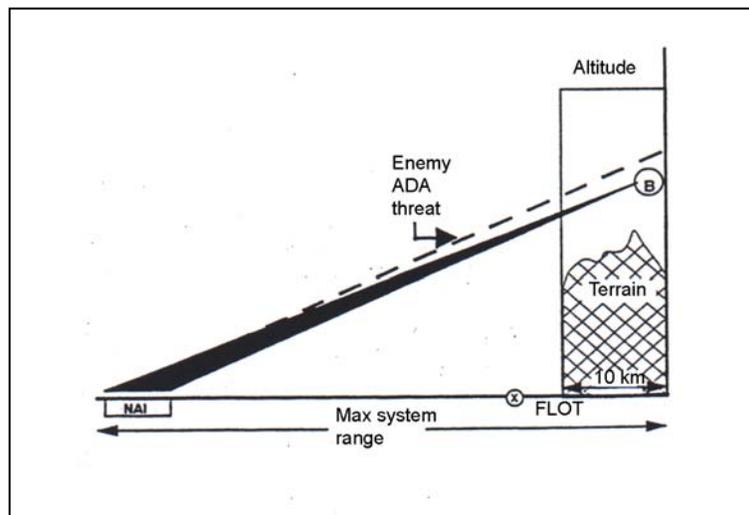


Figure H-12. Minimum Single-Pass Altitude

Note: The examples in Figures H-11 and H-12 focus on single-pass options on an NAI. The third flight-profile option (shown in Figure H-13) depicts multiple passes on the NAI to

more difficult, but a good operator may be capable of picking out a BW cloud if agent concentrations are above sensor thresholds.

(h) Laser Scanning. During scanning, the following operational feedback indicates guidance that should help increase the probability of detection when scanning.

- Remain aware of the correct LRBSDS settings (e.g., scan extents and roll correction). Check for proper settings before events (e.g., starting a mission leg) instead of randomly trying different settings.
- Ensure that scanning occurs in the designated NAIs and that friendly troop positions are not scanned.
- Check that the LRBSDS's roll setting value allows the best view into the NAI when scanning up slope.
- Check for the presence of a terrain obstacle (near-terrain blocking) during scanning, if there is no ground return.
- Remember that the LRBSDS waveform window may provide the first indication of an aerosol cloud.
- Use the color compression setting to help detect the extreme ends of the aerosol when using the retrace flight technique (for example, the aircraft turning around in mid-flight of the leg to reacquire a lost cloud).
- Ensure that the LRBSDS upper (waveform) and lower (scan) windows must be monitored continuously. When a cloud signal is received, the assistant operator will get a mark (position location) immediately from the flight crew or from their GPS.
- Ensure that a solid ground return is present in the waveform window before estimating cloud height.

(i) In-flight Protocols. The LRBSDS crew operates as a team with the UH-60 flight crew. Examples of the crew interaction and teamwork may involve the following situations.

- Lost Cloud. The LRBSDS operator will request a mark (such as position location) from the flight crew or their GPS immediately upon losing contact with the biological cloud. The operator will declare cloud contact lost if 2 minutes have elapsed since the last previous positive scan.
- Enemy ADA Avoidance. The LRBSDS operator will turn off the laser during evasive aircraft action. He will request a mark from the flight crew or from their GPS upon initiation of aircraft evasive-action maneuvers. He will also request the time until resumption of scanning along a course leg and a mark before resumption of scanning.
- End of Previous Leg/Start of Next Leg. Before starting a course leg for LRBSDS scanning, the operator requests a 10-second lead time (advance notice)

from the flight crew before scanning. At the end of the 10-second countdown, the pilot provides the operator permission to scan. When turning around at the end of a flight leg, the aircraft turns away from the FLOT. The LRBSDS operator and flight crew ensure that the experimental model (XM)-94 is prepared to scan in the proper direction. A situation report (SITREP) will be provided to the TOC if a biological cloud is tracked beyond the end of a course leg.

- **In-Flight Communications.** The flight crew and LRBSDS operators communicate when the UH-60 changes altitude, when the LRBSDS is not receiving ground return, when the laser is turned on or off, when starting a course leg, upon completion of a course leg, before activating the laser (about 10 seconds before), when an upcoming terrain feature may cause terrain blocking, when a cloud detection occurs, when obtaining marks (position location) as part of the critical information exchange (such as cloud location), or when evasive action is required.

(j) **Communications Protocols.** Communications between the flight crew, the LRBSDS team, and the TOC require timely and effective SITREPs and detection reports. This section provides suggested message content and formats for communications between the various members of the biological surveillance team

Note: The call signs used for this section are: LRBSDS team = Bloodhound 2; ground controller = Eagle 24; biological detection company officer (BDCO) = E5K.

- **Departure Report.** A departure report would be used to notify the TOC that the aircraft has cleared airfield traffic control. Figure H-14 is an example of a departure-report transmission.

<p>Copilot to Assistant Operator: “As soon as we have cleared the airfield traffic control, please send your departure report.”</p> <p>Operator: “The system is operational.”</p> <p>Assistant Operator: “Eagle 24, this is Bloodhound 2. Departure report, over.”</p> <p>Operations Center NCO: “Bloodhound 2, this is Eagle 24. Send, over.”</p> <p>Assistant Operator: “Bloodhound 2 has departed airfield Eagle at 2130 local. System green. Relay to E5K. Over.”</p> <p>Operations Center NCO: “WILCO. Out.”</p>

Figure H-14. Departure Report

- **Course-Leg Commencement Request.** A course-leg commencement request would be used to notify the TOC that the aircraft is close to reaching a specific course leg. Figure H-15 (page H-32) is an example of a course-leg commencement request.

Copilot to Assistant Operator: “We are 5 minutes from ACP 108, the starting point for course-leg Zulu. The pilot recommends commencing the LRBSDS mission. Call operations and request permission to execute.”

Assistant Operator: “Eagle 24, this is Bloodhound 2. Over.”

Operations Center: “Bloodhound 2, this is Eagle 24. Over.”

Assistant Operator: “We are preparing to execute LRBSDS mission along course-leg Zulu. Over.”

Operations Center: “Roger. Out.”

Operator to Copilot: “Request permission to initialize the laser from aircraft left (ACLEFT).”

Copilot to Operator: “You are cleared to initialize the laser ACLEFT.”

Operator: “Initializing ACLEFT.”

Assistant Operator: “Laser ACLEFT.”

Copilot to Operator: “Commencing east-west run on course-leg Zulu. You are clear to begin lasing ACLEFT.”

Operator: “Lasing ACLEFT.”

Figure H-15. Course-Leg Commencement Request

- **Course-Leg Commencement SITREP.** The course-leg commencement SITREP format provides a notional situation that informs the TOC that a new course leg is just beginning. Figure H-16 is an example of a course-leg commencement SITREP transmission.

Copilot: “Coming up to start of second course leg, course-leg Whiskey. Location ACP 55. You are clear to lase ACLEFT!”

Operator: “Initializing ACLEFT.”

Assistant Operator: “Laser is ACLEFT.”

Operator: “Lasing ACLEFT.”

Assistant Operator: “Eagle 24, this is Bloodhound 2. SITREP, over.”

Operations Center: “Bloodhound 2, this is Eagle 24. Send it, over.”

Assistant Operator: “Time 2220 local. Beginning course-leg Whiskey at FS 470490. System green. Relay to E5K. Over.”

Operations Center: “WILCO. Out.”

Figure H-16. Course-Leg Commencement SITREP

• Initial LRBSDS Detection Report. The initial LRBSDS detection report notifies the TOC of a possible detection. Figure H-17 is an example of an initial LRBSDS detection report.

Operator: "We have a possible detection. Mark."

Assistant Operator: "Time is 2303 local."

Copilot: "Our present position is FS 315 588. Ground heading 200 degrees magnetic. Crab angle one degree right; speed 85 knots, altitude 3,000 feet but are going to drop to 1,000 feet and attempt to detect the cloud from further down the course leg."

Operator: "The cloud appears manmade in a course-line configuration. Width is 4 kilometers. Height is 80 meters. Range is 35 kilometers. Intensity is high. Seven scans. Continuing to track."

Copilot to Operator: "We are descending to 1,000 feet. You need to shut down the laser until we climb back up."

Operator: "Laser off."

Assistant Operator: "Eagle 24, this is Bloodhound 2. LAZER report, over."

Operations Center: "Bloodhound 2, this is Eagle 24. Send it, over."

Assistant Operator:

"Line: L1	FS 315 588
A1	35 kilometers
A2	4 kilometers
A3	N/A
A4	80 meters

BREAK.

Line: Z	2305 local
E1	3,000 feet
E2	200 degrees magnetic
E3	One degree right

BREAK.

Line: R1	Initial
R2	60 minutes
R3	N/A
R4	Confidence - High
R5	High-intensity, seven scans. Continuing to track, over."

Operations Center: "Roger. Out."

Figure H-17. Initial LAZER Detection Report

- **Follow-Up Detection Report.** The follow-up detection report transmission notifies the TOC when a cloud is reacquired. Figure H-18 is an example of a follow-up detection report transmission.

Copilot: “We have now leveled back off at 3,000 feet. You can turn your laser back on.”

Operator: “Laser is on ACLEFT. It appears that I have reacquired the cloud. Range 36 kilometers. Cloud width is 5 kilometers. Cloud is 30 meters above the ground. Detected with three scans.”

Copilot: “Our position is FS 330560. All other helicopter information is the same.”

Assistant Operator: “Eagle 24, this is Bloodhound 2. Follow-up detection report, over.”

Operations Center: “Bloodhound 2, this is Eagle 24. Send, over.”

Assistant Operator :

“Report follows:

L1 FS 330560

A1 36 kilometers

A2 5 kilometers

A4 30 meters

Z 2315 local

R1 Follow-up

R5 3 scans/relay to E5K. Over.”

Operations Center: “Roger, WILCO, out.”

Figure H-18. Follow-Up Detection Report

- **Cloud-Loss Detection Report.** The cloud-loss detection report transmission notifies the TOC that LRBSDS scanning has lost contact with the cloud. Figure H-19 is an example of a cloud-loss detection report transmission.

Operator: “No longer tracking cloud. Mark.”

Copilot to Operator: “Our present location is FS 390550 and our ground heading is 300 degrees magnetic. Additionally, we are at ACP 36 at the end of course-leg Zulu. You need to turn off the laser.”

Operator: “Laser off.”

Assistant Operator: “Eagle 24, this is Bloodhound 2. Cloud-loss detection report, over.”

Operations Center: “Bloodhound 2, this is Eagle 24. Send, over.”

Assistant Operator:

“Line

L1 FS 390500

Z 2345 local

E2 300 degrees magnetic

BREAK.

Line:

R1 Loss report

R5 Relay to E5K. Also, we have completed the second pass on course-leg Zulu. Over.”

Operations Center: “Roger, WILCO, out.”

Figure H-19. Cloud Loss Detection Report

(k) Reporting. The LRBSDS team provides SITREPs according to the BDC’s SOP (such as the location and personnel and supply statuses). During mission operations, the LRBSDS crew submits detection reports using the information from Table H-10 (page H-36).

Table H-10. Data Items for LRBSDS Detection Report

Line		Data Item	Leg Identification:
L	L1	Position of observer	Start track position, latitude/longitude, or coordinates
A	A1	Helicopter to aerosol range	Distance from helicopter to aerosol, in km
	A2	Aerosol width	Width of aerosol, in meters (cross section)
	A3	Aerosol height (optional)	Height from ground to underside of aerosol, in meters
	A4	Aerosol height above ground	Altitude (AGL), in feet
Z	Z	Detection time	
E	E1	Helicopter altitude	Direction of flight, ground track, and azimuth, in degrees
	E2	Helicopter heading	Degrees from heading (left or right)
	E3	Helicopter crab angle	Degrees from heading (left or right)
R	R1	Type of report	Initial, follow-on, or loss of cloud
	R2	Flight time remaining	Estimated time helicopter can remain on station
	R3	Ground track (optional)	Direction on map that helicopter is tracking
	R4	Confidence	High, medium, or low
	R5	Remarks	Other information

(l) Detection and Incident Reports. The LRBSDS team reports the detection of manmade clouds using the helicopter radio on the appropriate communications net. The detection report may be sent to the aviation brigade TOC (or other relay station) for relay to the BDC CP; however, the preferred approach would be to submit detection reports directly to the BDC CP. Incident reports are not required for LRBSDS background missions.

(m) Detection Report Data Items. The data items on the detection report may vary during a mission, depending on the specific objective assigned to the LRBSDS team. The team will use one of the following techniques to accomplish the assigned objective:

- Detection and mapping. Each data item on the detection report is reported.
- Detection and tracking. The critical data items are associated with detection and tracking from Table H-10: L1, A1, Z, E1, E2, E3, R1, R4, and R5.
- Detection and classification. The critical data items are associated with only detection and classification from Table H-10: L1, A1, Z, E1, E2, E3, R4, and R5.

(n) Detection Report Remarks Item. The remarks column reports information such as current ground speed and operator's assessment as to the type of the manmade cloud (smoke or vehicle dust). Operators may also generate a follow-on report once they reacquire the cloud. This report consists of the same type of information as the initial report. Follow-on reports provide the ability to further track the cloud and

determine the cloud drift. Operators should also generate a loss-of-cloud report after there has been no contact with the cloud for more than 2 minutes. The loss-of-cloud report contains the time of cloud loss and the last known location.

c. Postoperations Phase.

(1) The LRBSDS team completes the checklist information shown in Table H-11 (page H-38) after a mission. Since the LRBSDS internal hard drives have limited storage capacity, the data from biological surveillance missions must be downloaded from the hard drives to tapes. Team members download the mission information and archive the data tapes immediately after concluding the aerial mission. Archiving includes labeling each tape with the times and locations of the biological surveillance missions, matching each tape with its corresponding mission documentation, and storing the tapes and documents in the LRBSDS's area. The team uses the tapes to conduct mission debriefs and for training. The biological detection company may determine that some tapes are needed for further review or interpretation. In such a situation, the team packages the tapes and mission documentation for evacuation using a chain of custody form.

(2) Following the mission, the operator contacts the LRBSDS NCOIC, briefs his current status, and receives follow-on orders. The operator receives an update from the detachment NCOIC or the aviation brigade chemical officer on the current friendly and enemy situations. The team shuts down the LRBSDS if it is not immediately going on another mission.

(3) The LRBSDS operator also completes a post-mission debriefing with the aircrew. Key data points of the mission are verified between the team and the aircrew. The mission checklist is archived along with all other mission documentation.

(4) Upon completion of a mission, the aviation brigade chemical officer will determine if the LRBSDS is to be removed (such as if no other mission is scheduled). If removal is required, operators remove the system, conduct PMCS, and return the system to the storage site. The NCOIC finalizes return movement plans (if required) such as passage of lines and support, and the team conducts movement. The team NCOIC conducts planning, crew debriefing and training, equipment maintenance, and resupply to prepare for future missions.

(5) Senior team member receives brief from the detachment NCOIC on the current friendly and enemy situation update.

(6) Senior team member finalizes return movement plans such as passage of lines and support.

(7) Unit conducts movement.

Table H-11. LRBSDS Postoperations Checklist

Actions Required	LRBSDS Team Actions
Perform download of data	Download data onto data tapes. Remove and package data tapes (if required). Initiate DA Form 4137 procedures.
Determine future mission requirement from LRBSDS NCOIC	Obtain orders/updates. Determine requirement for future mission. Obtain permission to remove LRBSDS. Determine disposition of data tapes.
Shut down LRBSDS	Power down all components. Lower the laser platform. Lock azimuth brakes.
Conduct postmission debriefing with aircrew	Verify mission data points with aircrew. Annotate/verify mission work sheet entries.
Remove LRBSDS from helicopter	Disconnect power. Remove attachment fixtures from helicopter floor. Use forklift to remove LRBSDS from helicopter. Conduct PMCS of equipment. Conduct inspections.
Perform troubleshooting	Perform troubleshooting as required.
Conduct movement (if required)	Load equipment. Conduct road march. Report movement per SOP.
Prepare for next mission	Perform planning, training, maintenance, and resupply.

Appendix I

BIOLOGICAL INTEGRATED DETECTION SYSTEM UNIT OPERATIONS (M31A1 AND M31A2)

1. Background

This appendix provides information on the M31A1 and M31A2 BIDS. The appendix also addresses BIDS unit information management and their communications architecture.

2. Preplanned Product Improved Biological Integrated Detection System

a. Preplanned Product Improvement (P3I) BIDS (M31A1) System Functions. The P3I BIDS is an enhanced biological-agent detection system. It performs the basic functions (see Table I-1 [page I-2]) of monitoring, sampling, detecting, identifying, reporting to presumptively identify that a large-scale biological attack has occurred. Improvements in the P3I BIDS individual components, as well as overall system design, provide an operator-friendly, automated detection suite that has a significantly increased capability.

(1) Monitor. The P3I BIDS continuously monitors the air for an increase in the number of aerosol particles within a certain size range. The product-improved system uses two monitoring devices—the ultraviolet aerodynamic particle sizer (UVAPS) and the chemical biological mass spectrometer (CBMS)—to provide an added discriminatory capability. The UVAPS can determine whether a biological mass is present within the aerosol particles being monitored; the CBMS also supports this function and can generically classify the biological material.

(2) Detect. The P3I BIDS's detection capability (through the use of the miniature flow cytometer [Mini-FCM] and the CBMS) determines with greater sensitivity whether biological material (cells, spores, or toxins) is present. A positive result from either the CBMS or the Mini-FCM can lead to further testing for identification results.

(3) Identify. The P3I BIDS uses the biological detector device to presumptively identify biological agents. The BD can identify up to eight preselected BW agents. The biological detector is a more sensitive instrument and is nearly completely automated as compared to its NDI counterpart (which is much more labor intensive to operate).

(4) Sample. The liquid sampler and biological sampler are automatically activated immediately following an alert within the P3I BIDS. The P3I BIDS's LS dispenses preset amounts for further tests that minimize the requirement for any pipetting or transfer of liquid from one tube to another.

Table I-1. P3I (M31A1 BIDS) System Functions

Mission-Essential Tasks	Products	Required Components
Monitor	Nonspecific alert Nonspecific alert	UVAPS CBMS
Sample	Physical samples for analysis	LS and/or BS
Detect	Generic biological indicators	Mini-FCM CBMS
Identify	Specific presumptive identification	Biological detector HHA
Report	PIRs/IRs	HF radio, FBCB2, and SINCGARS radio (Platoon HQ—HF/FBCB2 [M31A2 only]/ SINCGARS/ MSRT)

(5) Report. The BDTs report to the platoon HQ using the AN/GRC-193A high frequency (HF), the single-channel ground and airborne radio system (SINCGARS) radio, and/or the FBCB2 system. The following list provides general reporting requirements. These requirements may vary based on the JFC's PIR/IR and other protection and warning criteria. During biological detection operations, the BDT operates on a shift basis. The incoming shift receives a thorough brief (i.e., materiel and supply status, BW event status, sample evacuation status) from the outgoing shift.

(a) BDTs report to the platoon leader when—

- A new biological detection site becomes occupied.
- A new biological detection site becomes operational.
- Processing event data during operations at the biological detection site.
- Mission-essential components fail.
- A BDT change of shift occurs.

(b) BDTs submit personnel status (PERSTAT), logistics status (LOGSTAT), and SITREPs as required.

(c) Platoon leaders report to company operations when—

- Any BDT reports a positive detection.
- Any BDT reports a positive identification.

(d) Platoon leaders submit SITREPs as required. These include weather and background data, key friendly information, and sample evacuation requests.

(e) It is critical for the BDT to maintain communications during biological detection operations. BIDS incident report information is time sensitive. For example, the leading edge of a BW aerosol cloud is moving at about 1½ times the average wind speed. As each minute elapses from the time of the alert, the suspected BW cloud is moving further downwind. Effective BDT reporting also keeps unit leaders informed as to the current status of their systems. Effective and timely event reporting also facilitates the event tracking process by platoon leaders.

(f) The BIDS's unit leaders conduct contingency planning to identify alternate communications capabilities should the HF or the VHF fail. For example, the platoon HQ can also use their authorized mobile subscriber equipment (MSE) for forwarding reports.

(6) Communication. The following communication equipment and capabilities allow the P3I BIDS to communicate with the BDP, BDC, and supported command; maintain SA; and report findings.

(a) HF radio. The AN/GRC-193A high frequency (HF) radio allows long-range secure communications between widely dispersed units of the BDC. The HF radio is an AM radio that, depending on atmospheric conditions, can communicate over extended distances. It is the primary means for voice communications between the BIDS company HQ, platoons, and individual detection teams. Each BIDS vehicle is equipped with the HF radio.

(b) FBCB2. The FBCB2 system provides SA and C² capabilities to all elements of the BIDS company and facilitates C² between the BDC and FBCB2 equipped supported and supporting units. For the M31A2 equipped BDC, FBCB2 is the primary means for digital communications between the BIDS company HQ, platoons, and individual detection teams. Each BIDS is equipped with FBCB2. The FBCB2 system is comprised of the following: AN/UyK-128 Digital Computer Set; FBCB2 software; position navigation and reporting capability (GPS); interface to a terrestrial communication system (e.g., SINCGARS and/or Enhanced Position Location Reporting System (EPLRS) radio); and combat identification capability. Only the BDP and BDC HQ for M31A2 units will have FBCB2 with an EPLRS capability.

(c) Mobile Subscriber Receiver/Transmitter (MSRT). The MSRT is at the company and platoon level; the BDT does not have an MSRT. MSRT has secure digital and facsimile communications capability and serves as the primary means of communication at the CP level. It is normally used as the alternate operations and intelligence net. MSRT may also be used as the primary means to pass operations and intelligence information directly from the BDC's CP to the FBCB2 equipped supported HQ chemical officer.

b. P3I (M31A1) Sample Handling and Chain of Custody.

(1) The P3I BIDS team provides—

- A liquid biological-agent sample for confirmatory laboratory analysis.
- Supporting information that provides descriptive data for the sample.

- Environmental background samples with their supporting information.

The supporting data provided by the P3I BIDS will include alert, detection, and identification results. This data is provided on data collection forms and as numerical, graphical information (communications interface processor [CIP] mission files) stored on computer files.

(2) Logistics Requirements. The following items specifically apply to sample handling and the chain of custody for the P3I BIDS:

(a) STC. A direct current (DC)-powered STC is located in the BDT's support vehicle and enables the support crew to conduct a sample evacuation. The support vehicle's STC provides a sturdy, rigid container that maintains the sample temperature at 1-degree to 4-degrees C and eases carry and transport. A temperature monitor provides the BDT with the assurance that the STC's temperature remains between 1-degree to 4-degrees C.

(b) Onboard Cooler. The BIDS vehicles have onboard coolers that are identical to the STCs located in the support vehicles. These items provide temporary storage for samples pending evacuation. The P3I BIDS has one cooler.

(c) Clear Plastic Bags. Clear plastic bags are the approved secondary container for biological wet collectors; however, due to the requirement to double-bag these items, the recommended basic load for each BIDS should be increased from 25 to 50 bags.

(d) Tamper-Resistant Tape.

(e) Laboratory Film.

(3) Air-Sample Collection from the BS. The primary purpose of the P3I BIDS's BS is to collect and contain suspect material in a collection medium for transport. In the P3I system, the sampler is normally activated by the CIP in response to a UVAPS or CBMS alert. Upon completion of the sampling cycle this component provides the operator with about 40 ml of liquid in the wet collector.

(4) Chain of Custody Instructions. Instructions for filling out the chain of custody form can be found in Appendix G.

(5) Biological-Sample Packaging. Table I-2 gives specific instructions for preparing the P3I BIDS wet collector for evacuation.

(6) Alternate Sample Containers. If the BS is not mission capable (NMC), the LS will provide the liquid sample for evacuation (see Table I-3 [page I-6]). This procedure is restricted to situations when the BS is either NMC or the current operating protocol does not require the use of the BS. The conical tube should be selected according to guidance in TM 3-6665-350-12&P.

Note: When using this procedure, ensure that the appropriate entries are made on the corresponding chain of custody form under the "Remarks Column".

Table I-2. Preparing the Wet Collector for Shipment

Completed	Item	Instructions
	1	Close the wet collector with the prepacked rubber grommet.
	2	Ensure that the lower lid is tight. Ensure that the upper lid is secured to the wet collector's lower lid. Apply laboratory film around the wet collector's upper lid in case of leakage.
	3	Label the wet collector with the sample identification number.
	4	Seal the wet collector's lid with tamper-resistant tape. Apply the tape in an x pattern, ensuring that it is long enough to reach the wet collector. Ensure that the tamper-resistant tape covers a portion of the label on the wet collector.
	5	Place the wet collector inside a clear plastic bag with absorbent material. Remove the excess air and twist the neck of the bag until it forms a tight coil with the bag snug around the wet collector. Label and secure the bag with a quick-lock fastener. Ensure that the sample identification number can still be read.
	6	Place the bagged wet collector inside another clear plastic bag. Remove the excess air and twist the neck of the bag until it forms a tight coil with the bag snug around the wet collector. Place an adhesive label containing the sample ID number on the bag. Secure the bag with a quick-lock fastener.
	7	Place the packaged wet collector in the STC.
	8	Complete chain of custody form.

Table I-3. Preparing the Alternate Sample Container for Shipment

Completed	Item	Instructions
	1	Ensure that the wet collector is properly secured with a cap. Wrap laboratory film around the cap.
	2	Affix an adhesive label containing the sample ID number on the wet collector in a lengthwise manner.
	3	Seal the wet collector by applying a strip of tamper-resistant tape in a lengthwise manner; starting at the side, run the strip up, over the cap and down the other side. Ensure that the tamper-resistant tape covers a portion of the label on the wet collector. Add the temperature monitor strip.
	4	Place the wet collector inside a clear plastic bag with absorbent material. Remove the excess air and twist the neck of the bag until it forms a tight coil. With the bag snug around the wet collector, place an adhesive label containing the sample identification number on it. Secure the bag with a quick-lock fastener.
	5	Place the bagged wet collector inside another clear plastic bag. Remove the excess air and twist the neck of the bag until it forms a tight coil. With the bag snug around the wet collector, place an adhesive label containing the sample ID number on it. Secure the bag with a quick-lock fastener.
	6	Place the package in the STC.

(7) Supporting Documents. The documents that support the evacuated sample are integral components of the evacuation package. These items must accompany the sample. Routinely, they will be comprised of a printed copy of the CIP display; however, under some circumstances (such as the CIP or printer being NMC), a copy of the BIDS incident report will be provided in lieu of page 2 from the CIP display. Table I-4 provides instructions for packaging this material.

Table I-4. Packing Supporting Documents for Evacuation

Completed	Item	Instructions
	1	Ensure that the chain of custody form is accurate.
	2	Ensure that the printed copy of page 2 of the CIP display has the sample identification number annotated.
	3	Check the CIP printout for consistency with chain of custody form.
	4	Ensure that the sample ID number is present and consistent with the chain of custody form and that the BIDS Incident Report is also submitted (in lieu of the printed copy of page 2 of the CIP display).
	5	Place the printout and BIR in a floppy-disk mailer and seal it. If additional mailers are used, each one must have a separate item description on the corresponding chain of custody form.
	6	Place an adhesive label containing the sample ID number on the outside of the mailer, and place the mailer in the STC.

(8) The Completed Evacuation Package. The completed sample-evacuation package is comprised of the following items packed in either the P3I BIDS onboard cooler or the support vehicle's STC:

- Sealed and packaged wet collector.
- Sealed floppy-disk mailer with CIP printout or the BIDS incident report.

Note: The completed chain of custody form will be hand carried by the escort.

(9) The methods used for executing a sample transfer will vary. For example, the following options could be used:

- The BIDS BDT support crew could transport the sample to the designated STP for pickup by escort personnel.
- Escort personnel could pick up the sample at the BIDS site.
- Other BIDS unit personnel could receive custody from the BDT and transport the sample to a designated STP.

c. P3I BIDS (M31A1) Unit Employment.

See Chapter III, Biological Surveillance Planning.

d. P3I BIDS (M31A1) Operational Modes and Data Analysis. This paragraph outlines the basic operational modes and data collection and analysis information for the P3I BIDS.

(1) Data-Collection Methods. There are four basic methods for data collection: standard protocol, continuous sampling, reduced capability operation, and threat-based protocols.

- The standard protocol is executed in response to a CBMS or UVAPS alert condition.
- Continuous sampling is normally initiated only upon interruption of normal monitoring to ensure that a BW aerosol cloud is not missed during situations such as a severe dust storm.
- The reduced-capability operation is used when one or more components of the BIDS become inoperable (see TM 3-6665-350-12&P for detailed information on reduced-capability operations).
- Threat-based protocols involve adapting biological detection suite operations as a countermeasure against an enemy's BW capability.

(a) Standard Protocol. The standard protocol is executed in response to a UVAPS or CBMS alert condition. When a UVAPS/CBMS alert condition occurs, the CIP activates both the LS and the BS. The CIP uses input from the generic detection components (UVAPS, CBMS, and Mini-FCM) to determine if detection has occurred. If positive detection results are obtained, a representative sample is analyzed with a specific identification component (such as the biological detector or the HHA). A detailed discussion of the standard protocol can be found in TM 3-6665-350-12&P.

(b) Continuous-Sampling Protocol. The continuous-sampling protocol involves activating the LS and turning off both monitoring devices (i.e., the UVAPS and CBMS) to prevent damage to these components. The sampler collects one liquid sample every 15 minutes for testing. This protocol could be used when directed by the BDC or BDP CPs. It can also be used during a weather event (such as a severe dust storm) to prevent clogging of the UVAPS/CBMS air intakes. See TM 3-6665-350-12&P for a detailed discussion of continuous sampling.

(c) Reduced-Capability Operations. The P3I BIDS can operate at reduced capability when one or more components of the biological-detection suite become inoperable. Specific procedures for reduced-capability operations are summarized in TM 3-6665-350-12&P.

(d) Threat-Based Protocol. The standard P3I BIDS operating protocol can be adapted as a potential countermeasure against an enemy's BW capability (for example, linking the biological detection array to the command's air-defense early-warning system [cued monitoring]). On receipt of a warning, the BIDS array initiates continuous sampling (both triggers continue to operate). Therefore, if an alert occurs, the BIDS is ready to test liquid samples almost immediately.

(2) Overall P3I BIDS System-Level Process. The systems-level process begins with a triggering event by either the UVAPS or the CBMS that indicates an alert condition. This marks the beginning of a BIDS event. The second phase (detection) occurs when the

CIP receives all of the generic results from the UVAPS, the CBMS, and the Mini-FCM. If the system’s detection results are negative, the BIDS event ends; however, if the detection results are positive, the BIDS team conducts presumptive-identification procedures.

(a) P3I BIDS Event Cycle. Inclusive of the alert, detection, and identification phases, the P3I BIDS event cycle could range from 18 to 25 minutes. Following the alert, the detection process will last 3 to 11 minutes. During this phase, the CIP receives UVAPS, Mini-FCM, and CBMS data for a detection decision. During detection, operator-1 tests two liquid samples on the MINI-FCM, and the CBMS completes two pyrolysis cycles (about 3 minutes each). Next, based on a positive detection, the identification process (on the biological detector or the HHA) will take about 15 minutes.

(b) P3I BIDS Detection Classification. Each of the three components that contribute to the P3I BIDS detection decision performs functions that complement each other. See Table I-5 for a brief comparison of UVAPS, Mini-FCM, and CBMS functions. Table I-6 provides a brief description of each generic detectors capability.

Table I-5. Comparison of the UVAPS, CBMS, and Mini-FCM

Component	Results	Function	Speed
UVAPS	Detects a bio mass in an agent containing particles	Continuously monitors (triggering device)	Updates results every 60 seconds
CBMS	Detects ion activity, bio, cell, spores, or toxins	Continuously monitors (triggering device)	Updates results every 3 minutes
Mini-FCM	Detects cells or spores	Operates on demand (detection role only)	Results available in +/-100 seconds

Table I-6. UVAPS, CBMS, and Mini-FCM Capabilities

Component	Capability
UVAPS	Fluoresces biological material within aerosol particles with a UV laser.
CBMS	Analyzes ionized molecules for characteristic patterns of cells, spores, and toxins. The CBMS results are likely to be more accurate for spores and toxins than for cells.
Mini-FCM	Detects the presence of DNA/RNA within insoluble components (0.5 to 2.0 μm) of aerosol particles. Statistically, Mini-FCM results are more accurate for cells than for spores.

- As a generic detector, CBMS classification results are statistically more accurate for spores and toxins than for cells.

- As a generic detector, Mini-FCM classifications are statistically more accurate for cells than for spores.

(3) Background Effects. It is important to be aware of background-data results. In general, background can be broadly categorized into three types—low, high (biological), and high (nonbiological).

(a) **Background Characteristics.** The general characteristics of these background types and their possible effects on the P3I BIDS are included in Table I-7. For example, areas with a high biological background may yield positive Mini-FCM results and/or NSB results from the biological detector.

- High (nonbiological) background conditions are often attributed to high winds, which can cause more reaerosolization of soil or surface particles. This type of background activity may cause short-duration UVAPS alerts (most will be 1 minute) or low UV fluorescence (FL) results.

- Low wind speeds (less than 1 or 2 meters per second) may cause high background results. If large numbers of aerosol particles are present in the ambient air, low wind speeds may help keep the background conditions high. Furthermore, biological detector results may also indicate NSB in very high dust concentrations. NSB may also occur based on the BIDS being downwind of some artillery or weapons-fire by-products.

- Background materials that may cause responses on the Mini-FCM or biological detector may not trigger the UVAPS or the CBMS. Therefore, it is important for the BIDS team to be aware of local background conditions. For example, detection results could be affected by high-protein backgrounds and extremely short aerosol dwell times.

(b) **Background Data Recording.** Certain data must be recorded during the monitoring phase of a BIDS operation to ensure that all pertinent information is available for system-level analysis. This information (referred to as background) is listed in Table I-8. Background data collection consists of position location, weather data, local activity and conditions, Mini-FCM and biological detector results, and the sample from the BS. The wind speed and direction will be included in the report of background data to the biological detection platoon (BDP). A modified BIDS incident report form can be used for recording background data at team level. The unit's SOP or the OPLAN/OPORD will specify the reporting frequency.

- Background data should be recorded at the beginning of a mission and periodically updated during the mission (every 4 to 8 hours and especially after sunset or sunrise). The recording frequency depends on background conditions and operator workload (see Table I-8).

- If background conditions produce positive results on either the biological detection or the Mini-FCM, more frequent background sampling should be conducted (but not more often than every 2 hours). For example, the initial positive results on the Mini-FCM/biological detector may be a short-term anomaly, and one or two follow-on assays could result in negative results. Positive background results on the Mini-FCM/biological detector may be due to local activity (such as vehicle dust).

- It may become necessary to move the BIDS to an alternate detection area away from the source of background data that causes the positive Mini-FCM/biological detector results. It is important to know if the background information has changed before an alert condition to provide an accurate system-level result.

Table I-7. Possible Impact of Environment on BIDS Component Results

Background Type	Environmental Factors	Possible Impact On BIDS Component Results
Low	Cold climates, snow-covered terrain, temperate climates with dormant vegetation, coastal areas, and regions of sparse vegetation with low levels of fine sand or dust	All components typically negative
High (biological)	Temperate/tropical climates with high levels of vegetation, primarily early in the growing season; agricultural areas during the growing season; and areas near industrial facilities with biological processes/sewage treatment	Biological detector—possible NSB Mini-FCM—possible cell results
High (nonbiological)	Dry/desert regions with high levels of fine sand or dust; dry grassland/scrub, primarily late in the growing season; urban or industrial areas; and artillery/weapons-fire by-products	UVAPS—short-duration alerts CBMS—possible cell results Mini-FCM—possible spore results Biological detector—may cause NSB

Table I-8. P3I BIDS Background Data

Component	Data	CIP screen
GPS	Position location	CIP screen
MET sensor	Wind direction (degrees) Wind speed (kph) Temperature (°C) Relative humidity (percent)	CIP screen
BIDS team	Local activity/conditions	Support crew
Mini-FCM	Cell result Spore result	CIP screen and Mini-FCM LCD
Biological detector or HHA	Biological detector or HHA result	CIP screen or BD or HHA strip
BS	Wet-collector contents	BS

(4) Data Analysis (System-Level Analysis). A BIDS event begins with a UVAPS/CBMS alert condition and ends when all steps in the data-collection process have been completed. See Table I-9 (page I-12) for BW event data. These results are used for the P3I BIDS incident report. Critical-event data includes local meteorological readings; observations of local activity or weather conditions; alert, detection, and identification results; and location.

Table I-9. P3I BIDS Event Data

Source	Data

Alert result	Alert time
MET sensor	Wind direction (degrees)
	Wind speed (kph)
	Temperature (°C)
Detection result	Cell, spore, toxin
Identification result	Agent result
BIDS team	Local activity/conditions
BIDS team	Location

(a) System-Level Analysis Process. The system-level analysis process is summarized in Table I-10 (page I-14). The first phase of the process (alert) occurs when the UVAPS or the CBMS indicates an alert condition. The second phase (detection) occurs when all BIDS generic results have been obtained from the UVAPS, Mini-FCM, and CBMS following an alert. If all of these results are negative, the detection result is also negative. If one or more of these results is positive, the detection result is positive. If the detection event is negative, the incident is considered a nonevent, and the process is terminated. The third phase (presumptive identification) occurs when specific results are available from either the biological detector or HHA following a positive detection. If all of these results are negative, the identification result is also negative. If one or more of these results is positive, the identification result is positive. The fourth phase (reporting) marks the end of a BIDS event.

(b) System-Level Analysis. The BIDS's system-level analysis consists of obtaining alert, detection, and identification results and adding information (as required) about background results. In turn, the system-level results are reported to the platoon HQ for use in unit-level analysis. This process consists of the following steps:

- Step 1 (alert). Consider alert results from the UVAPS/CBMS and the most recent background results from the monitoring devices. Report in the remarks section of the BIDS incident report whether earlier background UVAPS monitoring caused recurring UV FL low or high results or whether CBMS monitoring caused recurring positive results.

- Step 2 (detection). If the detection decision is positive, go to step 3 (identification). If generic detection devices (such as the Mini-FCM and the CBMS) have provided positive results during previous background testing, record that information in the remarks section of the BDT's BIDS incident report.

- Step 3 (identification). Consider current identification results and the most recent background results from the biological detector. Report in the remarks section of the BIDS incident report whether previous background assays indicated positive biological detector results for a specific agent.

- Step 4 (report). Review and report the final system results.

(c) The BIDS Incident Report (plus any unusual local activity or weather conditions) and associated background information is forwarded to the platoon HQ for use in unit-level analysis. Follow-up reports of BW-event results should include or reference the alert time for the specific event being analyzed.

(5) System-Level Response Profiles. Each decision regarding a possible BW attack must consider all of the results produced by the P3I BIDS biological detection suite. The full set of results from the alert, detection, and identification components is referred to as an event's response profile. The BDP and BDC CPs will use the results from their BDT's BIDS incident reports to determine and assess system-level response profiles.

(a) Determining System-Level Response Profiles. Response profiles are determined by using alert, detection, and identification results from the P3I BIDS incident report. The confidence level of the resulting profile is obtained from Table I-11 (page I-14). The final system-level result correlates agent classification results from detection (biological, cell, spore, or toxin) and identification (plague, ricin, anthrax, or none), process and then assigns an associated confidence level (very high, high, medium, or low). Consistency between the detection and identification results (for example, spores detected or anthrax identified) provides a high confidence level.

- Detection response profiles can be expressed in differing confidence levels, depending on the concentration (high, medium, or low) associated with the detection result. For example, detection with an associated high concentration (identification - none) results in a medium confidence level. A confidence level of medium to high is typically considered as a possible BW-attack indicator, and a low confidence level has poor reliability. The assigned confidence level from Table I-11 (page I-14) indicates the relative probability that a particular response is indicative of an actual BW attack.

- Other factors can also influence the overall confidence associated with a possible BW event. Factors such as the current intelligence situation, LRBSDS results, and weather will influence platoon- and company-level analyses.

Table I-10. P3I BIDS System-Level Process

Phase	Criteria	Result
Alert	UVAPS or CBMS alert condition	Alert (event begins)
Detection	Negative results from CBMS, Mini-FCM, or UVAPS following an alert	Negative detection (nonevent or no report) (analysis terminated)
	Positive results from CBMS (toxin/spores), Mini-FCM (cells/spores), or both CBMS/UVAPS alert	Positive detection (conduct BD/HHA assay)
Presumptive Identification	Negative results from BD/HHA following a positive detection	Negative identification
	Positive results from BD/HHA following a positive detection	Positive identification
Reporting	Positive detection and identification result	P3I BIDS event data and BIDS location (event ends)

Table I-11. P3I BIDS System-Level Response Profile

Alert	Detection	Identification	Confidence
UVAPS and/or CBMS	Toxin (H/M/L)	Toxin (such as Ricin)	Very high
	Cell, spore, or bio (H/M/L)	Toxin (such as Ricin)	High
	Spore	Spore (such as Anthrax)	Very high
	Cell, toxin, or bio (H/M/L)	Spore (such as Anthrax)	High
	Cell	Cell (such as Plague)	Very high
	Spore, toxin, or bio (H/M/L)	Cell (such as Plague)	High
	Toxin, spore, or bio (H/M/L)	Virus (such as Venezuelan Equine Encephalitis)	High
	Spore (H), Cell (H), Toxin (H), or Bio (H)	None	Medium
	Spore (M/L), Cell (M/L), Toxin (M/L), or Bio (M/L)	None	Low

NOTES: H indicates a high concentration; M, a medium concentration; and L, a low concentration.

Note: The following four examples illustrate the use of Table I-11. First, the CIP displays toxin (medium concentration) as a detection, and identification indicates ricin. The associated confidence level is very high. Second, a cell detection result and a ricin identification result would have a high confidence level. Third, a positive detection (toxin -

medium concentration) and a virus-identification would have an associated high confidence level. Fourth, a positive detection (spores-high concentration) and negative identification provides medium confidence. Fifth, a positive detection (spores-low concentration) and negative presumptive identification provides a low confidence.

(b) **Factors That Can Impact System-Level Response Profiles.** The BIDS teams maintain SA through the knowledge of key factors such as environmental conditions, local activity, and METT-TC. This awareness leads to an understanding of the impact that factors such as high wind speed may have on BW aerosols. See Table I-12 for information on environmental or threat factors that could result in medium or low system-level response profiles.

Table I-12. Factors that Could Influence Medium or Low Confidence Levels

Selected Factors	Potential Impact On Bids System-Level Response
High wind speed	Short BW cloud duration (1 to 2 minutes) <ul style="list-style-type: none"> • Detection—positive • Identification—negative • Confidence—medium or low
Threat point source BW attack	Short BW cloud duration (1 to 2 minutes) <ul style="list-style-type: none"> • Detection—positive • Identification—negative • Confidence—medium or low
Significant aerosolization of dust in a dry, grassland area late in the growing season	UVAPS—short UV alert; Mini-FCM—spores <ul style="list-style-type: none"> • Detection—positive • Identification—negative • Confidence—medium or low
Terrain/vegetation causes large area BW aerosol clouds to separate	Multiple short-duration BW clouds (1 to 2 minutes) <ul style="list-style-type: none"> • Detection—positive • Identification—negative • Confidence—medium or low

(6) **P3I BIDS Information Management.** The P3I BIDS system-level results displayed on the CIP or the Information Management System (IMS) are recorded by the operator on the BIDS incident report. Alternatively, if the CIP becomes NMC, the BIDS operator will then observe and analyze component-level responses and manually record the system-level results on the BIDS Incident Report.

(7) The CIP mission files are downloaded onto compact discs (CDs) following each mission (about a 12-hour duration). Data from each BW event resulting in a positive detection or identification are also transferred to separate CDs. These records are complemented by the BIDS teams written message logs. The BIDS team maintains accurate records for each mission and forwards mission records to higher HQ for retention upon completion of an operation.

3. Joint Biological Point Detection System (M31A2-Biological Integrated Detection System) System Operations

a. JBPDS (M31A2-BIDS) Functions. The JBPDS provides the commander an automated BW agent detection, collection, identification, reporting and sample evacuation capability. The JBPDS is a biological agent detection system that performs the same basic functions—detecting, collecting and identifying—as its counterpart, the M31A1-BIDS (P3I); however, the JBPDS provides more automated capabilities than the M31A1-BIDS. See Table I-13 to see how the system functions are accomplished by the M31A2 system.

Table I-13. JBPDS (M31A2-BIDS) System Functions

	Alerting	Collecting	Identifying	Reporting
JBPDS (M31A2-BIDS)	Determines increase in the number of particles within a certain size range and if aerosol particles contain biological material; detection based on single component, rather than multiple components as in the M31/M31A1.	Automatic activation of sample collector	Determines presumptive identification of up to 10 preselected BW agents.	Time range for reporting of presumptive identification is: 18-20 minutes; automated data recording and display.

(1) Alerting. The JBPDS Biological Aerosol Warning Sensor (BAWS) continuously monitors the air for an increase in particles that may contain biological material. The BAWS contains a particle counter that constantly compares the airborne particle count of a given size range against an established background. The BAW laser detector fluoresces particles and measures their emission wavelengths to determine if the airborne articles contain biological mass. Based on an increased number of particles of the correct size and emission signature, the BAWS triggers an alert and the follow-on collection and identification process.

(2) Collecting. Following an alert, the collector begins a collection cycle to gather a representative sample for analysis. The collector draws in air and captures particulate matter using a cyclone principle that concentrates the sample in collector fluid. The concentrated sample is then sent by the fluid transfer system (FTS) to the identifier for analysis. If the presumptive identification is positive for BW agent, the FTS routes a volume of the collected sample to either a sample vial or sample bottle for evacuation.

(3) Identifying. The identifier uses immunoassay technology to presumptively identify any of 10 preselected BW agents. Presumptive identification processing is completed in approximately 15 minutes.

(4) Reporting. The time from the detection to presumptive identification is approximately 20 minutes. Data is automatically displayed to the operator and recorded in a JBPDS (M31A2-BIDS) biological event log.

b. JBPDS (M31A2-BIDS) Sample Handling and Chain of Custody. The JBPDS

(M31A2-BIDS) provides a liquid biological agent sample for laboratory analysis and supporting information that provides descriptive data for the sample. The JBPDS (M31A2-BIDS) sample evacuation guidance is consistent with BIDS (P3I) sample evacuation guidance. The supporting data will include the bio event log that provides information about positive identifications and detection events associated with a selected JBPDS (M31A2-BIDS) as each event occurs. This information includes date/time, agent identified, location of the biological event, elevation, wind direction, and wind speed. The biological event data will be stored on a CD and printed out on a paper copy. The printed copy will be packaged as part of the sample evacuation process.

(1) Logistics Requirements.

(a) STC. The STC used for the JBPDS (M31A2-BIDS) is identical to the one used in the BIDS (P3I). The JBPDS (M31A2-BIDS) has one on-board cooler identical to the STCs located in support vehicles. The cooler provides temporary storage for samples pending evacuation.

(b) Sample Vial and SB. These collection items used in the JBPDS (M31A2-BIDS) and are packaged separately. The sample vials are bulk packaged at 100 vials per box, and SBs are packaged two per box (two boxes are provided as part of the system basic load). The sample extraction bottle is used in the dry collection mode for the M31E2 for sample evacuation.

(c) Packaging Container. The requirement for packaging the M31A2 sample is described in the JBPDS TM/TO.

(d) Tamper-Resistant Tape. The requirement for tamper-resistant tape is the same for the JBPDS (M31A2-BIDS) as for the BIDS (P3I). Tamper-resistant tape is a special tape that tears easily after application. Tears in the tape indicate that the sealed container has been opened.

(e) Laboratory Film. The requirement for lab film or laboratory film is the same for the JBPDS (M31A2-BIDS) as for the M31/M31A1.

(2) Sample Collection from the JBPDS (M31A2-BIDS). The primary purpose of the JBPDS (M31A2-BIDS) is to collect and contain suspect materiel for evacuation and evaluation. If a presumptive identification is made, a sample will be stored for evacuation and further analysis in one of four sample vials. After the fourth sample vial has been used, any additional samples will be stored in the SB, if the sample vials are not replaced.

(3) Packaging the JBPDS (M31A2-BIDS) Biological Sample. When handling the sample from the JBPDS (M31A2-BIDS), eye protection, respiratory protection, and gloves must be worn. See instructions in the JBPDS TM or TO for specific instructions of preparing the JBPDS (M31A2-BIDS) sample for evacuation. When directed to prepare the sample and supporting materials for evacuation, Operator 1 or 2 will package the sample and release it to operator 3 or 4 using the chain of custody form. Operator 3 or 4 will then evacuate the sample to the STP.

Note: The use of tamper resistant tape and labeling of each packaging container with the sample identification number for the M31A2 sample is consistent with M31A1 sample processing procedures.

Note: If a shift change occurs prior to evacuation notice, the stored sample vial or common SB must be released to the new shift leader using chain of custody form.

(4) Packaging Supporting Documentation (JBPDS (M31A2-BIDS)). The documents that support the evacuated sample are integral components of the evacuation package, and must accompany the sample. While either operator 1 or 2 prepares the sample vial, SB, or sample extraction bottle for evacuation, the other should collect and package the supporting documents for evacuation with the sample. Table I-14 provides instructions for packaging this material.

Table I-14. Packing Supporting Documents for Evacuation (JBPDS [M31A2-BIDS])

Packaging Supporting Documents		
✓	Item	Instructions
	1	Print two copies of the bio event log with the sample identification number. Label the hand written BIR with the sample identification number.
	2	Place one copy of the bio event log and one copy of the BIR inside the disk mailer. Maintain the second copy of the bio event log and the BIR with the JBPDS (M31A2-BIDS) vehicle log.
	3	Place an adhesive label containing the sample identification number on the disk mailer.
	4	Seal the disk mailer.
	5	Place tamper resistant tape over all sealed edges of the disk mail sealer. Do not cover the sample identification number with the tape.
	6	Place the supporting documents package in the STC.
	7	Complete the chain of custody form. Ensure initial signature is signed immediately by the operator handling the sample.

(5) The Completed Evacuation Package. Each completed sample evacuation package is comprised of the following items packed in the temperature monitored JBPDS (M31A2-BIDS) on board cooler or the support vehicle STC.

- Sealed and packaged sample vial, SB, or sample evacuation bottle.
- Sealed disk mailer with the printout of bio event log and handwritten BIR.

The completed chain of custody form will be hand carried by the escort. There will be one complete sample evacuation package for each sample.

c. JBPDS (M31A2-BIDS) Unit Employment. See Chapter III, Biological Surveillance Planning.

d. JBPDS (M31A2-BIDS) Operational Modes and Data Analysis.

(1) There are five operational modes the JBPDS (M31A2-BIDS) uses to collect data: standard mode, single sample mode, periodic mode, degraded mode, and extreme cold mode.

(a) Standard Mode. The BDT initiates the standard mode during normal JBPDS (M31A2-BIDS) operations when the system is fully functioning. In standard mode, the M31A2 monitors ambient air particles, and (if required) the BAWS will initiate the collection sequence, perform the identification process, and store a portion of the sample.

(b) Single Sample Mode. The BDT may initiate the single sample mode to take a background reading or check conditions after an event such as a sand storm or a weather front moving through the area. In this mode, conducted by SOP or on order, the detection process is not used (i.e., the BAWS is not utilized; only collection and identification functions are performed by the JBPDS). The JBPDS changes to the previous operational mode at the end of the sequence.

(c) Periodic Mode. The BDT may use the M31A2's periodic mode when the BAWS is not functioning, or during an operational situation such as an air defense alert (i.e., air or missile attack imminent or in progress and use of BW agents is suspected). In this mode, the BDT initiates established time intervals for the collection and identification sequence that can range from 5 to 60 minutes in 5-minute intervals. The operator ensures that consumables in the FTS are replenished.

(d) Degraded Mode. The JPBDS enters the degraded mode automatically when the identifier fails during either standard mode or single sample mode operation. While in the degraded mode, the JPBDS performs detection and collection operations only, and stores the collected sample in the common SB. In turn, the BDT used the identification assay strips to conduct the identification process manually.

(e) Extreme Cold Mode. Operating the JBPDS (M31A2-BIDS) in extreme cold conditions may cause the liquid in the JBPDS to freeze. When these conditions are present (14°F to -18°F), an audible and visual alarm will be sounded. The BDT places the system in extreme cold mode.

(2) Background Characteristics. It is important to be aware of background data results. In general, background can be broadly categorized into three types that are characterized as low, high (biological), and high (non-biological).

(a) The general characteristics of these background types and their possible effect on the JBPDS (M31A2-BIDS) are included in Table I-15 (page I-20).

Table I-15. Background Characteristics

Background Type	Environmental Factors	Possible Impact On M31A2 Component Results
Low	Cold climates; snow covered terrain; temperate climates with dormant vegetation; coastal areas; regions of sparse vegetation with low levels of fine sand or dust.	All components typically NEGATIVE.
High (Biological)	Temperate/tropical climates with high levels of vegetation primarily early in the growing season. Agricultural areas during growing season. Areas near industrial facilities with biological processes/sewage treatment.	Possible positive on BAWS. Identifier and manual identification – Possible NSB
High (Non-Biological)	Dry/desert regions with high levels of fine sand or dust. Dry grassland/scrub, primarily late in the growing season. Urban/industrial areas; artillery/weapons fire by-products.	Identifier and manual identification – Possible NSB

(b) JBPDS (M31A2-BIDS) Background Data. Background data should be recorded in the BDT’s log at the beginning of a mission, and periodically updated during the mission, especially after sunset or sunrise. It is important to know if the background has changed prior to a DETECTION condition to provide an accurate system level result. Further, a POSITIVE response on the identifier may necessitate evacuation of a biological sample to a supporting medical lab to determine the reason for the positive results.

(3) System and platoon level reporting will include background data and the BIDS Incident Report. Data analysis is conducted at two levels within the biological detection platoon. The first consists of system level assessment using a single JBPDS (M31A2-BIDS). The second level of analysis is unit-level analysis using input from multiple JBPDS (M31A2-BIDS). This analysis is accomplished at platoon level and includes event tracking that is used to merge individual BIDS level results within the platoon AOs.

(4) Table I-16 lists the information required for a background report. Complete background data is obtained by operating the JBPDS in an iteration of a single sample mode operation.

Table I-16. JBPDS (M31A2-BIDS) Background Data

Component	Data	Source
GPS	Position Location	Time/Location/Weather Screen (BBSU)
MET Sensor	Wind direction (degrees) Wind speed (mph)	Time/Location/Weather Screen (BBSU)
JBPDS (M31A2-BIDS) Team	Local activity/conditions	Support Crew
Identifier or Manual Identification	Positive or Negative result	Alarm/Screen or Activity Summary Screen (BBSU)
Collector/Fluid Transfer System	Sample Vial, SB, or Sample Extraction Bottle	Biological Sample

(5) An M31A2-BIDS BW event begins with an alert condition and ends when all steps in the data collection process have been completed. See Table I-17 for BW event data that are needed for reporting purposes. These results are used for the M31A2-BIDS incident report.

Table I-17. JBPDS (M31A2-BIDS) Event Data

Source	Data
Alert Results	Alert Time
Meteorological Sensor	Wind direction (degrees) Wind speed (kph)
Identification Result	Agent Identification Result (Positive or Negative) and Identification Time.
JBPDS (M31A2-BIDS) Team	Local activity/conditions

(6) The system level analysis is summarized in the four steps below. This process consists of obtaining detection and identification results. System-level results are reported to the platoon HQ for use in unit-level analysis. The system-level analysis steps include:

- Step 1 (Alert). Record alert results from BAWS.
- Step 2 (Report). Review/report alert results.
- Step 3 (Identification). Record current identification results.
- Step 4 (Report). Review/report identification results (positive or negative).

Note: It is critical that the BDT report alert results, and then follow up with reporting either positive or negative identification result.

4. Biological Integrated Detection System Unit Information Management/Reports

a. BIDS Unit Reports. The following paragraphs contain generic sample information and report formats for BIDS units. This section specifically outlines reports that are used by BDTs or BDPs, a suggested incident data report format, and suggested techniques and procedures for biological-event tracking. Specific reports required by different units or TM guidance may require changes in these formats. Additional information-management report formats may be required to meet specific mission or unit requirements. The use of brevity codes (as directed by the unit's SOP or OPLAN) should also shorten required message transmissions.

(1) Reporting Requirements. BIDS teams are required to report to the platoon leader at the following times:

- (a) Upon occupation of a new biological detection site.
- (b) When operational at a new biological detection site.
- (c) During operations at the biological detection site. Submit BW event data (in the BIDS incident report format)— BIDS incident reports should include:
 - Time of alert.
 - Identification result and time.
 - Weather data (e.g., wind speed and direction).
 - Confidence level assigned to the BW agent detection or identification.
 - Location.
- (d) When mission-essential components fail.
- (e) When operations at the biological detection site are complete.
- (f) When the mission, SOP, threat, background, or location characteristics require a report.
- (g) When the SOP or OPLAN requires a personnel or LOGSTAT report.

(2) The platoon leader submits reports to company operations based on:

- (a) The analysis of detection and/or identification data from BIDS teams.
- (b) The mission, SOP, threat, background, or location characteristics require a report.

b. BIDS Situation Report. The sample BIDS SITREP shown in Table I-18 can be used to provide a complete status report at pre-established times according to the unit's SOP. It can also be used to report partial information (such as an "operational at new site" report). An "operational at new site" report would simply state: "P61 this is T51, SITREP over." "T51 this is P61, send over." "This is T51, line five ALPHA GOLF ONE, over." "T51 this is P61, Roger, out." The team leader (TL) just communicated to his platoon leader that his team is in position, fully mission capable, and operational.

Table I-18. Sample BIDS SITREP

Line	Item	Content		Remarks
1	Platoon location	Grid coordinates or no change	NA	
1 (alternate)	Team location	Grid coordinates	NA	
2a	COMM status: SINCGARS	G, A, R, or B	Anything less than GOLF requires explanation	
2b	COMM status: HF	G, A, R, or B		
3	Personnel status	G, A, R, or B		
4a	Supply status: Class I	G, A, R, or B		
4b	Supply status: Class III	G, A, R, or B		
4c	Supply status: Class V	G, A, R, or B		
4d	Supply status: Class IX	G, A, R, or B		
5a	System status: Team A	G, G1, A, R, or B		
5b	System status: Team B	G, G1, A, R, or B		
5c	System status: Team C	G, G1, A, R, or B		
5d	System status: Team D	G, G1, A, R, or B		
5e	System status: Team E	G, G1, A, R, or B		
5f	System status: Team F	G, G1, A, R, or B		
5g	System status: Team G	G, G1, A, R, or B		
6	Leader assessment	G, A, R, or B		
<p>GOLF (G) — fully mission capable (green). GOLF ONE (G1) — fully operational (green one). ALPHA (A) — requires resupply or maintenance after mission (amber).</p> <p>ROMEO (R) — requires resupply or maintenance before mission (red) BRAVO (B) — NMC</p>				

c. **BIDS Incident Reports.** The BIDS incident report is used by BIDS team members to record, and subsequently report pertinent information obtained during biological detection operations. There are generally three fundamental fields of data that are routinely compiled and reported by BIDS teams during operations—alert, detection, and identification. As the data is completed for each of these areas, it is transmitted to the platoon HQ element.

d. **Biological Event Tracking.** The analysis of BIDS incident reports is a dynamic process. The platoon HQ is the first organizational element to compile and assess report data from multiple systems. Event tracking enables the platoon HQ to systematically evaluate the BIDS report information. The characteristics associated with a BW aerosol cloud's downwind travel, as well as the effects of weather and terrain, provide the basis for tracking the BW event. Based on a large-area BW attack, the data from multiple BIDS are used by the platoon CP to make estimates on BW aerosol-cloud direction. For example, BIDS teams deployed in depth could alert sequentially, based on a BW aerosol cloud moving downwind. Two or more BIDS located in a general crosswind direction could detect the same BW aerosol cloud almost simultaneously. The BIDS alert times also depend on factors such as wind speed and the downwind separation distance between the BIDS.

Note: The leading edge of a BW aerosol cloud moves downwind at about 1.5 times the average wind speed, whereas the trailing edge of an aerosol cloud moves at about 0.5 times the average wind speed.

(1) **Event Tracking.**

(a) **Event-tracking process** is normally initiated as a result of one or more positive alert, detection, or identification results from an individual BIDS. The following process is repeated each time a BIDS report is received.

- **Characterization**— Characterization assigns a label to each BIDS event. The label consists of the BIDS number; location; time; weather data; and alert, detection, and identification results to include confidence level taken from the BIDS incident report. All results should be considered during unit-level analysis.

- **Grouping**— The second step is to accomplish grouping of events by assigning each BIDS event to a specific group based on spatial (space) and temporal (time) relationships. Relative time and space relationships exist among the various BIDS events because of the large area over which the teams are placed and the nature of a BW attack. These relationships are due to local meteorological conditions and the physical distance between detectors. Detection/identification conditions caused by a BW attack should occur sequentially in a downwind direction with detection/identification times between BIDS related to wind speed and downwind separation distance. Since the distance between BIDS will often be large (10-30 km), the time interval between adjacent downwind BIDS events is expected to be on the order of 10 minutes to 3 hours. Two or more BIDS located in a general crosswind direction could detect the same BW aerosol cloud nearly simultaneously. Events are assigned to the same group if they could reasonably have resulted from the same BW release, based on the relationship of their locations and detection times with the prevailing wind speed and direction. Any new event that does not appear to satisfy the time and space relationships for a group is assigned to a new group. Each group consists of

one or more events, and the membership of any particular group can change as more information becomes available.

- Attribution—review all available information on local conditions, friendly and enemy information, and weather data to determine if any non-BW causes exist for each group of BW events. If a specific cause is identified, it is added to the event tracking information. If no probable cause is identified, it is labeled as unknown. If non-BW causes are identified, the BIDS team data is not deleted from the group array. Each group array's information is augmented with applicable narrative information on local activity or terrain data specific to the AO.

(b) Event tracking is a systematic process that is continually revised as additional information becomes available. To support platoon-level BW event tracking, Figure I-1 (page I-26) provides a suggested BIDS incident report event-tracking format for recording data from multiple systems. As information is received, it is recorded sequentially in chronological order (left to right) on an event-tracking form.

(2) Other Planning Factors. Other factors that platoon leaders should consider include—

- (a) Whether multiple BIDS are providing similar information.
- (b) The influence of wind or terrain on aerosols as the BW event reaches various BIDS.
- (c) Whether the specific agent or type of agent detected is suspected to be in the enemy's arsenal.
- (d) The degree to which a BIDS event cannot be attributed to other (non-BW) causes such as friendly activity or known background ambient-air characteristics.
- (e) The current intelligence assessment of enemy plans and operational factors (such as air-defense warning status, enemy tactics, doctrine, patterns of prior use, medical and operational impacts, potential target value, and downwind hazards). This assessment should be used to supplement the checklist, as required.

BIDS Teams							
Alert Time							
Type (UVAPS, CBMS, APS)							
MET– wind speed (kph)							
MET – wind direction (deg)							
Detection Time (If applicable)							
Type of Detection							
Identification Time							
Agent(s)							
Notes							

SAMPLE

Figure I-1. Sample Event Tracking Form

e. Sample BW Event Tracking. Figure I-2 illustrates a sample scenario for a series of sample P3I BIDS incident reports submitted by individual M31A1s. The scenario indicates a potential sequence of events when a BW aerosol cloud passes over a platoon array. Figure I-3 (page I-29) provides a sample sector sketch for a biological detection platoon.

(1) A biological cloud was first detected at 2200 hours northwest of the Division Support Command (DISCOM) sector by the LRBSDS. Traveling at a speed of about 8 to 10 kph, the aerosol cloud reached the first BIDS (Team D) in the 501-support area about 1 hour later at 2300.

(2) With wind direction at 260 degrees and wind speed at 8 kph, the next BIDS (Team A) alerted at about 2315, followed by Teams C and B at 2318 and 2320, respectively. Based on the event-tracking process, the platoon HQ element assigns Teams D, A, C, and B and BW event data to Group 1.

(3) Subsequently, Teams E and F provided BIDS report information to the platoon CP about 4 hours later (within a 5-minute time frame of each other). The platoon CP conducted BW event tracking and assigns Teams E and F to the same group (for example, Group 2).

(4) Finally, Team G forwarded a BIDS incident report to the platoon CP. The information cannot be readily correlated with any other team information. In turn, Team G results are assigned to a separate group (for example, Group 3).

(5) The sample sketch (Figure I-3 [page I-28]) is not drawn to a specific scale, but report information (along with the sector sketch) provides a way to characterize and group platoon BW information. The platoon CP could circle the team or group of teams that come up with the same identification results. Event information indicates that teams D, A, C, and B can be grouped together as Group 1 and Teams E and F as Group 2. Team G stands alone as Group 3. In examining this information, a platoon leader can characterize, group, and attribute all information for his platoon by using the sample format in Figure I-2 and their sector sketch or operation map. Note: For this example only, “65” and “64” are the two-digit codes displayed by the BD for anthrax and plague, respectively).

BIDS Teams	D	A	C	B	E	F	G
Alert Time	2300	2315	2318	2320	0300	0305	0308
MET-wind speed (mph)	008	010	009	011	008	008	009
MET wind direction (deg)	270	260	260	260	270	270	260
Detection Time	2306	2320	2321	2323	0306	0310	0313
Type Detection (spores, cells, toxin, biological, none)	S	S	S	C	C	C	C
Identification Time	2322	2336	2337	2339	0326	0328	0330
Agent Code (Example Only)	65/	Neg	65/	Neg	64/	64/	Neg
Agent(s) Name	Anthrax		Anthrax		Plague	Plague	

Figure I-2. Sample BIDS Incident Report for Event Tracking

5. Biological Integrated Detection System Unit Communication

a. Communications and Organization.

(1) The BDC or BDP are operational-level-of-war assets. In general, the biological detection unit HQ will establish their CPs as close as possible to the Corps/JTF NBCCC. Generally, the biological detection unit CP and the Corps chemical brigade's main CP will be located where they can best support the Corps/JTF HQ. Normally, this will be within the same base cluster as the Corps/JTF Main CP.

(2) A BDC has a HQ element, three LRBSDS teams, and five BDPs; each platoon has seven BDTs. The platoon leaders are generally located where they can best support their BDTs. Because of the size of the area covered, the platoon leader may be located near a division's main CP or logistics base. BDTs will normally be positioned as far forward as possible, but out of enemy direct fire or observed indirect fire weapons range. Systems are widely separated, so BDTs operate an independent communications net. LRBSDS teams will likely be collocated with an aviation unit that is tasked to fly LRBSDS missions. The communications link for LRBSDS reports should be directly to the BDC's operations section. However, factors such as distance or communications system compatibility may require LRBSDS reports to be forwarded through the aviation unit back to the BDC's operations section.

(3) Since the BDC's CP is generally located within the same base cluster as the Corps Main CP and chemical brigade main CP, the corps and chemical brigade staffs must establish requirements for running subscriber access cables to the biological detection unit CP. This hardwire system architecture should permit the biological detection unit CP to pass critical operational information directly to the supported unit's battle staff.

b. Communications Equipment.

(1) The BDC's CP, each BDP's CP, and each BDT should have the following communications equipment:

- One AN/GRC-193A HF Radio (BDC, BDP, and BDT).
- One AN/VRC-90 VHF Radio (SINCGARS) (BDC, BDP, and BDT).
- For M31A2 units, one Force XXI Command Brigade and Below (FBCB2) System (BDC, BDP, and BDT). The BDC and BDP will have Enhanced Position Location Reporting System (EPLRS) capability.
- One AN/VRC-97 MSRT (BDP and BDC only).

Note: The BDT does not have an MSRT.

(2) Use of the communications capability. The BDC and BDP coordinate to determine communications interoperability requirements with their supporting and supported unit. Key items for coordination include frequencies, interoperability of

communications capabilities (i.e., identifying whether the BDC or BDP is supporting a digitized or non digitized unit), periodic reporting requirements, etc.

(a) For M31A2 equipped units, the FBCB2 is the BDT's primary means of forwarding reports (i.e., BIDS incident reports and other reports as required by SOP) to the BDP. The FBCB2 system (which includes SINCGARS) provides SA information, and burst digital data transmission. The system is capable of secure communications and has a range of approximately 20 kilometers; however, the Enhanced Position Location Reporting System (EPLRS) nets at the BDP or BDC can support retransmission of data across the digital theater. The BDP uses FBCB2 as a primary means of communication with the BDC to forward required reports. FBCB2 communication from the BDTs to the BDP is limited by the capabilities of the AN/VRC-90 VHF Radio (i.e., approximately 20 km line of sight).

(b) The HF radio (AN/GRC-193A HF Radio) becomes an alternate means of communication if distance or other operational factors prevent communication through use of the FBCB2 system. The HF radio provides a long-range (300+ miles) communications capability to send and receive reports. The HF radio provides a command net capability for use by the BDC.

(c) The SINCGARS (AN/VRC-90 VHF Radio) provides a line of sight (range approximately 20 km) communications capability. Distance permitting, the SINCGARS provides a command net capability for use by the BDC. Additionally, the SINCGARS is also the primary means of communication internal to the BDP (i.e., communication between the support crew and BIDS crew). Coordination with the supported or supporting unit may identify retransmission stations for transmittal of SINCGARS communications to tactical satellite (TACSAT) interfaces to allow BDC access to the Corps or theater "warfighter net" in the event other means of communication are not available.

(d) Each BDC's and BDP's CPs has a MSRT, which is similar to modern cellular telephones. It provides continuous access to the area communications system during movement and CP displacement. The MSRT has secure digital and facsimile communications capability. This is a particularly useful capability for status reports and issuing fragmentary orders. MSRT will serve as the primary means of communication at the CP level. The LRBSDS will communicate with the BDC's CP. The LRBSDS's reports may be communicated through aviation unit communications assets (the MSRT or VHF) to the BDC's CP.

c. Communications Planning and Nets.

(1) Units must plan for the rapid transmission of a high volume of data to and from the BDC. Therefore, units plan for and use brevity codes to communicate recurring items of information. Other key communications planning considerations include:

- Plan for interface between the supported unit and higher HQ communications circuits and automated data processing (ADP) systems.
- Plan to use complementary communications to reduce the impact of radio-electronic combat operations.

- Ensure interoperability of communications capability (i.e., connectivity between legacy and digitized units). For example, FBCB2 M31A2 units provide a digital communications capability. M31A1 and M31 equipped units do not have a digital communications capability.

- Data-architecture planning must ensure that the systems are interoperable and that the BDC is included in Technical Operational Data (TECHOPDAT) instructions. Ensure that the BDC is provided a copy of exchange message protocols.

- Ensure aviation assets for the LRBSDS are included in the communications plan.

- Plan for and monitor message precedence allocation.

- During joint or combined operations it is imperative to establish a combined coordination, communication and integration center for exchange of operational information.

- Plan for communications with the supporting medical laboratory, the theater TEU, and the theater CLS element for BIDS/LRBSDS.

- Provide contingency plans for alternate communications (such as losing the HF capability).

- Plan for signal security (SIGSEC).

- Plan for obtaining their own set of SOI for frequencies and internal nets.

- Guard against self-induced electromagnetic frequency interference and keep a 10 to 15 megahertz separation between adjacent transmitters for HF radio frequency management.

(3) There are three primary nets to consider:

- For M31A2 Unit Only - FBCB2 Net. This is the primary net for passing required reports as required by unit SOP (i.e., biological detection reports, situation reports, logistics status reports, sensitive item reports, etc.) Use the FBCB2 net to maintain and transmit SA data to communicate with the supporting unit and as a complementary means of communication (i.e., forwarding

- HF Net. This is the primary operations/intelligence net and is an alternate net for passing biological detection reports for M31A2 units. It remains the primary means of passing biological detection reports for M31A1 and M31 equipped units.

- VHF Net. This is the primary administrative and logistics net. Use the VHF net to maintain and transmit SA data to communicate with the supporting unit and as a complementary means of communication (i.e., forwarding biological detection reports) with the BDC's and BDP's CPs. This net is also used to gain access to TACSAT

and Joint Surveillance Target Attack Radar System (JSTARS) voice and digital communications systems.

- Mobile Subscriber Access Net. This is the alternate operations and intelligence net. MSRT may also be the primary means to pass operations and intelligence information directly from the BDC's CP to the Corps chemical officer. For example, the Corps chemical battle staff may have a subscriber access node that allows them to speak directly to the BDC.

(3) Figures I-4 through I-6 provide graphical representations of the communications architecture for biological-detection units.

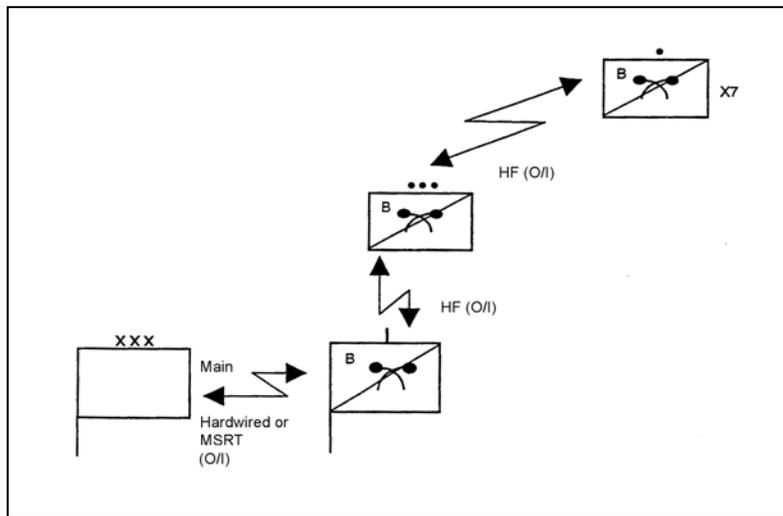


Figure I-4. HF Network

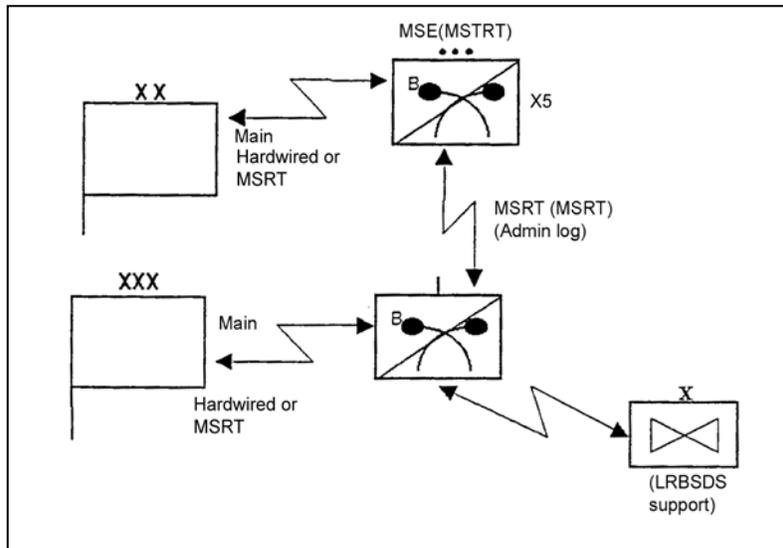


Figure I-5. MSE Network

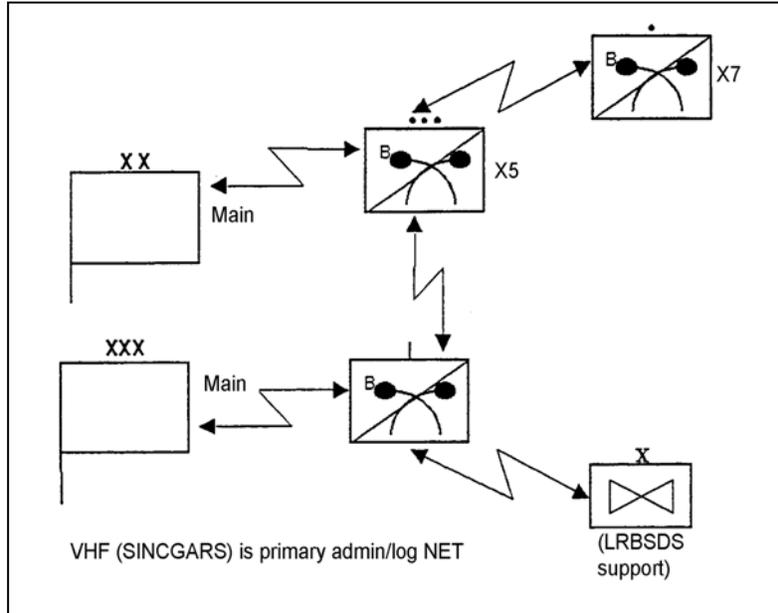


Figure I-6. VHF Network for M31, M31A1, and M31A2 and FBCB2 for M31A2 Only

d. FBCB2 (Force XXI Battle Command Brigade and Below)(For M31A2 Units Only).

(1) The FBCB2 is an additional communications capability for M31A2 units. The FBCB2 system exchanges position locations, spot reports, BIRs, situation reports, etc. FBCB2 software is presently found in hardware in other platforms including combat vehicles, HMMWVs, and C² operations centers. FBCB2 software is also embedded in new combat vehicle upgrades and C² components of the Army Tactical Command and Control System (ATCCS).

(2) FBCB2 uses the Joint Variable Message Format (JVMF). Message set and the new MIL STD 188-220(A) message protocol. Although designed primarily for use at battalion, company, and below, there is overlap through use of the embedded command interface between MCS and FBCB2, thereby closing the communications seam.

(3) Functional Description. The FBCB2 system hardware is a militarized computer communications capability. The FBCB2 is connected to a positioning and navigation (POS/NAV) device, i.e., Global Positioning System (GPS) and other embedded platform interfaces such as the Battlefield Combat Identification System (BCIS). These interfaces enhance the capability of the FBCB2 to provide relevant information to commanders, staffs, units, and soldier/weapon platforms.

(4) Employment.

(a) The FBCB2 system provides interoperability for the exchange of information with other ABCS systems over a tactical network. For example, BDTs submit digitally biological incident reports to the BDP using preformatted free message text

reports (Figure I-7). The BDP receives, consolidates, and evaluates the incoming reports and prepares and forwards an NBC-1 (BIO) report. The digitized message saves the time that would have required for a voice communication.

(b) The FBCB2 supports the BDC and BDP with seamless C² capabilities through interfaces with other Army and joint C² HQ. Communications planning identifies whether the M31A2 digitized reporting capability is compatible with the supporting and supported unit. These capabilities allow the user to send and receive C² information horizontally and vertically across the AO irrespective of task organization. The FBCB2 facilitates a flow of communications that effectively supports the synchronization of close combat operations.

(c) FBCB2 provides support for the following functional areas: situational understanding, battle command, communications management, and connectivity (i.e., interface) with other units.

BIDS Number: _____
19 Digit Sample Identification Number: _____
1. Detection Time
a. DTG
b. Background Sample
c. Command Directed Sample
2. MET Data
a. Elevation
b. Direction
c. Wind Speed
d. Temperature
e. Relative Humidity
3. Identification
a. DTG
b. Agent Code
c. Negative
4. Mode of Operation
a. Standard
b. Single Sample
c. Periodic
d. Degraded
e. Extreme Cold

Figure I-7. Sample FBCB2 Free Message Text for Biological Incident Reports

(5) FBCB2 Capabilities.

(a) SA. FBCB2 capabilities provide the BDT, BDP, and BDC with the capability to create a common tactical picture that includes mapping, maneuver, weather, combat service support, intelligence, air defense, and fire support features. There is applicability in each of these domains (i.e., weather, mapping, etc.) for biological detection unit operations. For example, FBCB2:

- Provides a visual image of the AO showing unit locations and the location of the surrounding FBCB2 equipped systems. The FBCB2 system provides each echelon with SA of the battlespace, two echelons up and down, and units on the right and left.

- Provides for the automatic display of SA data, maps, grids, and overlays (i.e., identification of friendly units, own unit, enemy units, fire plans, routes, unknown units, and obstacles.).

- Provides micrometeorological weather data for other locations within the area of operations.

- Provides visual imagery of digital maps to support biological detection site selection for primary, alternate, and supplemental sites.

- Provides information on friendly force NAIs.

- Provides available information on enemy locations and what is the enemy status.

- Provides information on friendly force intent and locations to support current and future operations.

- Provides information on the air defense umbrella.

- Provides a capability to identify routes of march and movement times between points.

- Provides PLGR location (i.e., the PLGR is connected to the FBCB2 through a serial interface).

(b) Battle Command.

- Provides the capability for the BDC or BDP to send and receive orders and the attached graphical overlays (i.e., sending the biological employment plan overlay to higher HQ or subordinate BDTs).

- Provides the capability to forward biological detection reports digitally from the BDT to BDP or BDC; thereby saving the time to transmit the reports via voice.

Note: The capability to transmit reports will be dependent on the range of the communications system used (i.e., HF or FBCB2).

- Provides an enhanced capability to track multiple biological events graphically at different levels of command.

- Provides a more efficient means than voice communications to forward periodic reports as required by unit SOP (i.e., logistics status reports, personnel status reports, sensitive item status reports, readiness condition [REDCON] reports) from team level to a platoon or company HQ.

- Provides a capability to respond to emergency situations (i.e., request for MEDEVAC, calls for fire, etc.).

- Provides an immediate method of notifying a unit if they are within the danger area of a warning event (i.e., an Air Defense Warning). The platform distance away from the warning event can be displayed in meters.

(c) Communications Management.

- Provide a means to preformat and provide standard digitized preaddressed message formats.

- Provides a means to establish electronic message folders and address groups to more efficiently monitor and track incoming and outgoing message traffic.

- Provides a means to provide periodic reminders of required activities or reports (i.e., periodic submission of situation reports).

Note: The SINCGARS radio transmits and receives SA and C² between platforms on the same data net frequencies if SINCGARS is attached. SINCGARS is the primary communications system for the FBCB2 below platoon level. It is used to transmit and receive SA and C² between platforms using data net frequencies.

(d) Interface to other ABCS (i.e., support to Legacy and non-Legacy Force). Communications planning considers the interoperability between the biological detection unit and the unit being supported (i.e., joint task force, other service, host nation, Army major command, etc.). For example, if an Army legacy force unit is supported, the appropriate nondigitized (i.e., voice communications) means will be used. Internal to the biological detection unit, FBCB2 capabilities can be used (distance and other factors being considered); however, there must be interoperability for submission of reports to the required C² node.

Note: At the BDC and BDP HQ level, data transfer occurs through use of the Enhanced Position Location Reporting System (EPLRS). The EPLRS is both a data radio and a location device and the primary data transfer system for those C² nodes (i.e., BDC and BDP HQ) equipped with EPLRS. EPLRS acts as a hub, relaying information to platforms outside the local net. Information is relayed to the local net SA server, which relays it over EPLRS to the receiving end. The EPLRS transmits and receives SA and C² from the FBDB2 system.

(6) Limitations.

- When a user must change platforms due to battle damage or mission requirements, data that was stored on the previous FBCB2 is lost.
- The computer and keyboard are susceptible to damage from dust and dirt. Users should take all practical steps to prevent this from happening.
- Interoperability must be assured to ensure communications between biological detection units and legacy and digitized units.

REFERENCES

Department of Defense

DODD 2000.12, *DOD Antiterrorism/Force Protection (AT/FP) Program*, 13 April 1999.

DODD 3025.1M, *Manual for Civil Emergencies*, June 1994 (U).

DODD 3025.12, *Military Assistance for Civil Disturbances (MACDIS)*, 4 February 1994 (U).

DODD 3025.15, *Military Assistance to Civil Authorities*, 18 February 1997.

DODD 5100.52-M, *Nuclear Weapon Accident Response Procedure (NARP) Manual*, 4 September 1990.

DODD 5100.77, *DOD Law of War Program*, 9 December 1998.

DODD 5240.1, *DOD Intelligence Activities*, 25 April 1988 (U).

DODD 5525.5, *DOD Cooperation with Civilian Law Enforcement Officials*, 15 January 1986.

Joint

Chairman of the Joint Chiefs of Staff Instruction (CJCSI) 3125.01, *Military Assistance to Domestic Consequence Management Operations in Response to a Chemical, Biological, Nuclear, or High-Yield Explosive Situation*, 3 August 2001.

CJCSM 3150.03, *Joint Reporting Structure Event and Incident Reports*, 19 June 1998.

Chairman of the Joint Chiefs of Staff Manual (CJCSM) 3500.04B, *Universal Joint Task List, Version 4.0*, 1 October 1911, Change 1, 1 November 1999

JP 1, *Joint Warfare of the Armed Forces of the United States*, 14 November 2000.

JP 1-01, *Joint Publication System: Joint Doctrine and Joint Tactics, Techniques, and Procedures Development Program*, Change 1.5, July 2000.

JP 1-02, *Department of Defense Dictionary of Military and Associated Terms*, 12 April 2001.

JP 2.01.3, *Joint Tactics, Techniques, and Procedures for Joint Intelligence Preparation of the Battlespace*, Final Coordination, 24 May 2000.

JP 3-0, *Doctrine for Joint Operations*, 10 September 2001.

JP 3-01, *Joint Doctrine for Countering Air and Missile Threats*, 19 October 1999.

JP 3-01.5, *Doctrine for Joint Theater Missile Defense*, 22 February 1996

JP 3-04.6, *Joint Tactics, Techniques, and Procedures for Foreign Humanitarian Assistance*, 15 August 2001.

JP 3-07, *Joint Doctrine for Military Operations Other Than War*, 16 June 1995.

JP 3-07.1, *Joint Tactics, Techniques and Procedures for Foreign Internal Defense (FID)*, 26 June 1996.

JP 3-07.2, *Joint Tactics, Techniques, and Procedures for Antiterrorism*, 17 March 1998.

JP 3-07.7, *Joint TTP for Domestic Support Operations*, June 1996.

JP 3-10, *Joint Doctrine for Rear Area Operations*, 28 May 1996.

JP 3-10.1, *Joint Tactics, Techniques and Procedures for Base Defense*, 23 July 1996.

JP 3-11, *Joint Doctrine for Operations in Nuclear, Biological, and Chemical (NBC) Environments*, 11 July 2000.

JP 3-33, *Joint Force Capabilities*, 13 October 1999.

JP 4-0, *Doctrine for Logistic Support of Joint Operations*, 6 April 2000.

JP 4-02, *Doctrine for Health Service Support in Joint Operations*, 30 July 2001.

JP 5-0, *Doctrine for Planning Joint Operations*, 13 April 1995.

JP 5-00.2, *Joint Task Force (JTF) Planning Guidance and Procedures*, 13 January 1999.

JP 5-03.1, *Joint Operation Planning and Execution System Vol I: (Planning Policies and Procedures)*, 9 August 1993.

JP 5.03.2, *Joint Operation Planning and Execution System (JOPES), Volume II*, 10 March 1992 (U).

JP 6-0, *Doctrine for Command, Control, Communications, and Computer (C4) Systems Support to Joint Operations*, 30 May 1995.

Joint Service Chemical and Biological Defense Program FY 00-02 Overview.

Joint Service Chemical and Biological Defense Fact Sheets, August 1998.

Joint Service Nuclear, Biological, and Chemical Defense Concept, September 1997.

Multiservice

FM 3-3/FMFM 11-17, *Chemical and Biological Contamination Avoidance*, 16 Nov 1992, C1, 29 September 1994.

FM 3-3-1/FMFM 11-18, *Nuclear Contamination Avoidance*, 9 September 1994.

FM 3-4/FMFM 11-9, *NBC Protection*, 29 May 1992, Change 2, 21 February 1996.

FM 3-5/MCWP 3-37.3, *NBC Decontamination*, 8 July 2000, Change 1, 31 January 2002.

FM 3-6/AFM 105-7/FMFM 7-11H, *Field Behavior of NBC Agents (Including Smoke and Incendiaries)*, 3 November 1986.

FM 3-9/NAVFAC P-467/AFR 355-7, *Potential Military Chemical/Biological Agents and Compounds*, 12 December 1990.

FM 3-11/MCWP 3-31.1/NWP 3-11/AFTTP(I) 3-2.41, *Multiservice Tactics, Techniques, and Procedures for Nuclear, Biological, and Chemical Defense Operations*, June 2002.

FM 3-11.34/MCRP 3-37.5/NWP 3-11.23/AFTTP (I) 3-2.33, *Multiservice Tactics, Techniques, and Procedures for NBC Defense of Theater Fixed Sites, Ports, and Airfields*, 29 September 2000.

FM 3-19/FMFM 11-20, *NBC Reconnaissance*, 19 November 1993.

FM 3-100/MCWP 3-3-7.1, *Chemical Operations Principles and Fundamentals*, 8 May 1996.

FM 8-9/NAVMED P-5059/AFJMAN 44-151V1V2V3, *NATO Handbook on the Medical Aspects of NBC Defensive Operations Amed P-6(B)*, 1 February 1996.

FM 8-33/NAVMED P-5038, *Control of Communicable Disease Manual*, 9 April 1996.

FM 8-284, *Treatment of Biological Warfare Agent Casualties*, 17 July 2000.

FM 21-10/MCRP 4-11.1D, *Field Hygiene and Sanitation*, 21 June 2000.

FM 101-4/MCRP 6-23A/NWP 3-13.1.16/AFTTP 3-2.22, *Multiservice Procedures for Joint Task Force-Information Management*, 8 April 1999.

Army

USAMRICD, *Medical Management of Biological Casualties Handbook*, February 2001.

FM 3-0, *Operations*, 14 June 2001.

FM 3-7, *NBC Field Handbook*, 29 September 1994.

FM 3-14, *Nuclear, Biological, and Chemical (NBC) Vulnerability Analysis*, 12 November 1997, Change 1, 24 September 1998.

FM 3-19, *NBC Reconnaissance*, 19 November 1993.

FM 3-90, *Tactics*, 4 July 2001

FM 3-101, *Chemical Staffs and Units*, 19 November 1993.

FM 3-101-6, *Biological Defense Operations, Corps/Company Tactics, Techniques and Procedures*, 25 March 1999, Change 1, 1 September 2000.

FM 8-10, *Health Service Support in a Theater of Operations*, 1 March 1991.

FM 8-10-7, *Health Services Support in a Nuclear, Biological, and Chemical Environment*, 22 April 1993, Change 1, 26 November 1996.

FM 8-42, *Combat Health Support in Stability Operations and Support Operations*, 27 October 1997.

FM 8-500, *Hazardous Materials Injuries, A Handbook for PreHospital Care (4th Edition)*, January 1997.

FM 21-11, *First Aid for Soldiers*, 27 October 1988, Reprinted including changes 1-2, December 1991.

FM 100-6, *Information Operations*, 27 August 1996.

FM 100-7, *Decisive Force: The Army in Theater Operations*, 31 May 1995.

FM 100-23, *Peace Operations*, 30 December 1994.

FM 101-5, *Staff Organization and Operations*, 31 May 1997.

TRADOC Pamphlet 525-63, *Operations Concept for Biological Defense*, 1 December 1994.

US Army Chemical School, *Concept for Biological Detection Future*, 18 September 1996.

US Army Chemical School, *Chemical Vision 2010*, 3 February 1999.

US Army Chemical School, *Theater Missile Defense, Joint Project Optic Cobra 1996, After Action Report*, 1996.

US Army Chemical School, *TOE Summary Book*, 1 June 2000.

US Army Chemical School, *Chemical Review, NBC Operations in Bosnia*, July 1996.

US Army Chemical School, *Chemical Review*, January 1997.

US Army Maneuver Support Center, *Force Development BR DCD*, 15 October 2001.

US Army Medical Research Institute of Infectious Diseases (USAMRIID), *Medical Management of Biological Casualties Handbook*, Fourth Edition, February 2001.

US Army Training Circular 3-4, *Chemical Battle Staff Handbook*, 3 October 1995.

Air Force

AFDD-1, *Air Force Basic Doctrine*, September 1997.

AFH 32-4014 V1, *Operations in a Chemical and Biological (CB) Warfare Environment, CB Planning and Analysis*, 1 March 1998.

AFH 32-4014 V2, *USAF Operations in a Chemical and Biological (CB) Warfare Environment*, 1 December 1997.

AFH 32-4014 V3, *USAF Operations in a Chemical and Biological (CB) Warfare Environment*, 1 February 1998.

AFH 32-4014 V4, *USAF Ability to Survive and Operate Procedures in a Nuclear, Biological, and Chemical (NBC) Environment*, 1 March 1998.

AFI 32-4002, *Hazardous Material Emergency Planning and Response Compliance*, March 1997.

AFMAN 32-4004, *Emergency Response Operations*, 1 December 1995.

AFMAN 32-4005, *Personnel Protection and Attack Actions*, 30 October 2001.

AFMAN 32-4017, *Civil Engineer Readiness Technician's Manual for Nuclear, Biological, and Chemical Defense*, 29 May 2003.

AFPAM 32-4019, *Chemical-Biological Warfare Commander's Guide*, 1 April 1998.

AFPD 32-40, *Disaster Preparedness*, 1 May 1997.

US Air Force Engineering Support Activity, *Chemical and Biological Defense Concept of Operations*, January 1998.

US Air Force Institute for National Security Studies, *Countering the Proliferation and Use of Weapons of Mass Destruction*, 1998.

Marine Corps

MCWP 3-37, *Marine Air-Ground Task Force (MAGTF) Nuclear, Biological, and Chemical Defensive Operations*, September 1998.

OPNAV P-86-1-95, *US Navy CBR Defense/US Marine Corps NBC Defense Handbook*, April 1995.

Navy

Naval Doctrine Command, *US Navy, Executive Summary, Multinational Maritime Operations*, 1996.

Naval Doctrine Publication 1, *Naval Warfare*, Washington, DC: Department of the Navy, 28 March 1994.

Naval Doctrine Publication 2, *Naval Intelligence*, Washington, DC: Department of the Navy, 30 September 1994.

Naval Doctrine Publication 4, *Naval Logistics*, Washington, DC: Department of the Navy, 20 February 2000.

Navy Warfare Publication 3-20.31 (Revision A), *Ship Survivability*, June 1998.

OPNAV P-86-1-95, *US Navy CBR Defense/US Marine Corps NBC Defense Handbook*, April 1995.

Trainee Guide, Disaster Preparedness Operations Specialist, US Navy Detachment, Fort Leonard Wood, MO, June 1998.

NATO Standardization Agreements (STANAG) and Publications

STANAG 2002, *Warning Signs for the Marking of Contaminated or Dangerous Land Areas, Complete Equipment, Supplies, and Stores*, January 29, 1999.

STANAG 2103, *Reporting Nuclear Detonations, Biological and Chemical Attacks, and Predicting the Warning of Associated Hazards and Hazard Areas* (Allied Tactical Publication (ATP) 45 (A)), 14 January 1998.

STANAG 2112, *NBC Reconnaissance*, March 6, 1998.

STANAG 2353, *NBC (Editions) – Evaluation of NBC Defense Capability*, 24 March 2000.

Other Sources

Allied Engineering Publication (AEP) (10), *Sampling and Identification of CB Agents*.

DA Form 2028, *Recommended Changes to Publications and Blank Forms*.

DD Form 1991, *Material Courier Report*.

Defense Intelligence Agency Manual 58-13, *Defense Human Resources Intelligence Collection Procedures* (SECRET/NOFOR).

Department of Transportation, *2000 Emergency Response Guidebook, A Guide for First Responders During the Initial Phase of a Dangerous Goods/ Hazardous Materials Incident*.

Department of Transportation (DOT) Regulation 49 CFR 173.196.

Federal Emergency Management Agency (FEMA), *Federal Radiological Emergency Response Plan (FRERP)*, CFR 50, Federal Register 46542, May 1996 (U).

Federal Emergency Management Agency (FEMA), Federal Response Plan (Unclassified), April 1999.

IATA Packaging Instruction 602, 2001.

IATA Packaging Instruction 650, 2001.

IATA Packaging Instruction 650, 2001.

International Air Transport Association (IATA) Dangerous Goods Regulation (DGR), 1 January 2002—31 December 2002.

International Civil Aviation Organization Technical Instructions (ICAO TI) on the Safe Transport of Dangerous Goods by Air, 1999—2000 Edition.

Memorandum, Under Secretary of Defense, *Military and Veterans Health Coordinating Board and Presidential Review Directive (PRD-S)*, 7 December 1999.

National Defense University, Center for Counter-Proliferation Research – *Deterrence and Defense in a Nuclear, Biological, and Chemical Environment*, Robert B. Joseph and John F. Reichart, 1999.

Office of Special Assistant for Gulf War Illness, *Lessons Learned Implementation*, 18 November 1999.

Presidential Decision Directive (PDD)/National Security Council (NSC) 39, *US Government Policy on Counterterrorism*, 21 June 1995.

STP 8-91B-15-SM-TG, MOS 91W, *Health Care Specialist*, 10 October 2001.

GLOSSARY

PART I—ABBREVIATIONS AND ACRONYMS

A

AAR	after-action report
AB	airbase
AC	alternating current
ACADA	automatic chemical agent detector and alarm
ACLEFT	aircraft left
ACOR	administrative contracting officers representative
ACP	aerial checkpoint
ADA	air defense area, air defense artillery
ADP	automated data processing
AEP	Allied Engineering Publication
AF	Air Force
AFB	Air Force base
AFDD	Air Force Doctrine Document
AFH	Air Force Handbook
AFI	Air Force Instruction
AFJMAN	Air Force Joint Manual
AFM	Air Force manual
AFMAN	Air Force manual
AFPAM	Air Force pamphlet
AFPD	Air Force Policy Directive
AFTTP	Air Force tactics, techniques, and procedures
AGL	above ground level
AM	amplitude modulation
AMC	Air Mobility Command
AML	area medical laboratory
AO	area of operations
AOI	area of interest
AOR	area of responsibility
APO	Army Post Office
APOD	aerial port of debarkation
APOE	aerial port of embarkation
ARFOR	Army forces
ASIOE	associated support items of equipment
AT	antiterrorism
ATP	Allied tactical publication
ATTN	attention
AUG	August

B

BAT	biological augmentation team
BAWS	Biological Aerosol Warning Sensor
BBSU	Basic Biological Suite Unit
BDC	biological detection company
BDCO	biological detection company officer
BDE	brigade
BDP	biological detection platoon
BDT	biological detection team
BIDS	Biological Integrated Detection System
BIO	biological
BIR	biological incident report
BS	biological sampler
BSA	brigade support area
BW	biological warfare

C

C	Celsius
C²	command and control
C⁴I	Command, control, communications, computers, and intelligence
CA	civil affairs
CB	chemical-biological
CBMS	chemical biological mass spectrometer
CBR	chemical, biological, and radiological
CCIR	commander's critical information requirements
CD	compact disc
CDC	Centers for Disease Control and Prevention
CFR	Code of Federal Regulations
CG	commanding general
CHS	combat health support
CIP	communications interface processor
CJCS	Chairman of the Joint Chiefs of Staff
CJCSI	Chairman of the Joint Chiefs of Staff Instruction
CJCSM	Chairman of the Joint Chiefs of Staff Manual
CLS	contracted logistic support
CMO	chief military observer
COA	course of action
COCOM	combatant command (command authority)
COE	concept of employment
COMM	communications
CONOPS	concept of operations
CONUS	continental United States
COP	common operational picture
COR	contracting officer representative
COS	chief of staff

COTS commercial off-the-shelf
CP command post
CPE cytopathic effects
CPU central processing unit
CRC CONUS replacement center
CS combat support
CSH combat support hospital
CSS combat service support
CW chemical warfare
CWO chief warrant officer

D

DA Department of the Army, deployment area
DC direct current
DCC damage control center
DD Department of Defense
deg degree
DFU dry filter unit
DGR Dangerous Goods Regulation
DISCOM division support command
DNA deoxyribonucleic acid
DNBI disease and nonbattle injury
DOD Department of Defense
DODD Department of Defense directive
DODI Department of Defense instruction
DOT Department of Transportation
DS detector site
DSN Defense Switch Network
DST decision support tool
DTG date-time group

E

EAC echelons above corps
ECBC2 Force XXI Command Brigade and Below
ECL electrochemiluminescence
ECU environmental control unit
e.g. for example (*exempli gratia*)
ELISA enzyme-linked immunosorbent assay
EOC emergency operations center
EOD explosive ordnance disposal

F

F Fahrenheit
FA fluorescent antibody
FARP forward arming and refueling point
FBCB2 Force XXI Battle Command/Brigade and Below

FDA	Food and Drug Administration
FDPMU	forward-deployed preventive medical unit
FEMA	Federal Emergency Management Agency
FHP	force health protection
FIP	foreign internal defense
FL	fluorescence
FLOT	forward line of own troops
FM	field manual, frequency modulation
FMFM	Fleet Marine Force Manual
FNS	foreign nation support
FORSCOM	United States Army Forces Command
FP	force protection
FPCON	force protection condition
FPO	Fleet Post Office
FRAGORD	fragmentary order
FRERP	Federal Radiological Emergency Response Plan
FS	fire support
FSB	forward staging base
FSCOORD	fire support coordinator
FSE	fire support element
ft	foot/feet
FTS	fluid transfer system
FY	fiscal year

G

G2	intelligence section
GA	Georgia
GCCS	Global Command and Control System
GFE	government-furnished equipment
GPFU	gas particulate filter unit
GPS	global positioning system
GS	gram stain

H

HF	high frequency
HHA	hand held assay
HLS	homeland security
HMMWV	high mobility multipurpose wheeled vehicle
HN	host nation
HNS	host-nation support
HQ	headquarters
hr	hour
HSS	health service support
HUMINT	human intelligence
HVAC	heating, ventilation, and air conditioning
HVT	high-value target

I

IATA	International Air Transport Association
IBADS	interim biological agent detector system
ICAOTI	International Civil Aviation Organization Technical Instruction
ID	identification
i.e.	that is (<i>id est</i>)
IHC	immunohistochemical
IMS	information management system
IPB	intelligence preparation of the battlespace
IPE	individual protective equipment
IR	information requirement
ISR	intelligence, surveillance, and reconnaissance

J

JACC	joint airspace control center
JBAIDS	joint biological agent identification and diagnostic system
JBPDS	joint biological point detection system
JFC	joint force commander
JOPEs	Joint Operation Planning and Execution System
JP	joint publication
JPS	Joint Portal Shield
JSLNBCRS	Joint Service Light Nuclear, Biological, and Chemical Reconnaissance System
JSTARS	Joint Surveillance Target Attack Radar System
JTF	joint task force
JWARN	Joint Warning and Reporting Network

K

kg	kilogram
km	kilometer(s)
KO	contracting officer
kph	kilometers per hour
kW	kilowatt

L

LA	Louisiana
LCAC	landing craft, air cushion
LMS	Lightweight Multipurpose Shelter
LOAC	Law of Armed Conflict
LOGSTAT	logistics status
LOS	line of sight
LRBSDS	Long-Range Biological Standoff Detection System
LRN	Laboratory Response Network
LRU	line replacement unit
LS	liquid sampler

LSA	logistics support area
LSE	logistics support element
LZ	landing zone
M	
M403	microbiology augmentation set
MACDIS	military assistance for civil disturbances
MAGTF	Marine Air-Ground Task Force
MANSCEN	Maneuver Support Center
MAR	March
MARFOR	Marine Corps forces
MCCDC	Marine Corps Combat Development Command
MCM	military classification manual
MCRP	Marine Corps reference publication
MCWP	Marine Corps Warfighting Publication
MEDCEN	medical center
MEDINT	medical intelligence
MEDSURV	medical surveillance
MET	meteorological
METT-TC	mission, enemy, terrain and weather, troops and support available— time available and civilian
MGySgt	Master Gunnery Sergeant
MILSTRIP	military standard requisitioning and issue procedures
Mini-FCM	miniature flow cytometer
ml	milliliter
mm	millimeter
MO	Missouri
MOB	main operating base
MOPP	mission-oriented protective posture
MOS	military occupational specialty
mph	miles per hour
MS	mobilization station
MSC	Military Sealift Command, major subordinate command
MSE	mobile subscriber equipment
MSR	main supply route
MSRT	mobile subscriber receiver/transmitter
MTF	medical treatment facility
MTMC	Military Traffic Management Command
MTTP	multiservice tactics, techniques, and procedures

N

N/A	not applicable
NAF	numbered air force
NAI	named area of interest
NARP	Nuclear Accident Response Procedures
NATO	North Atlantic Treaty Organization
NAVFAC	Naval Facility
NAVFOR	Navy forces
NAVMEDP	Navy Medical Pamphlet
NBC	nuclear, biological, and chemical
NBCC	nuclear, biological, and chemical center
NBCCC	nuclear, biological, and chemical control center
NBCD	nuclear, biological, and chemical defense
NBCDO	nuclear, biological, and chemical defense officer
NBCWRS	nuclear, biological, and chemical warning and reporting system
NBI	nonbattle injury
NC	North Carolina
NCO	noncommissioned officer
NCOIC	noncommissioned officer in charge
NDI	nondevelopmental item
NEPMU	Navy Environmental and Preventive Medicine Unit
NGO	nongovernmental organization
NLT	not later than
NMC	not mission capable
NMRC	Navy Medical Research Center
NMRI	Navy Medical Research Institute
NOE	nap-of-the-earth
NSB	non-specific binding
NSC	National Security Council
NTTP	Navy tactics, techniques, and procedures
NWDC	Navy Warfare Development Command
NWP	naval warfare publication

O

OCIE	organizational clothing and individual equipment
OCONUS	outside the continental United States
OGA	other government agency
OPCEN	operations center
OPCON	operational control
OPLAN	operation plan
OPORD	operation order
OPR	office of primary responsibility
OPSEC	operations security
OPTASK	operation task
OPTEMPO	operating tempo

ORF	operational readiness float
P	
P3I	preplanned product improvement
PBS	phosphate buffered saline
PC	personal computer
PCR	polymerase chain reaction
PDD	Presidential Decision Directive
PERSTAT	personnel status
PHL	public health lab
PIR	priority intelligence requirement
PLGR	precise lightweight global positioning system (GPS) receiver
PMCS	preventive maintenance checks and services
POC	point of contact
POD	port of debarkation
POE	port of embarkation
PPV	positive predictive value
PRD	Presidential Review Directive
PVNTMED	preventive medicine
Q	
QA	quality assurance
QC	quality control
QM	quality management
R	
R&S	reconnaissance and surveillance
RA	risk analysis
RF	radio frequency
RI	Rhode Island
RNA	ribonucleic acid
ROM	restriction of movement
RSOI	reception, staging, onward movement, and integration
S	
S2	intelligence section
SA	situational awareness
SB	sample bottle
SBCCOM	Soldier and Biological Chemical Command
SBL	ship-based laboratory
SCC	service compound commander
SEAD	suppression of enemy air defenses
SEB	sample extraction bottle
SIGINT	signals intelligence
SIGSEC	signal security

SINGARS	single-channel ground and airborne radio system
SITREP	situation report
SJA	Staff Judge Advocate
SMF	sample management facility
SNCOIC	special noncommissioned officer in charge
SOF	special operations forces
SOI	signal operating instructions
SOP	standard operating procedure
SPOD	seaport of debarkation
SPOE	seaport of embarkation
STANAG	standardization agreement
STC	sample transfer case
STP	sample transfer point
SWO	staff weather officer
T	
TAB	target acquisition battery
TACSAT	tactical satellite
TAML	theater Army medical laboratory
TBM	theater ballistic missile
TECHOPDAT	technical operational data
TEU	technical escort unit
TIB	toxic industrial biological
TL	team leader
TM	technical manual
TMST	theater medical surveillance team
TO	theater of operations, technical order
TOC	tactical operations center
TOE	table of organization and equipment
TPFDD	time-phased force and deployment data
TPFDL	time-phased force and deployment list
TRADOC	United States Army Training and Doctrine Command
TSP	training support package
TTP	tactics, techniques, and procedures
U	
UH	utility helicopter
UHF	ultrahigh frequency
UIC	unit identification code
UMD	unit movement data
UN	United Nations
US	United States
USA	United States Army
USACMLS	United States Army Chemical School
USAF	United States Air Force
USAMC	United States Army Materiel Command
USAMRICD	United States Army Research Institute for Chemical Defense

USAMRIID	United States Medical Research Institute of Infectious Diseases
USMC	United States Marine Corps
USN	United States Navy
USTRANSCOM	United States Transportation Command
UVAPS	ultraviolet aerodynamic particle sizer

V

VA	Virginia, vulnerability assessment
VEE	Venezuelan equine encephalitis
VHF	very high frequency

W

WARNORD	warning order
----------------	---------------

X

XM	experimental model
XO	executive officer

PART II – TERMS AND DEFINITIONS

Aerosol. A liquid or solid composed of finely divided particles suspended in a gaseous medium. Examples of common aerosols are mist, fog, and smoke. (JP 1-02)

Air defense area. 1. overseas—A specifically defined airspace for which air defense must be planned and provided. 2. United States—Airspace of defined dimensions designated by the appropriate agency within which the ready control of airborne vehicles is required in the interest of national security during an air defense emergency. (JP 1-02)

Air defense artillery. Weapons and equipment for actively combating air targets from the ground. Also called ADA. (JP 1-02)

Air Mobility Command. The Air Force component command of the US Transportation Command. Also called AMC. (JP 1-02)

Area of interest. That area of concern to the commander, including the area of influence, areas adjacent thereto, and extending into enemy territory to the objectives of current or planned operations. This area also includes areas occupied by enemy forces who could jeopardize the accomplishment of the mission. Also called AOI. (JP 1-02)

Area of operations. An operational area defined by the joint force commander for land and naval forces. Areas of operation do not typically encompass the entire operational area of the joint force commander, but should be large enough for component commanders to accomplish their missions and protect their forces. Also called AO. (JP 1-02)

Area of responsibility. The geographical area associated with a combatant command within which a combatant commander has authority to plan and conduct operations. Also called AOR. (JP 1-02)

Assembly Area. 1. An area in which a command is assembled preparatory to further action. 2. In a supply installation, the gross area used for collecting and combining components into complete units, kits, or assemblies. (JP 1-02)

Avoidance. Individual and/or unit measures taken to avoid or minimize nuclear, biological, and chemical (NBC) attacks and reduce the effects of NBC hazards. (JP 1-02)

Battlespace. The environment, factors, and conditions that must be understood to successfully apply combat power, protect the force, or complete the mission. This includes the air, land, sea, space, and the included enemy and friendly forces; facilities; weather; terrain; the electromagnetic spectrum, and the information environment within the operational areas and areas of interest. (JP 1-02)

Biological agent. A microorganism that causes disease in personnel, plants, or animals or causes the deterioration of materiel. (JP 1-02)

Biological defense. The methods, plans, and procedures involved in establishing and executing defensive measures against attacks using biological agents. (JP 1-02)

Biological operation. Employment of biological agents to produce casualties in personnel or animals or damage to plants. (JP 1-02)

Biological threat. A threat that consists of biological material planned to be deployed to produce casualties in personnel or animals or damage plants. (JP 1-02)

Biological weapon. An item of materiel, which projects, disperses, or disseminates a biological agent including arthropod vectors. (JP 1-02)

Blister agent. A chemical agent which injures the eyes and lungs and burns or blisters the skin. Also called vesicant agent. (JP 1-02)

Boundary. A line that delineates surface areas for the purpose of facilitating coordination and deconfliction of operations between adjacent units, formations, or areas. (JP 1-02)

Casualty. Any person who is lost to the organization by having been declared dead, duty status – whereabouts unknown, missing, ill, or injured. (JP 1-02)

Chemical agent. Any toxic chemical intended for use in military operations. (JP 1-02)

Chemical defense. The methods, plans, and procedures involved in establishing and executing defensive measures against attack utilizing chemical agents. See also nuclear, biological, and chemical defense. (JP 1-02)

Chemical environment. Conditions found in an area resulting from direct or persisting effects of chemical weapons. (JP 1-02)

Chemical operation. Employment of chemical agents to kill, injure, or incapacitate for a significant period time, man or animals, and deny or hinder the use of areas, facilities, or materiel; or defense against such employment. (JP 1-02)

Chemical warfare. All aspects of military operations involving the employment of lethal and incapacitating munitions/agents and the warning and protective measures associated with such offensive operations. Since riot control agents and herbicides are not considered to be chemical warfare agents, those two items will be referred to separately or under the broader term “chemical,” which will be used to include all types of chemical munitions/agents collectively. Also called CW. (JP 1-02)

Chief of staff. The senior or principal member or head of a staff, or the principal assistant in a staff capacity to a person in a command capacity; the head or controlling member of a staff, for purposes of the coordination of its work; a position that in itself is without inherent power of command by reason of assignment, except that which is invested in such a position by delegation to exercise command in another’s name. (JP 1-02)

Civil affairs. Designated Active and Reserve component forces and units organized, trained, and equipped specifically to conduct civil affairs activities and to support civil-military operations. Also called CA. (JP 1-02)

Combatant command (command authority). Nontransferrable command authority established by title 10 (“Armed Forces”), United States Code, section 164, exercised only by commanders of unified or specified combatant commands unless otherwise directed by the President or the Secretary of Defense. Combatant command (command authority) cannot be delegated and is the authority of a combatant commander to perform those functions of command over assigned forces involving organizing and employing commands and forces, assigning tasks, designating objectives, and giving authoritative direction over all aspects of military operations, joint training, and logistics necessary to accomplish the missions assigned to the command. Combatant command (command authority) should be exercised through the commanders of subordinate organizations. Normally this authority is exercised through subordinate joint force commanders and Service and/or functional component commanders. Combatant command (command authority) provides full authority to organize and employ commands and forces as the combatant commander considers necessary to accomplish assigned missions. Operational control is inherent in combatant command (command authority). Also called COCOM. (JP 1-02)

Combat service support. The essential capabilities, functions, activities, and tasks necessary to sustain all elements of operating forces in theater at all levels of war. Within the national and theater logistic systems, it includes but is not limited to that support rendered by service forces in ensuring the aspects of supply, maintenance, transportation, health services, and other services required by aviation and ground combat troops to permit those units to accomplish their missions in combat. Combat service support encompasses those activities at all levels of war that produce sustainment to all operating forces on the battlefield. Also called CSS. (JP 1-02)

Combat support. Fire support and operational assistance provided to combat elements. Also called CS. (JP 1-02)

Command and control. The exercise of authority and direction by a properly designated commander over assigned and attached forces in the accomplishment of the mission. Command and control functions are performed through an arrangement of personnel, equipment, communications, facilities, and procedures employed by a commander in planning, directing, coordinating, and controlling forces and operations in the accomplishment of a mission. Also called C2. (JP 1-02)

Commander’s critical information requirements. A comprehensive list of information requirements identified by the commander as being critical in facilitating timely information management and the decision making process that affect successful mission accomplishment. Two key subcomponents are critical friendly force information and priority intelligence requirements. Also called CCIR. (JP 1-02)

Command post. A unit’s or subunit’s headquarters where the commander and the staff perform their activities. In combat, a unit’s or subunit’s headquarters is often divided into echelons; the echelon in which the unit or subunit commander is located or from which such commander operates is called a command post. Also called CP. (JP 1-02)

Common operational picture. A single identical display of relevant information shared by more than one command. A common operational picture facilitates collaborative

planning and assists all echelons to achieve situational awareness. Also called COP. (JP 1-02)

Concept of operations. A verbal or graphic statement, in broad outline, of a commander's assumptions or intent in regard to an operation or series of operations. The concept of operations frequently is embodied in campaign plans and operation plans; in the latter case, particularly when the plans cover a series of connected operations to be carried out simultaneously or in succession. The concept is designed to give an overall picture of the operation. It is included primarily for additional clarity of purpose. Also called CONOPS. (JP 1-02)

Contamination. 1. The deposit, absorption, or adsorption of radioactive material, or of biological or chemical agents on or by structures, areas, personnel, or objects. 2. Food and/or water made unfit for consumption by humans or animals because of the presence of environmental chemicals, radioactive elements, bacteria, or organisms, the by-product of the growth of bacteria or organisms, the decomposing material (to include the food substance itself), or waste in the food or water. (JP 1-02)

Contamination control. Procedures to avoid, reduce, remove, or render harmless (temporarily or permanently) nuclear, biological, and chemical contamination for the purpose of maintaining or enhancing the efficient conduct of military operations. (JP 1-02)

Continental United States. United States territory, including the adjacent territorial waters, located within North America between Canada and Mexico. Also called CONUS. (JP 1-02)

Contingency Plan. A plan for major contingencies that can reasonably be anticipated in the principal geographic subareas of the command. (JP 1-02)

Contracted logistic support. Support in which maintenance operations for a particular military system are performed exclusively by contract support personnel. Also called CLS. (JP 1-02)

Contracting officer. A US military officer or civilian employee who has a valid appointment as a contracting officer under the provisions of the Federal Acquisition Regulation. The individual has the authority to enter into and administer contracts and determinations as well as findings about such contracts. Also called KO. (JP 1-02)

Control Point. 1. A position along a route of march at which men are stationed to give information and instructions for the regulation of supply or traffic. 2. A position marked by a buoy, boat, aircraft, electronic device, conspicuous terrain feature, or other identifiable object which is given a name or number and used as an aid to navigation or control of ships, boats, or aircraft. 3. In marking mosaics, a point locate by ground survey with which a corresponding point on a photograph is matched as a check. (JP 1-02)

Course of action. 1. Any sequence of activities that an individual or unit may follow. 2. A possible plan open to an individual or commander that would accomplish, or is related to the accomplishment of the mission. 3. The scheme adopted to accomplish a job or mission.

4. A line of conduct in an engagement. 5. A product of the Joint Operation Planning and Execution System concept development phase. Also called COA. (JP 1-02)

Decontamination. The process of making any person, object, or area safe by absorbing, destroying, neutralizing, making harmless, or removing chemical or biological agents, or by removing radioactive material clinging to or around it. (JP 1-02)

Deliberate Attack. A type of offensive action characterized by preplanned coordinated employment of firepower and maneuver to close with and destroy or capture the enemy. (JP 1-02)

Detection. 1. In tactical operations, the perception of an object of possible military interest but unconfirmed by recognition. 2. In surveillance, the determination and transmission by a surveillance system that an event has occurred. 3. In arms control, the first step in the process of ascertaining the occurrence of a violation of an arms control agreement. 4. In nuclear, biological, and chemical (NBC) environments, the act of locating NBC hazards by use of NBC detectors or monitoring and/or survey teams. (JP 1-02)

Direct action. Short-duration strikes and other small-scale offensive actions by special operations forces or special operations-capable units to seize, destroy, capture, recover, or inflict damage on designated personnel or materiel. In the conduct of these operations, special operations forces or special operations-capable units may employ raid, ambush, or direct assault tactics; emplace mines and other munitions; conduct standoff attacks by fire from air, ground, or maritime platforms; provide terminal guidance for precision-guided munitions; conduct independent sabotage; and conduct anti-ship operations. Also called DA. (JP 1-02)

Doctrine. Fundamental principles by which the military forces or elements thereof guide their actions in support of national objectives. It is authoritative but requires judgment in application. (JP 1-02)

Explosive ordnance disposal. The detection, identification, on-site evaluation, rendering safe, recovery, and final disposal of unexploded explosive ordnance. It may also include explosive ordnance which has become hazardous by damage or deterioration. Also called EOD. (JP 1-02)

Fire support. Fires that directly support land, maritime, amphibious, and special operation forces to engage enemy forces, combat formations, and facilities in pursuit of tactical and operational objectives. Also called FS. (JP 1-02)

Force health protection. All services performed, provided, or arranged by the Services to promote, improve, conserve, or restore the mental or physical well-being of personnel. These services include, but are not limited to, the management of health services resources, such as manpower, monies, and facilities; preventive and curative health measures; evacuation of the wounded, injured, or sick; selection of the medically fit and disposition of the medically unfit; blood management; medical supply, equipment, and maintenance thereof; combat stress control; and medical, dental, veterinary, laboratory, optometry, medical food, and medical intelligence services. Also called FHP. (JP 1-02)

Force protection. Actions taken to prevent or mitigate hostile actions against Department of Defense personnel (to include family members), resources, facilities, and critical information. These actions conserve the force's fighting potential so it can be applied at the decisive time and place and incorporate the coordinated and synchronized offensive and defensive measures to enable the effective employment of the joint force while degrading opportunities for the enemy. Force protection does not include actions to defeat the enemy or protect against accidents, weather, or disease. Also called FP. (JP 1-02)

Forward line of own troops. A line that indicates the most forward positions of friendly forces in any kind of military operation at a specific time. The forward line of own troops (FLOT) normally identifies the forward location of covering and screening forces. The FLOT may be at, beyond, or short of the forward edge of the battle area. An enemy FLOT indicates the forward-most position of hostile forces. Also called FLOT. (JP 1-02)

Health service support. All services performed, provided, or arranged by the Services to promote, improve, conserve, or restore the mental or physical well-being of personnel. These services include but are not limited to the management of health services resources, such as manpower, monies, and facilities; preventive and curative health measures; evacuation of the wounded, injured, or sick; selection of the medically fit and disposition of the medically unfit; blood management; medical supply, equipment, and maintenance thereof; combat stress control; and medical, dental, veterinary, laboratory, optometric, medical food, and medical intelligence services. Also called HSS. (JP 1-02)

High-value target. A target the enemy commander requires for the successful completion of the mission. The loss of high-value targets would be expected to seriously degrade important enemy functions throughout the friendly commander's area of interest. Also called HVT. (JP 1-02)

Host nation. A nation that receives the forces and/or supplies of allied nations, coalition partners, and/or NATO organizations to be located on, to operate in, or to transit through its territory. Also called HN. (JP 1-02)

Host-nation support. Civil and/or military assistance rendered by a nation to foreign forces within its territory during peacetime, crisis or emergencies, or war based on agreements mutually concluded between nations. Also called HNS. (JP 1-02)

Human intelligence. A category of intelligence derived from information collected and provided by human resources. Also called HUMINT. (JP 1-02)

Identification. 1. The process of determining the friendly or hostile character of an unknown detected contact. 2. In arms control, the process of determining which nation is responsible for the detected violations of any arms control measure. 3. In ground combat operations, discrimination between recognizable objects as being friendly or enemy, or the name that belongs to the object as a member of a class. Also called ID. (JP 1-02)

Individual protection. Actions taken by individuals to survive and continue the mission under nuclear, biological, and chemical conditions. (JP 1-02)

Individual protective equipment. In nuclear, biological, and chemical warfare, the personal clothing and equipment required to protect an individual from biological and chemical hazards and some nuclear effects. Also called IPE. (JP 1-02)

Industrial chemicals. Chemicals developed or manufactured for use in industrial operations or research by industry, government, or academia. These chemicals are not primarily manufactured for the specific purpose of producing human casualties or rendering equipment, facilities, or areas dangerous for human use. Hydrogen cyanide, cyanogen chloride, phosgene, and chloropicrin are industrial chemicals that also can be military chemical agents. (JP 1-02)

Information requirements. Those items of information regarding the enemy and his environment which need to be collected and processed in order to meet the intelligence requirements of a commander. Also called IR. (JP 1-02)

Intelligence. 1. The product resulting from the collection, processing, integration, analysis, evaluation, and interpretation of available information concerning foreign countries or areas. 2. Information and knowledge about an adversary obtained through observation, investigation, analysis, or understanding. (JP 1-02)

Intelligence preparation of the battlespace. An analytical methodology employed to reduce uncertainties concerning the enemy, environment, and terrain for all types of operations. Intelligence preparation of the battlespace builds an extensive database for each potential area in which a unit may be required to operate. The database is then analyzed in detail to determine the impact of the enemy, environment, and terrain on operations and presents it in graphic form. Intelligence preparation of the battlespace is a continuing process. Also called IPB. (JP 1-02)

Interoperability. 1. The ability of systems, units, or forces to provide services to and accept services from other systems, units, or forces and to use the services so exchanged to enable them to operate effectively together. 2. The condition achieved among communications-electronics systems or items of communications-electronics equipment when information or services can be exchanged directly and satisfactorily between them and/or their users. The degree of interoperability should be defined when referring to specific cases. (JP 1-02)

Joint force commander. A general term applied to a combatant commander, subunified commander, or joint task force commander authorized to exercise combatant command (command authority) or operational control over a joint force. Also called JFC. (JP 1-02)

Joint publication. A publication containing joint doctrine and/or joint tactics, techniques, and procedures that involves the employment of forces prepared under the cognizance of Joint Staff directorates and applicable to the Military Departments, combatant commands, and other authorized agencies. It is approved by the Chairman of the Joint Chiefs of Staff, in coordination with the combatant commands and Services. Also called JP. (JP 1-02)

Joint task force. A joint force that is constituted and so designated by the Secretary of Defense, a combatant commander, a subunified commander, or an existing joint task force commander. Also called JTF. (JP 1-02)

Logistics. The science of planning and carrying out the movement and maintenance of forces. In its most comprehensive sense, those aspects of military operations that deal with: a. design and development, acquisition, storage, movement, distribution, maintenance, evacuation, and disposition of material; b. movement, evacuation, and hospitalization of personnel; c. acquisition or construction, maintenance, operation, and disposition of facilities; and d. acquisition or furnishing of services. (JP 1-02)

Logistic support. Logistic support encompasses the logistic services, materiel, and transportation required to support the continental United States-based and worldwide deployed forces. (JP 1-02)

Main operations base. In special operations, a base established by a joint force special operations component commander or a subordinate special operations component commander in friendly territory to provide sustained command and control, administration, and logistical support to special operations activities in designated areas. Also called MOB. (JP 1-02)

Main supply route. The route or routes designated within an operational area upon which the bulk of traffic flows in support of military operations. Also called MSR. (JP 1-02)

Maritime environment. The oceans, seas, bays estuaries, islands, coastal areas, and the airspace above these, including the littorals. (JP 1-02)

Mission-oriented protective posture. A flexible system of protection against nuclear, biological, and chemical contamination. This posture requires personnel to wear only that protective clothing and equipment (mission-oriented protective posture gear) appropriate to the threat level, work rate imposed by the mission, temperature, and humidity. Also called MOPP. (JP 1-02)

Mission-oriented protective posture gear. Military term for individual protective equipment including suit, boots, gloves, mask with hood, first aid treatments, and decontamination kits issued to soldiers. Also called MOPP gear. (JP 1-02)

Monitoring. 1. The act of listening, carrying out surveillance on, and/or recording the emissions of one's own or allied forces for the purposes of maintaining and improving procedural standards and security, or for reference, as applicable. 2. The act of listening, carrying out surveillance on, and/or recording of enemy emissions for intelligence purposes. 3. The act of detecting the presence of radiation and the measurement thereof with radiation measuring instruments. (JP 1-02)

Movement to contact. A form of the offense designed to develop the situation and to establish or regain contact. (JP 1-02)

Named area of interest. The geographical area where information that will satisfy a specific information requirement can be collected. Named areas of interest are usually selected to capture indications of adversary courses of action, but also may be related to conditions of the battlespace. Also called NAI. (JP 1-02)

Nonbattle injury. A person who becomes a casualty due to circumstances not directly attributable to hostile action or terrorist activity. Also called NBI. (JP 1-02)

Nongovernmental organizations. Transitional organizations of private citizens that maintain a consultative status with the Economic and Social Council of the United Nations. Nongovernmental organizations may be professional associations, foundations, multinational businesses, or simply groups with a common interest in humanitarian assistance activities (development and relief). “Nongovernmental organizations” is a term normally used by non-United States organizations. Also called NGOs. (JP 1-02)

Nuclear, biological, and chemical defense. Defensive measures that enable friendly forces to survive, fight, and win against enemy use of nuclear, biological, or chemical (NBC) weapons and agents. United States forces apply NBC defensive measures before and during integrated warfare. In integrated warfare, opposing forces employ nonconventional weapons along with conventional weapons (NBC weapons are nonconventional). (JP 1-02)

Nuclear, biological, and chemical environment. Environments in which there is deliberate or accidental employment, or threat of employment, of nuclear, biological, or chemical weapons; deliberate or accidental attacks or contamination with toxic industrial materials, including toxic industrial chemicals; or deliberate or accidental attacks or contamination with radiological (radioactive) materials. (JP 1-02)

Objective. 1. The clearly defined, decisive, and attainable goals towards which every military operation should be directed. 2. The specific target of the action taken (for example, a definite terrain feature, the seizure or holding of which is essential to the commander’s plan, or, an enemy force or capability without regard to terrain features). (JP 1-02)

Obstacle. Any obstruction designed or employed to disrupt, fix, turn, or block the movement of an opposing force, and to impose additional losses in personnel, time, and equipment on the opposing force. Obstacles can be natural, manmade, or a combination of both. (JP 1-02)

Operational control. Command authority that may be exercised by commanders at any echelon at or below the level of combatant command. Operational control is inherent in combatant command (command authority) and may be delegated within the command. When forces are transferred between combatant commands, the command relationship the gaining commander will exercise (and the losing commander will relinquish) over these forces must be specified by the Secretary of Defense. Operational control is the authority to perform those functions of command over subordinate forces involving organizing and employing commands and forces, assigning tasks, designating objectives, and giving authoritative direction necessary to accomplish the mission. Operational control includes authoritative direction over all aspects of military operations and joint training necessary to accomplish missions assigned to the command. Operational control should be exercised through the commanders of subordinate organizations. Normally this authority is exercised through subordinate joint force commanders and Service and/or functional component commanders. Operational control normally provides full authority to organize commands and forces and to employ those forces as the commander in operational control considers necessary to accomplish assigned missions; it does not, in itself, include

authoritative direction for logistics or matters of administration, discipline, internal organization, or unit training. Also called OPCON. (JP 1-02)

Operation plan. Any plan, except for the Single Integrated Operational Plan, for the conduct of military operations. Plans are prepared by combatant commanders in response to requirements established by the Chairman of the Joint Chiefs of Staff and by commanders of subordinate commands in response to requirements tasked by the establishing unified commander. Operation plans are prepared in either a complete format (OPLAN) or as a concept plan (CONPLAN). The CONPLAN can be published with or without a time-phased force and deployment data (TPFDD) file. a. OPLAN—An operation plan for the conduct of joint operations that can be used as a basis for development of an operation order (OPORD). An OPLAN identifies the forces and supplies required to execute the combatant commander's strategic concept and a movement schedule of these resources to the theater of operations. The forces and supplies are identified in TPFDD files. OPLANs will include all phases of the tasked operation. The plan is prepared with the appropriate annexes, appendixes, and TPFDD files as described in the Joint Operation Planning and Execution System manuals containing planning policies, procedures, and formats. Also called OPLAN. b. CONPLAN—An operation plan in an abbreviated format that would require considerable expansion or alteration to convert it into an OPLAN or OPORD. A CONPLAN contains the combatant commander's strategic concept and those annexes and appendixes deemed necessary by the combatant commander to complete planning. Generally, detailed support requirements are not calculated and TPFDD files are not prepared. c. CONPLAN with TPFDD—A CONPLAN with TPFDD is the same as a CONPLAN except that it requires more detailed planning for phased deployment of forces. Also called CONPLAN. (JP 1-02)

Operations center. The facility or location on an installation, base, or facility used by the commander to command, control, and coordinate all crisis activities. (JP 1-02)

Operations security. A process of identifying critical information and subsequently analyzing friendly actions attendant to military operations and other activities to: a. identify those actions that can be observed by adversary intelligence systems; b. determine indicators that hostile intelligence systems might obtain that could be interpreted or pieced together to derive critical information in time to be useful to adversaries; and c. select and execute measures that eliminate or reduce to an acceptable level the vulnerabilities of friendly actions to adversary exploitation. Also called OPSEC. (JP 1-02)

Ordnance. Explosives, chemicals, pyrotechnics, and similar stores, e.g., bombs, guns and ammunition, flares, smoke, or napalm. (JP 1-02)

Persistency. In biological or chemical warfare, the characteristic of an agent which pertains to the duration of its effectiveness under determined conditions after its dispersal. (JP 1-02)

Port of debarkation. The geographic point at which cargo or personnel are discharged. This may be a seaport or aerial port of debarkation; for unit requirements; it may or may not coincide with the destination. Also called POD. (JP 1-02)

Port of embarkation. The geographic point in a routing scheme from which cargo or personnel depart. This may be a seaport or aerial port from which personnel and equipment flow to a port of debarkation; for unit and nonunit requirements, it may or may not coincide with the origin. Also called POE. (JP 1-02)

Preventive medicine. The anticipation, communication, prediction, identification, prevention, education, risk assessment, and control of communicable diseases, illnesses and exposure to endemic, occupational, and environmental threats. These threats include nonbattle injuries, combat stress responses, weapons of mass destruction, and other threats to the health and readiness of military personnel. Communicable diseases include anthropol-, vector-, food-, waste-, and waterborne diseases. Preventive medicine measures include field sanitation, medical surveillance, pest and vector control, disease risk assessment, environmental and occupational health surveillance, waste (human, hazardous, and medical) disposal, food safety inspection, and potable water surveillance. Also called PVNTMED. (JP 1-02)

Priority intelligence requirements. Those intelligence requirements for which a commander has an anticipated and stated priority in the task of planning and decision making. Also called PIRs. (JP 1-02)

Protection. 1. Measures that are taken to keep nuclear, biological, and chemical hazards from having an adverse effect on personnel, equipment, or critical assets and facilities. Protection consists of five groups of activities: hardening of positions, protecting personnel, assuming mission-oriented protective posture, using physical defense measures, and reacting to attack. 2. In space usage, active and passive defensive measures to ensure that United States and friendly space systems perform as designed by seeking to overcome an adversary's attempts to negate them and to minimize damage if negation is attempted. (JP 1-02)

Protective clothing. Clothing especially designed, fabricated, or treated to protect personnel against hazards caused by extreme changes in physical environment, dangerous working conditions, or enemy action. (JP 1-02)

Protective mask. A protective ensemble designed to protect the wearer's face and eyes and prevent the breathing of air contaminated with chemical and/or biological agents. (JP 1-02)

Reconnaissance. A mission undertaken to obtain, by visual observation or other detection methods, information about the activities and resources of an enemy or potential enemy, or to secure data concerning the meteorological, hydrographic, or geographic characteristics of a particular area. Also called RECON. (JP 1-02)

Risk assessment. The identification and assessment of hazards (first two steps of risk management process). (JP 1-02)

Search. 1. An operation to locate an enemy force known or believed to be at sea. 2. A systematic reconnaissance of a defined area, so that all parts of the area have passed within visibility. 3. To distribute gunfire over an area in depth by successive changes in gun elevation. (JP 1-02)

Security. 1. Measures taken by a military unit, activity, or installation to protect itself against all acts designed to, or which may, impair its effectiveness. 2. A condition that results from the establishment and maintenance of protective measures that ensure a state of inviolability from hostile acts or influences. 3. With respect to classified matter, the condition that prevents unauthorized persons from having access to official information that is safeguarded in the interests of national security. (JP 1-02)

Signal security. A generic term that includes both communications security and electronics security. (JP 1-02)

Signals intelligence. 1. A category of intelligence comprising either individually or in combination all communications intelligence, electronic intelligence, and foreign instrumentation signals intelligence, however transmitted. 2. Intelligence derived from communications, electronic, and foreign instrumentation signals. Also called SIGINT. (JP 1-02)

Situation report. A report giving the situation in the area of a reporting unit or formation. Also called SITREP. (JP 1-02)

Special operations forces. Those Active and Reserve Component forces of the Military Services designated by the Secretary of Defense and specifically organized, trained, and equipped to conduct and support special operations. Also called SOF. (JP 1-02)

Subordinate command. A command consisting of the commander and all those individuals, units, detachments, organizations, or installations that have been placed under the command by the authority establishing the subordinate command. (JP 1-02)

Suppression of enemy air defenses. That activity that neutralizes, destroys, or temporarily degrades surface-based enemy air defenses by destructive and/or disruptive means. Also called SEAD. (JP 1-02)

Surveillance. The systematic observation of aerospace, surface, or subsurface areas, places, persons, or things by visual, aural, electronic, photographic, or other means. (JP 1-02)

Survey. The directed effort to determine the location and the nature of a chemical, biological, and radiological hazard in an area. (JP 1-02)

Tactical control. Command authority over assigned or attached forces or commands, or military capability or forces made available for tasking, that is limited to the detailed direction and control of movements or maneuvers within the operational area necessary to accomplish missions or tasks assigned. Tactical control is inherent in operational control. Tactical control may be delegated to, and exercised at any level at or below the level of combatant command. Also called TACON. (JP 1-02)

Tactical operations center. A physical groupment of those elements of a general and special staff concerned with the current tactical operations and the tactical support thereof. Also called TOC. (JP 1-02)

Tactics. 1. The employment of units in combat. 2. The ordered arrangement and maneuver of units in relation to each other and/or to the enemy in order to use their full potentialities. (JP 1-02)

Terrorism. The calculated use of unlawful violence or threat of unlawful violence to inculcate fear; intended to coerce; or to intimidate governments or societies in the pursuit of goals that are generally political, religious or ideological. (JP 1-02)

Theater of operations. A subarea within a theater of war defined by the geographic combatant commander required to conduct or support specific combat operations. Different theaters of operations within the same theater of war will normally be geographically separate and focused on different enemy forces. Theaters of operations are usually of significant size, allowing for operations over extended periods of time. Also called TO. (JP 1-02)

Time-phased force and deployment data. The Joint Operation Planning and Execution System database portion of an operation plan; it contains time-phased force data, non-unit-related cargo and personnel data, and movement data for the operation plan, including the following: a. In-place units; b. Units to be deployed to support the operation plan with a priority indicating the desired sequence for their arrival at the port of debarkation; c. Routing of forces to be deployed; d. Movement data associated with deploying forces; e. Estimates of non-unit-related cargo and personnel movements to be conducted concurrently with the deployment of forces; and f. Estimate of transportation requirements that must be fulfilled by common-user lift resources as well as those requirements that can be fulfilled by assigned or attached transportation resources. Also called TPFDD. (JP 1-02)

Time-phased force and deployment list. Appendix 1 to Annex A of the operation plan. It identifies types and/or actual units required to support the operation plan and indicates origin and ports of debarkation or ocean area. It may also be generated as a computer listing from the time-phased force and deployment data. Also called TPFDL. (JP 1-02)

Unit movement data. A unit equipment and/or supply listing containing corresponding transportability data. Tailored unit movement data has been modified to reflect a specific movement requirement. Also called UMD. (JP 1-02)

Unit type code. A Joint Chiefs of Staff developed and assigned code, consisting of five characters that uniquely identify a “type unit.” Also called UTC. (JP 1-02)

Weapons of mass destruction. Weapons that are capable of a high order of destruction and/or of being used in such a manner as to destroy large numbers of people. Weapons of mass destruction can be high explosives or nuclear, biological, chemical, and radiological weapons, but exclude the means of transporting or propelling the weapon where such means is a separable and divisible part of the weapon. Also called WMD. (JP 1-02).

INDEX

A

Air Force I-11, II-2, II-3
Air Release H-6, H-25
Army I-11, I-13, II-13, D-3, G-2, G-5, H-2
Assessing I-5, I-7, I-10, III-3, V-5, V-11, V-12
Assessments I-5, I-9, II-3, II-7, V-2, V-5, A-3, A-4, D-9, E-7, E-10

B

Background I-1, I-2, I-4, I-6, I-11, II-1, II-2, III-1, III-4, III-12, III-13, III-15, III-21, IV-1, IV-2, IV-4, V-1, V-5, V-6, V-7, V-8, V-9, V-11, V-13, V-14, A-1, B-1, C-1, C-6, D-1, E-1, E-4, F-1, G-1, G-3, G-10, G-12, H-1, H-4, H-7, H-10, H-23, H-24, H-29, H-30, H-37, I-1, I-3, I-9, I-10, I-11, I-12, I-13, I-16, I-19, I-20, I-21, I-22, I-23, I-24, I-27
Background Sample I-2, III-21, IV-2, E-10, G-1, G-3, I-3
BIDS I-13, II-9, II-11, II-12, II-13, III-2, III-10, III-20, III-21, IV-2, V-1, V-3, V-4, V-10, V-13, C-3, C-4, C-5, C-6, D-7, E-5, E-17, E-18, E-20, E-22, G-1, G-4, G-5, H-1, H-3, H-6, H-17, I-1, I-2, I-3, I-4, I-6, I-7, I-8, I-9, I-10, I-11, I-12, I-13, I-14, I-15, I-16, I-17, I-18, I-19, I-20, I-21, I-22, I-23, I-24, I-26, I-27, I-28, I-29, I-31, I-32
Biological Agent Detection Capabilities C-6
Biological Collection C-1, E-1
Biological Detection Capabilities I-6, II-16

Biological Integrated Detection System
See BIDS

Biological Sample I-4, II-3, II-14, II-15, III-13, III-18, IV-1, G-4, G-7, G-11, I-18, I-20, I-22

Biological Sample Evacuation II-3, IV-1

Biological Sampling IV-1, C-6, C-7

Biological Sampling Kit II-10, II-15, V-4, C-8, C-9

Biological Surveillance I-1, I-2, I-3, I-5, I-8, I-9, I-11, I-12, II-1, II-2, II-3, II-5, II-7, II-11, II-13, II-16, III-1, III-2, III-3, III-4, III-5, III-6, III-7, III-8, III-9, III-10, III-11, III-12, III-13, III-14, III-15, III-16, III-17, III-18, III-19, III-20, III-21, V-1, V-2, V-3, V-4, V-8, V-10, V-15, E-1, E-2, E-3, E-4, E-6, E-7, E-9, E-10, E-15, E-16, E-17, E-18, E-20, H-1, H-5, H-10, H-18, H-20, H-23, H-25, H-32, H-38

Biological Surveillance Capabilities I-2, I-3, I-11, I-12, II-1, II-8

Biological Surveillance Concept I-1

Biological Surveillance Functions II-1

Biological Surveillance Planning III-1, III-5, III-6, III-7, III-8, III-9, III-10, III-11, III-12, III-13, III-14, III-15, III-16, III-17, III-18, III-19

Biological Surveillance Principles I-1, I-11

Biological Surveillance Responsibilities II-1, III-3

Biological Warfare Threat Triggers I-10

BW Attack Warning II-4, F-1

BW Sample Evacuation IV-1

C

Capabilities I-2, I-3, I-4, I-5, I-6, I-9, I-11, I-12, II-1, II-3, II-6, II-7, II-8, II-16, III-1, III-2, III-3, III-4, III-5, III-6, III-13, III-14, III-18, III-20, IV-2, V-5, A-3, B-1, B-2, B-6, C-1, C-4, C-5, C-6, C-7, D-1, D-2, D-5, D-6, D-8, E-5, E-8, E-9, E-12, E-23, E-24, E-25, E-26, H-1, H-2, H-4, H-11, H-18, H-20, H-23, H-29, I-3, I-9, I-16, I-32

Centralized I-7, III-21, V-4, D-7, D-10, D-11, E-2, F-1, F-3, F-4

Chain of Custody II-1, II-2, II-8, II-14, II-15, III-17, IV-1, IV-6, IV-7, G-1, G-2, G-4, G-5, G-6, G-7, G-8, G-11, G-12, H-23, H-38, I-3, I-4, I-5, I-7, I-17, I-18, I-19

Chain of Custody Document IV-7, G-4, G-9, G-11

CLS I-4, I-7, I-8, II-5, II-8, II-9, II-10, II-16, III-14, III-15, III-16, III-17, III-21, C-4, D-1, D-2, D-3, D-4, D-5, D-6, D-7, D-8, D-9, D-10, D-11, E-5, E-6, E-16, E-18, H-3, H-11, H-17, I-32

Commander's Information Requirements I-12

Common Limitation C-9

Communication I-3, I-7, II-8, II-9, II-10, II-13, III-14, III-19, IV-2, IV-3, V-2, V-11, V-15, A-2, C-1, C-2, C-6, C-8, D-2, D-5, D-7, D-10, E-21, E-23, E-24, G-1, G-2, G-3, H-11, H-17, H-19, H-22, H-23, H-24, H-25, H-32, H-37, I-3, I-31, I-32, I-33

Communications Architecture I-7, V-15, I-1, I-33

Completed Evacuation Package G-11, I-7, I-19

Concept of Operations I-5, III-3, E-1

Confidence Level I-2, V-7, V-8, V-9, V-11, V-13, V-14, B-2, E-12, F-5, I-13, I-15, I-23, I-26

Confirmatory Identification I-3, I-13, II-13, III-3, III-7, III-8, III-18, III-20, IV-4, IV-6, V-10, B-1, B-2, B-6, C-8, C-9, G-1, G-11

Constraints I-5, D-8, G-11

Contracted Logistic Support See CLS

Control I-1, I-2, I-5, I-7, I-8, I-12, I-13, II-2, II-7, III-8, III-11, III-12, III-14, V-5, A-2, A-4, C-1, C-6, C-9, D-3, D-9, D-10, E-4, E-25, H-2, H-4, H-11, H-20, H-22, H-32

Coordination II-7, II-15, III-5, III-17, IV-1, IV-2, IV-3, IV-4, V-1, V-11, A-3, A-4, D-2, D-3, D-10, D-11, E-19, E-20, E-27, F-3, G-1, G-2, G-3, G-11, H-5, H-6, H-10, H-12, H-17, H-19, H-20, H-22, H-23, H-24, I-32

Coverage of an APOD II-11, II-12

Criteria I-7, II-4, A-2, E-4, E-21, F-1, H-30, I-2, I-14

D

Data Analysis I-7, I-11, I-19, I-20

Decentralized III-21, D-11, E-2, F-3

Decentralized Warning I-7, F-1, F-3, F-4, F-5

Decisions I-2, I-5, I-7, I-10, I-13, II-13, II-16, III-7, III-12, III-19, IV-4, V-1, V-2, V-3, V-4, V-5, B-1, B-2, D-2, E-1, E-16, F-4, G-1

Definitive Identification I-2, I-3, I-12, I-13, IV-1, IV-3, IV-6, V-7, V-14, B-1, B-2, G-1, G-2, G-3

Detection Capabilities I-6, II-16, III-4,
III-13, C-1, C-6, E-8

DFU I-11, II-10, II-11, II-12, II-13, II-16,
III-9, III-10, III-18, V-9, V-10, C-6, C-
7, C-8, E-5, E-9, E-12, E-20, E-21, G-1,
G-5, G-6, G-8, G-9, G-11

Dry Filter Unit I-11, C-6

E

Employment I-2, I-3, I-5, I-7, I-8, II-1,
II-4, II-5, II-8, II-11, II-13, III-4, III-9,
III-10, III-20, III-21, V-11, V-12, B-2,
D-1, D-2, D-3, E-1, E-8, E-10, E-12, E-
13, E-14, E-15, E-19, E-20, H-4, H-5,
H-6, H-7, H-8, H-11, I-7, I-19

Employment Considerations D-3, E-5

Employment of Laboratories B-4

Employment Planning III-1, H-4

Employment Tactic II-13, III-20, E-6, E-
10, E-11, E-12, E-14, E-16, E-17, E-18,
E-20, E-21

Equipment I-2, I-12, II-2, II-5, III-2, V-2,
V-5, V-12, A-3, B-1, B-3, C-5, C-6, D-1,
D-3, D-5, D-6, D-7, D-8, D-9, D-10, E-
7, E-8, E-27, H-3, H-4, H-11, H-17, H-
19, H-20, H-21, H-24, H-38, H-39, I-3,
I-31

Evacuation I-11, II-2, II-3, II-5, II-7, II-
8, II-9, II-10, II-14, III-2, III-9, III-14,
III-18, III-21, IV-1, IV-2, IV-3, IV-4,
IV-7, V-1, V-10, C-7, C-8, C-9, D-10, G-
1, G-2, G-3, G-4, G-5, G-7, G-8, G-11,
G-12, H-11, H-38, I-2, I-3, I-4, I-7, I-
16, I-17, I-18

Evacuation Package IV-4, G-2, G-10, G-
11, I-6, I-7, I-18, I-19

Evacuation Plan I-3, II-3, II-5, II-14, III-
4, IV-2, IV-3, IV-4, G-2, G-3

Evacuation Planning IV-2, IV-3, G-1, G-
11

Event Tracking IV-4, V-7, V-11, V-13, V-
14, E-4, E-11, I-3, I-21, I-23, I-26, I-27,
I-28, I-29

F

Field Confirmatory Laboratory Support
IV-5

Field Laboratory Support B-1

Fixed Site I-8, I-9, I-11, II-8, II-10, II-11,
III-10, III-20, V-4, C-5, E-5, E-6, E-8,
E-9, E-12, E-14, E-22, F-4

G

Ground Release H-25, H-26

Guidelines V-15, A-3, G-11

H

HF Network I-33, I-34

I

Incident Report V-9, V-10, V-11, V-12,
C-8, F-3, G-6, G-11, H-1, H-23, H-37, I-
3, I-6, I-7, I-10, I-11, I-12, I-13, I-16, I-
20, I-22, I-23, I-26, I-27, I-28, I-29

Indoor C-9, E-24

Indoor Site Selection E-24

Information Collection V-5, V-13

Information Management III-4, V-1, I-1,
I-16, I-23

Integrated Biological Surveillance III-1

Integration II-7, III-20, V-1, C-5, D-2, D-
4, D-6, I-32

J

JBPDS I-11, II-1, II-9, II-11, II-12, II-13, II-16, III-10, III-20, III-21, V-8, V-10, V-13, V-14, C-5, C-6, D-7, E-5, E-6, E-12, E-16, E-17, E-20, G-11, I-16, I-17, I-18, I-19, I-20, I-21, I-22

Joint Biological Point Detection System
See JBPDS

Joint Portal Shield See JPS

JPS I-11, II-1, II-9, II-11, III-10, III-20, III-21, V-10, C-1, C-2, C-3, D-7, E-5, E-12

Joint Service Lightweight NBC
Reconnaissance System See
JSLNBCRS

JSLNBCRS II-10, II-11, III-10, V-4

L

Laboratory I-2, I-3, I-6, I-10, I-11, I-12, I-13, II-7, II-8, II-13, II-14, III-3, III-6, III-7, III-14, III-15, III-16, III-18, IV-1, IV-2, IV-3, IV-4, IV-5, IV-6, IV-7, V-1, V-5, V-6, V-8, V-10, V-12, V-13, V-15, A-1, B-1, B-2, B-4, B-6, C-6, C-9, C-10, E-6, E-21, G-1, G-2, G-3, G-4, G-7, G-11, G-12, I-3, I-4, I-5, I-6, I-17, I-18, I-32

Laboratory Response Network I-13, B-6

Land Force I-9, II-9, II-10, II-16, III-1, III-10, E-14, E-17, E-19

Limitations II-7, II-8, A-3, C-1, C-9, C-10, E-25, E-26

Logistics Requirements II-6, G-4, I-3, I-17

Logistic Support Team D-8

Long-Range Biological Standoff
Detection System See LRBSDS

LRBSDS II-10, II-11, III-2, III-9, V-4, C-5, C-6, D-7, H-1, H-2, H-3, H-4, H-5, H-6, H-7, H-8, H-10, H-11, H-12, H-13, H-14, H-15, H-16, H-17, H-18, H-19, H-20, H-21, H-23, H-24, H-25, H-26, H-27, H-28, H-29, H-30, H-31, H-32, H-33, H-34, H-35, H-36, H-37, H-38, H-39, I-13, I-28, I-31, I-32

LRN Structure B-6

M

Marine A-2, H-20

Maritime I-8, I-9, I-10, I-11, II-8, II-9, II-10, II-11, II-16, III-1, III-2, III-10, C-6, E-5, E-20

Medical Countermeasures I-1, A-1, A-3

Medical Intervention V-1, A-1, A-3

Medical Surveillance I-1, I-3, I-8, I-12, II-13, V-1, V-7, V-14

Mission Phases H-18

Mission Planning E-2, E-3, E-4, H-4, H-10, H-17, H-18, H-20

Mission Profiles H-10

MSE Network I-34

N

Navy I-11, I-13, II-13, A-2, G-2

O

Operational I-4, I-5, I-8, I-9, I-10, I-11, II-1, II-2, II-3, II-8, II-9, II-16, III-2, III-3, III-5, III-6, III-7, III-8, III-9, III-10, III-11, III-12, III-13, III-14, III-15, III-16, III-17, III-18, III-19, IV-4, V-1, V-2, V-4, V-8, V-11, A-4, C-2, C-4, C-6, D-1, D-2, D-5, D-10, E-5, E-7, E-10, E-17, E-19, E-20, F-3, G-5, H-1, H-2, H-6, H-7, H-18, H-19, H-21, H-25, H-31,

H-32, I-2, I-19, H-23, H-24, H-27, H-31, H-32

Operational Concepts I-3, I-5, I-8

Operational Considerations IV-3, G-2

Operational Level Assessments V-5

Operational Modes I-7, I-19

Organization III-5, III-6, III-12, A-3, D-2, D-5, D-9, E-27, G-4, H-2, H-3, I-31

P

Packaging III-9, III-18, IV-1, IV-5, C-7, C-9, G-1, G-3, G-4, G-8, G-9, G-10, G-11, I-4, I-6, I-17, I-18

Packaging Biological Samples G-7

Planning Considerations D-2, G-11, I-32

Planning Process II-16, III-3, III-12, IV-2, D-1, D-6, E-15, H-3, H-17

Point Detection I-11, III-9, C-1, C-5, I-16

Preplanned Product Improved I-1

Presumptive Identification I-3, I-13, II-2, II-9, II-10, IV-2, IV-4, IV-6, V-6, V-7, V-8, V-10, V-11, V-12, V-13, B-1, B-6, C-4, C-5, C-6, C-7, C-8, C-9, C-10, E-1, E-5, E-17, E-20, E-21, F-3, G-3, G-5, I-2, I-12, I-15, I-16, I-17

Protection I-2, I-3, I-5, I-7, I-9, II-3, II-4, II-15, III-1, III-2, III-13, III-19, III-20, V-5, V-8, V-11, A-1, A-3, B-1, E-21, E-23, E-24, E-25, F-1, F-3, G-1, G-8, I-2, I-18

R

Reporting I-1, I-3, I-7, I-9, I-10, I-11, I-12, II-1, II-2, II-13, II-14, III-2, III-4, III-6, III-8, III-18, III-19, III-21, IV-2, IV-3, IV-5, V-1, V-3, V-4, V-5, V-8, V-

10, V-11, V-12, C-1, C-3, C-4, C-5, C-6, C-7, C-8, C-9, F-1, F-3, F-4, H-16, H-19, H-20, H-23, H-25, H-36, I-1, I-2, I-3, I-10, I-12, I-13, I-14, I-16, I-17, I-20, I-22, I-23

Requirements I-2, I-4, I-9, I-10, I-12, II-3, II-6, II-7, II-8, II-16, III-1, III-2, III-5, III-10, III-16, IV-1, IV-2, IV-3, V-2, V-10, A-1, C-2, D-1, D-2, D-3, D-4, D-5, D-6, D-7, D-8, D-9, D-10, D-11, E-2, E-3, E-5, E-10, E-24, E-25, E-26, E-27, G-3, G-4, G-8, H-5, H-11, H-12, H-16, H-17, H-19, H-20, H-23, H-39, I-2, I-3, I-17, I-23, I-31

Restriction of Movement I-7, A-4

Results of Laboratory Analysis B-2

Risk Reduction Measures I-5, I-6, I-7, I-8, II-4, III-3, III-4, III-12

S

Sample Analysis I-12, I-13, IV-4, G-1, G-3

Sample Collection I-7, III-2, IV-5, IV-6, V-9, C-2, E-20, E-24, I-4, I-18, I-19

Sample Evacuation II-7, III-9, III-14, III-21, IV-1, IV-2, IV-3, IV-4, V-1, V-10, C-8, C-9, G-1, G-2, G-3, G-4, G-11, I-2, I-3, I-16, I-17

Sample Evacuation Execution IV-4

Sample Evacuation Package IV-4, G-2, G-4, G-11, I-19

Sample Evacuation Plan I-3, II-3, II-5, II-14, III-4, IV-2, IV-3, IV-4, G-2, G-3

Sample Evacuation Requirements IV-1

Sample Identification Number V-9, G-8, G-9, G-10, G-11, I-5, I-6, I-7, I-18, I-19

Shipping G-8

Site Selection I-9, E-21, E-22, E-23, E-24

Site Selection Criteria E-21

Strategic I-3, III-1, III-2, D-4, D-7

Strategic Planning III-2

Support Concept III-15, III-16, D-1, D-10

Supported Unit IV-2, IV-3, D-1, D-2, D-7, D-11, E-22, E-23, G-1, G-2, G-3, I-31, I-32

Supporting Documentation IV-3, G-10, I-18

Surveillance Operations II-13, II-16, III-1, III-3, III-5, III-6, III-8, III-9, III-12, III-13, III-15, III-17, E-1, E-4, E-6, E-7, H-3, H-18, H-25

System Capabilities I-3, I-4, C-4, E-9

System Functions I-1, I-2, I-16

System of Systems II-8, II-13

T

Tactical II-3, II-4, II-5, III-1, III-2, V-8, V-15, C-5, D-4, E-23, G-3, H-2, H-4, I-31

Tactical Planning III-2

Threat I-1, I-2, I-3, I-4, I-5, I-7, I-8, I-9, I-10, I-11, II-3, II-4, II-5, II-6, II-7, II-8, III-1, III-4, III-5, III-7, III-10, III-13, III-18, III-21, V-1, V-5, V-8, V-11, V-13, A-3, B-1, B-6, C-1, C-2, D-1, D-3, D-10, E-1, E-2, E-4, E-7, E-8, E-9, E-10, E-18, E-20, E-21, E-23, E-25, H-4, H-5, H-6, H-7, H-8, H-9, H-10, H-11, H-12, H-13, H-15, H-17, H-18, H-19, H-20, H-28, H-29, I-8, I-15, I-23, I-24

Types of Laboratories B-1

U

Unit Communication I-31, I-32

Unit Employment I-7, I-19

Unit Incident Reporting V-8

Unit Information Management I-1, I-23

V

Vaccine I-1, A-1, A-3

VHF Network I-34

W

Warning I-3, I-7, I-11, I-12, II-1, II-4, II-13, III-1, III-2, III-4, III-7, III-8, III-10, III-19, III-21, V-1, V-3, V-4, V-5, V-8, V-10, B-1, C-1, C-4, E-2, E-4, F-1, F-3, F-4, F-5, H-1, H-2, H-4, H-6, H-7, H-8, H-19, I-2, I-8, I-16, I-17, I-19, I-20, I-22, I-27

**FM 3-11.86
MCWP 3-37.1C
NTTP 3-11.31
AFTTP (I) 3-2.44
December 2003**

By Order of the Secretary of the Army:

Official:

**PETER J. SHOOMAKER
General, United States Army
Chief of Staff**

**JOEL B. HUDSON
Administration Assistant to the
Secretary of the Army
(NEED AUTHENTICATION NUMBER)**

DISTRIBUTION:

***Active Army, Army National Guard, and U.S. Army Reserve:* To be distributed in accordance with the initial distribution number xxxxx, requirements for FM 3-11.86**

By Order of the Secretary of the Air Force

**DAVID F. MACGHEE, JR.
MAJOR GENERAL, USAF
Commander
Headquarters Air Force Doctrine Center**

Air Force Distribution: F

Marine Corps PCN: XXXXXXXXXXXXXXX